State of Art Report on Variables Affecting Housing Value

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Abstract

Background/Objectives: Physical characteristics of real property are considered as the deciding factors of housing value. Value calculated on the basis of only property characteristics may not give accurate figure. This can be due to ignorance in considering variables which indirectly affect the value. **Methods/Statistical analysis**: Real property prices vary due to impact of not only property characteristics but also macroeconomic variables. Impact of macroeconomic variables is indirect and is difficult to assess in terms of quantum of variation in value of property. It is required to study available literature to summarize the probable attributes of real property value. **Findings:** Variables have been identified and presented in two categories namely intrinsic variables and extrinsic variables. **Applications/Improvements:** Wide range of variables from gross domestic product of nation to type of fixtures in the house affect property value. Appraisers should know which variables to be given consideration to get fairly accurate result.

Keywords: Extrinsic Variables, Housing Value, Intrinsic Variables, Property Valuation, Real Property

1. Introduction

Real properties have always observed high demand in developing cities as housing is one of the basic needs of humans. Property prices have been major criteria for buyers in purchase decision[1]. Like many other assets, housing prices are quite volatile relative to observable changes in fundamentals[2]. Housing prices have found to show variations based on various directly or indirectly related variables. The behavior of housing prices attracts considerable research attention as it is one of the most volatile sectors of the economy[3]. The variables that influence changes in housing prices are of interest to urban planners, developers, real estate professionals and financial executives as well as buyers and sellers[4]. Several studies have indicated that property price usually comprises of physical and economic characteristics, location, environment, and branding etc[5].

Property characteristics primarily affect the property value as they form the basis to assess the exact worth of the property. Macroeconomic variables affect the value of property in indirect sense. These and many more variables make it cumbersome to evaluate the exact value using conventional methods[6].

2. Nomenclature used for Study

Property characteristics have been broadly grouped under two categories and the nomenclature used is intrinsic and extrinsic variables. By basic definition, intrinsic means belonging to the essential nature or part of a thing whereas extrinsic is something originating from outside. Intrinsic variables in case of real estate are physical quantifiable parameters directly related to condition or state of property and are likely to depreciate with age or require

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maintenance for enhancement. External variables which affect the value of property but are not dependent on the condition of property have been identified as extrinsic variables. Value computed on the basis of intrinsic variables is intrinsic value and value computed on the basis of extrinsic variables is extrinsic value. Intrinsic value is the inherent worth of an item which depends on its own characteristics. Extrinsic value can also be defined as the segment of an item's worth that is assigned to it by external variables.

Intrinsic variables affecting real property value include area of the property, nature of workmanship; external and internal condition of property, construction specifications etc. Basically variables which define the present condition of property are identified as intrinsic variables. Extrinsic variables affecting real property value are variables of macroeconomic significance like gross domestic product, population growth, employment opportunities, other investment options like shares, bullion etc. These and many other variables affect the rate of land and construction cost eventually affecting the value of property at a given point of time. Both intrinsic and extrinsic variables affect the property value which is backed up by observation in the available literature.

