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Investigation of Dynamic Cultural factors affecting Housing demand in Iran urban areas

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ABSTRACT

Settlement is one of the most basic human needs and its quality has a direct effect on quality of life. These questions are posed in the research given the importance of housing sector in the society: firstly, housing demand depends on to which factors of the cultural aspect? Secondly, how is the dynamics governing the relationships between cultural variables affecting housing demand? The main objective of the research is also to discover the dynamics of behavior governing housing demand and the cultural factors affecting it. Methodology of this paper is based on statistical methods and based on modeling proposed in system's dynamics. The provided model is simulated based on the data collected from Statistical Center of Iran during the years 2001 to 2011. The simulation results indicate that demand and price have a sinusoidal behavior with phase delay.
Keywords: *housing, simulation, systematic dynamics*

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INTRODUCTION

Settlement is one of the most basic human needs and its quality has a direct effect on quality of life. The aim of settlement is not only providing shelter for residence but also includes all the issues related to site selection, house shape, the way of acting incumbency, neighborhood relations, and so on [1].

Housing that is a physical location and shelter, is one of the basic needs of households. It is considered the most important human need after food and clothing. It includes all the necessary services and facilities required for the well-being and health of individuals [6]. Additionally, housing is a basic commodity that has no substitute and yet is immovable and bound to the place. From the perspective of the macro economy, the housing sector is considered one of the stimulant motors of economy due to the late and former so much communication with other sectors of the economy [2].

Housing has a vital role in the economy for the following reasons. First, it is both consumer goods and capital, and its capital aspect helps to increase wealth. Second, landlords dispose their neighborhood more than the tenants, participate in crime prevention more than the tenants, and more help to build public needs of the neighborhood. In total, they are better residents r their neighborhood. Therefore, the promotion of investment in buying homes increases the social capital and also improves the quality of a society [3].

Another importance of the housing sector is that the investment in the housing sector has a fundamental role in the growth of other economy's sectors. This sector can act as a growth motor and development pole in economy because of its high need to other sectors of the economy. The increase of final demand in the housing sector creates demand for other sectors' data [4]. Backward linkages of housing sector have rating of 25 among 91 sectors of economy. It has allocated rating of 48 in terms of forward linkages to itself [5]. Private residential units constitute amounting to 75 to 90 percent of households' wealth. Investment in housing includes 15 to 35 percent of the total investments of housing in the world. Also,

employment in the housing sector has allocated 9 percent of total global employment to itself [6]. In total, housing has features that distinguish it from other sectors. These features can be noted as follows [7]:
- Housing is as essential commodity and one of the fundamental needs of human.
- Housing constitutes the most important household expenditure for the most families.
- It is a durable commodity and has a spatial stability.
- It is a capital commodity with long lifetime.
- It is a heterogeneous commodity with many components.

Housing is one of the most important issues that humans have been always grappling with it and trying to fix this problem and finding a proper and reasonable answer for it [8]. The housing problem is an issue that today has involved somehow all the countries in accordance with their conditions. This is while housing is a dimension of social welfare in developed countries, and housing development programs are focused on qualitative improvement. Housing has been considered a primary need in our country and supplying it has been considered aligned with supplying food and clothing [9].

One of the basic needs of each person and family is housing according to forty-third principle of constitution. Housing commensurate with need is the right of every Iranian individual and family according to thirty-first principle of constitution. Dezrwaily believes that housing is the most important suppliers of civilization and the most important preserver of social culture of the society. In a way that improvement of housing and urban services' status leads to increase of social stability, improvement of environmental conditions, and general improvement of quality of life and motivation of participating in society.

The role of housing is also important in the countries' economy. Almost a quarter of the national wealth in a country like America is in the form of rural and urban residential units [11]. Poverty of housing lowers individual ability for education and promotion of the skills. In fact, inappropriate housing is turned into a spatial trap. The spatial trap of housing is produced in two forms of internal quality and external quality. The purpose of external quality is the geographic location of housing. In Iran, housing being located in the peripheral areas of the cities or some worn out and poverty stricken neighborhoods within cities is like as falling into the spatial trap. The purpose of internal quality is housing with inappropriate building materials and equipment and inadequate infrastructure level that causes spatial trap [12].

Social indicators are the most suitable tool among the indicators of housing to measure progress and realization of the general goals of housing. This is so that all individual and collective levels can be evaluated by use of these indicators. On the other hand, in an ideal situation, social indicators of housing must be expanded and developed in a way that to be commensurate with the economic indicators, national income, government budget, residents' resources, the cost of programs and many other indicators that are necessary to decide on this issue.

Humans need an appropriate housing to protect the honor of family and to determine their familial framework. This is because man is a social creature, and one of his basic needs, the formation of family institution, is as the most important and the most fundamental social formation [13].

Lack of housing has a close and direct relationship with the increase of amount of delinquency, divorce, and social disruptions. It is considered as a deterrent factor in social, cultural and psychological growth and promotion. Also, the lack of housing creates abnormal social phenomena including street-sleeping, carton-sleeping, spontaneous settlement, slums, and acute problems such as begging. Each of these phenomena leads to specific psychological and personality damages.