3. Intrinsic Variables

Real property characteristics affect property value directly. Various researchers have used a different set of these variables for their analysis of value. Summary of the same has been shown in Table 1. Some studies considered property variables which include age, lot size per unit, total sale price, average square feet per unit, number of apartment units etc[7]. Some listed sale price, land area, floor area, number of bathrooms, age of house, partial or full basement, central air conditioning, fireplace, number of garages as the identified variables to find value of property[8]. A study used variables like total square feet, number of bedrooms, total acres, age of property (years), number of bathrooms, number of garages, number of fireplaces, sold in spring, sold in summer, sold in fall, number of days on the market, seller adjusted list price, seller granted concessions to forecast value of property[9]. In a study, location, reference urban proximity, number of levels, life in months, general rental units, surface salable, number of bedrooms, number of bathrooms, number of half bathrooms, number of parking space, elevator, valuation date, style of construction were considered as important variables affecting value of property[10]. A study was carried out for Madrid city and found that distance of the town, district or area from Madrid city centre, access road to the city of Madrid, size of the town, construction category, age of the building, state of repair, surface area, terrace, surroundings, interior, floor number, annexes are important variables affecting property value[11]. Sale price, year property sold, quarter of sale, land size (acres), year built, square footage in the basement, square footage on the floors, number of fireplaces, garage size, mean sales prices of all properties within the neighborhood, number of baths, presence of central air, lot type, construction type, wall type, basement type were used for comparing the property values generated by various nonconventional approaches[12]. The effect of urban rail on the market prices of residential properties, considering train proximity as both a source of improved access and a local disamenity was investigated[13]. The analysis indicated that about 50-100 meters wide area near train tracks absorbs about 13% of price decline. Beyond this zone, apartment prices were seen to rise to their peaks at approximately 100-150 meters from the train tracks, and then decline by an average of 0.7% for each additional 100-meter increase in the train line distance. The city level analysis of China, revealed that geographic, economic as well as regulatory variables are significant determinants of the variation in the observed price elasticity of real properties[14].

Researchers have considered surrounding neighbourhood[12,15--17] to have effect on property value. Location and economic status of the surroundings do add to property value[18]. Availability of access road for the property under consideration impacts the value in a positive way. No proper access to the premises or access road of lesser width affects value negatively[16,18]. Land formation on which the property has been built is also one of the variables that influence value. Site features like plain land, sloping land, hill base, hill top, crowded, ample space etc do affect value of property[16]. Also, built up area[12,15--20]), construction quality[15], age of building[15,18,20], condition of structure[16,17,19], internal specifications[15], view from property[16,17], availability of parking space[12,15,20] have been found to be effective features of property affecting property value. By using these variables, value of a real property can be computed by either cost approach or income approach which is applied to valuation of trademarks in a study[21].

Table 1. Summary of Intrinsic variables observed in literature

Sr. No.	Variable	Reference
1	Built up area	Lai Pi Ying (2011), Pagourtzi, E. et al. (2003), Kershaw, P. and Rossini, P. (1999), Rossini, P. (1998), Rossini, P. (2000), Zurada, J. et al. (2006), Limsombunchai (2004), Wiley J.A. and Wyman D. (2012), Bourassa, S. C. et al. (2010), Hamzaoui, Y. E. et al. (2011), Mora-Esperanza J. G. (2004), Samaha S. A. et al. (2008)
2	Age of building	Pagourtzi, E. et al. (2003), Lai Pi Ying (2011), Limsombunchai (2004), Wiley J. A. and Wyman D. (2012), Bourassa, S. C. et al. (2010), Mora-Esperanza, J. G. (2004), Samaha S. A. et al. (2008)
3	Condition of structure	Rossini (1998), Rossini (2000), Kershaw, P. and Rossini, P. (1999), Julio Gallego Mora-Esperanza (2004)
4	Surrounding neighbourhood	Mora-Esperanza, J. G. (2004); Pagourtzi, E. et al. (2003); Zurada, J. et al. (2006); Rossini, P. (1998); Rossini, P. (2000)
5	Location and economic status	Lai Pi Ying (2011), Hamzaoui, Y.P. et al. (2011)
6	Internal specifications	Pagourtzi, E. et al., Mora-Esperanza, J. G. (2004)
7	Construction quality	Pagourtzi, E. et al. (2003), Mora-Esperanza, J. G. (2004)
8	Availability of access road	Lai Pi Ying (2011), Rossini, P. (1998), Mora-Esperanza J. G. (2004)
9	Number of bedrooms	Wiley, J. A. and Wyman, D. (2009); Samaha, S. A. et al. (2008); Hamzaoui, Y. E. et al. (2011)
10	Number of bathrooms	Bourassa, S. C. et al. (2010); Samaha, S. A. et al. (2008); Hamzaoui, Y. E. et al. (2011); Zurada, J. et al. (2006)
11	Total Sale price	Wiley, J. A. and Wyman, D. (2009); Bourassa, S. C. et al. (2010)
12	View from property	Rossini, P. (1998), Rossini, P. (2000)
13	Availability of parking space/ Number of garages	Bourassa, S. C. et al. (2010); Samaha S. A. et al. (2008); Pagourtzi, E. et al; Zurada J. et al. (2006); Limsombunchai (2004); Hamzaoui, Y. E. et al. (2011)
14	Elevator	Hamzaoui, Y. E. et al. (2011)
15	Transport facility	Portnov B. A. et al. (2009)
16	Season/ quarter of sale	Samaha, S. A. et al. (2008); Hamzaoui, Y. E. et al. (2011); Zurada, J., et al. (2006)
17	Site features	Rossini, P. (1998)
18	Basement	Bourassa, S. C. et al. (2010); Zurada, J. et al. (2006)
19	Central air conditioning	Bourassa, S. C. et al. (2010); Zurada, J. et al. (2006)
20	Number of fire places	Bourassa, S. C. et al. (2010); Zurada, J. et al. (2006)

4. Extrinsic Variables

Research on the housing market has shown a significant connection with the economy and macro economy is believed to have a significant impact on real property rates. Some of the theoretical and empirical analyses for urban and housing economics include macroeconomic variables such as the inflation, the economic growth, GDP, the unemployment rate, etc[22]. These are termed as extrinsic variables in this study which are summarized in Table 2. At the city level, housing price is determined by economic fundamentals. Empirical studies start with supply and demand, and they use exogenous macro-economic variables, such as income, population, and construction cost, to explain housing price. Such factors are related to the supply and demand of the local housing market; thus, their impact on housing price is often estimated[23].

The causal relationship between money supply and real estate return was examined and found that money supply plays an important role in changes in real estate return[24]. Atheoretical argument was presented for a relationship between economic growth and urbanization processes, which in turn affect housing prices[25]. A study[26] found that money shocks have real effects on the housing market prices. Increase in money supply induced by rapid economic growth leads to strong investment demand in the Taiwanese housing market. Findings of astudy[3] suggested that the statistics of housing prices is primarily driven by investment demand. It is intuitive that real estate investment is related to the general economic activity and prosperity of a region or country[27]. Market variables such as % population of age 55 and older per metropolitan area, condo prices, per capita income, inventory of apartments, life expectancy, population, fair market rents, vacancy rates etc were considered in a study[7]. Another study[28] investigated whether variation in prices can be explained by changes in demand of fundamentals such as population, income growth and interest rates. It is found that there is causality relationship between sale volume and housing prices i.e. as the volume of sales increases, the demand increases and the housing prices observe a proportional rise[29]. A study[30] showed positive correlation of income, housing prices and housing transactions over the business cycle. Real housing price appreciation is strongly influenced by the growth of population and real changes in income, construction costs and interest rates[4]. The study also found that stock market appreciation imparts a strong current and lagged wealth effect on housing prices. The determinants of housing price in the United Kingdom were observed to be real disposable income, loan interest rates, and total loans[31]. Variables such as population shifts, employment, and income trends often have a unique impact on housing prices[32].

Housing market is very sensitive to shocks in the employment growth and mortgage rate at both national and regional levels[33]. The importance of a number of macroeconomic variables such as economic growth, growth rate in inflation and interest rates, bank lending, and equity prices affecting the dynamics of residential property prices was looked upon[34]. City level interactions of housing prices and economic fundamentals in China were investigated[35]. Examination of the long run relationship between macroeconomic variables like GDP, bank credit, equity prices, short term rate, CPI and exchange rate in a few Asiancountries[36], suggested that the driving

Table 2. Summary of Extrinsic variables

Sr. No.	Variable	Reference
1	Money supply	Darrat, A. F. and Glascock, J. L. (1989), Lastrapes, W. D. (2002)
2	Economic growth and urbanization	Tsatsaronis, K. and Zhu, H. (2004), Leung, C., (2004), Ball, M. (1994)
3	Population	Gerdesmeier D. et al., (2012), Clapp J. M. and Giaccotto C., (1994), Jud, G. D. and Winkler D. T. (2002), Wiley J. A. and Wyman D. (2012), Wheaton, W. C. and Nechayev, G., (2008)
4	GDP	Zhu, H. (2006), Leung, C., (2004)
5	Employment growth	Gerdesmeier D. et al., (2012), Baffoe-Bonnie, J., (1998), Clapp J. M. and Giaccotto C., (1994), Leung, C., (2004)
6	Per capita income	Gerdesmeier D. et al., (2012), Clapp J. M. and Giaccotto C., (1994), Nellis J. G. and Longbottom J. A. (1981), Jud, G. D. and Winkler D. T. (2002), François Ortalo-Magne et al. (2004), Wiley J. A. and Wyman D. (2012), Wheaton, W. C. and Nechayev, G., (2008)
7	Housing supply	Gerdesmeier D. et al., (2012), Wiley J. A. and Wyman D. (2012)
8	Mortgage rate	Baffoe-Bonnie, J., (1998)
9	Interest rate	Tsatsaronis, K. and Zhu, H. (2004), Nellis J. G. and Longbottom J. A. (1981), Jud, G. D. and Winkler D. T. (2002), Wheaton, W. C. and Nechayev, G., (2008)
10	Bank credit	Zhu, H. (2006)
11	Investment demand	Chen M. C. et al., (2012), Lieser K. and Groh A. P.,(2013)
12	Prosperity of region	Lieser K. and Groh A. P.,(2013)
13	Stock market appreciation	Jud, G. D. and Winkler D. T. (2002)
14	Sale volume	Shi, S. et al. (2010)

variables behind house prices tend to be country-specific. House price development are significantly explained by the user cost rate, a demographic variable like working population or labour force which affects the house prices positively, the unemployment rate, disposable income per capita with a positive coefficient, the debt-to-income ratio

and the housing stock or the housing stock per capita[37].

In the real estate market, bubbles occur when property values increase rapidly and reach levels that are unsustainable[38] and boom bust cycles affect the property rates dynamically. The bubbles in housing prices start when the appreciation of house prices becomes irrational and does not depend on economic fundamental variables[39]. The bubbles in housing market are also described as an unusually sharp rise in the asset price at the extraordinary high levels from the market fundamentals[40]. It is an increase in the purchase of houses for capital gain purposes and the excitement of buyers in purchasing a house regardless of the price and their financial condition. A housing bubble occurs when a house is defined as an investment and not as a house to occupy. Other indicators of bubbles include the amount of housing stock available in the market. A bubble exists when people start to purchase an asset based on expectation of future price increase. Other signs of a bubble booming in the housing market are liberalized loan conditions, low interest rates, overpriced properties and positive expectations for the future[41]. Bursting of housing bubbles leads to disruptions in real economy and financial sector reducing economic output and the emergence of banking crisis. Boom-bust cycles are an intrinsic feature of real estate markets[42].

5. Conclusion

Valuation of real property is a vast area and research in the same has shown that many variables affect property value. These variables are representatives of economy of the nation. Study of not only the property characteristics but overall impact of economic variables helps to derive the exact value of a property at a particular time in the economic cycle. The study has grouped variables in two categories namely intrinsic and extrinsic. Intrinsic variables are related to property characteristics while extrinsic variables are external factors those affect the value of the property.

Real property is an area of interest for every human being as it provides the basic necessity i.e. housing. Determination of the exact value of housing involves a lot of variables to be studied. Demand and supply condition in a prevailing market determines the probable range of value at which the property can be sold, purchased or rented. Demand and supply in turn are driven by population of the region, GDP of nation, available finances,

interest rates and many more macroeconomic factors. Investment decisions can be made with due attention to the future rates of properties. Study of extrinsic variables enables to make an optimum decision. With the ever increasing prices of land and properties thereon, everyone wishes to get a good deal with lesser investment. This can be achieved by due consideration to property characteristics where based on the characteristics, bargaining of rates can be done. An older property of same structure, details and location would fetch lesser value than a similar newer property. Identifying such deals is a task which needs study of both intrinsic as well as extrinsic variables. These can be studied further to develop mathematical relation between variables and value of property.

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