Inappropriate housing is an effective factor in the emergence of depression and behavioral and personality disorders, as well as reduction of the individual's resistance against the problems. A person who fails to have an appropriate and dependent housing because of economic problems is in crisis. This crisis puts the personality structure of the individual at risk of serious damage, and increases the rate of raucousness and crime in the society. Research by sociologists and urban geographers show that the urban low-income people living in poverty-stricken areas and inappropriate housing are usually subjected to psychological damages more than other citizens [14].

The need for housing has to quantitative and qualitative dimensions. Quantitative dimension of the need for housing relates to the lack of shelter and the amount of access to housing. Issues and phenomena are posed in qualitative dimension, which relate to homelessness, bad-housing and small-housing. In other words, the degree of responsiveness to the need, regardless of its quality is considered in quantitative dimension. But the type and shape of need are posed in qualitative dimension.

The housing market is a complex system that several factors including the urban population, supply constraints in the market, economic environment, and financial policies as well as social and cultural factors have an effect on it.

These questions are posed in the research given the importance of housing sector in the society: firstly, housing demand depends on to which factors from the cultural aspect? Secondly, how is the dynamics governing the relationships between cultural variables affecting housing demand? The main objective of the research is also to discover the dynamics of behavior governing housing demand and the cultural factors affecting it.

Methodology of this paper is based on statistical methods and based on modeling proposed in system's dynamics. The provided model is simulated based on the data collected from Iran Statistical Center during the years 2001 to 2011.

In the following, methodology of the paper is fully introduced after reviewing the subject literature and introducing theoretical principles of the discussion. Then, it is tried to determine the answers of research questions in the results analysis section. Finally, the sum up and provision of recommendations will be also noted for the future researches.

Theoretical principles of subject:

System is a complex of elements and/or factors that constitute a unit system by internal mutual relation and correlation to establish specified conditions and situation [7]. Systemic thinking means to observe phenomena with an integrated view. The system performance based on this thinking depends on the quality of interaction between its components rather than the quality of their independent performance [8] [7]. In fact, system is a collection that is not equal to the sum of its components, and for this reason it should be considered as a whole.

System dynamics methodology that was introduced to the scientific community for the first time by Forrester is study method and management of complex feedback systems, such as systems in the field of business and other social systems. Each dynamic system that is changed over time has a quadratic hierarchical structure. Such a structure can be provided for each type of evolution and dynamics in various phenomena. This quadratic hierarchical structure includes closed range, feedback loops, variables of level or mode, and variables of rate.

The focus in the problem solving method of dynamic systems is on the feedback processes. From the general view, feedback structures are the reason of changes in experience over time. The logical assumption is that the dynamic behaviors are derived from systemic structure. Feedback refers to the situation where A has an effect on B and then B also affects A. However, this effectiveness may be done through a chain of cause and effect. Studying whole system as a feedback system will lead to correct the results.

The advantage of dynamic systems' approach towards other systemic viewpoints is that it leads to mathematical modeling and simulation. This is while systemic thinking itself only creates a mental model. In fact, the correctness of modeler mentality and therefore the model can be examined through simulation.

System dynamics model system is a representation of the real world system in order to study the system behavior under different experimental conditions [9]. In general it can be said that any study of system dynamics has three essential stages:

- The conceptual stage in which the backgrounds and signs of the problem must be explained, the purpose of modeling to be determined, the closed range of system to be identified, and image of the system structure to be provided by the feedback circles.
- Amount stage in which the framework of conceptual real model is closed to its real shape and solved with the help of software.
- Analysis and evaluation of results stage during which the results are analyzed and it is tried with a greater awareness of the problem to solve again the new problems that have occurred by returning to the beginning of the chain.

System Dynamics is based on this philosophy that a system behavior is principally derived from its structure. The behavior of dynamic systems or what the dynamic system exhibit over time can be placed in the general category of goal-directed or non-goal-directed [7]. The purpose of modeling of a system is to receive a deep insight from its performances by obtaining multiple feedbacks in various stages of modeling. System dynamics model uses three communicational methods means words, graphic, and mathematics with logical order of using them means from inaccurate to accurate. Causal diagrams are used to better understand the systems' structure. The pattern of system behavior is known by this diagram and its feedback loops. The reason for the name of causal being referred to this method is that the effect of a component of the system is examined in the causal diagram assuming that other components of the system to be remained constant. Thus, only the communicational structure is drawn between components in causal diagram. Causal diagram is used to better understand the system

structure, not to display the system behavior. Causal diagram can shows the mental model and the system feedbacks, but the inability to show dynamic structure of the system is its limitation. The presence of dynamics in systems means the presence of the saver elements; in other words, variables of mode and rate in phenomena cause the dynamics of the system. In addition to variables of mode and rate, system's internal feedbacks play an important role in system dynamics. Diagrams of a dynamic system flow can be modeled with the help of cause and effect diagrams. Unlike cause and effect diagram that has the ability to display feedbacks, flow diagrams can also display variables that change over time [9].

Two types of variables are required in order to be able to explain a feedback circle. The first type variable is called variable of level. This variable must continuously show the system's level or mode. The second type variable is called variable of rate. This variable should be able to express any increase or decrease or any kind or change in level or mode [7].

METHODOLOGY

The present research methodology is statistically, and case study with modeling approach and systemic analysis of the demand created for housing based on cultural factors including life expectancy, new households and marriage and divorce rate, as well as unmarried life rate, migration rate, working female-headed households and such parameters.

We considered Iran's housing market as the studied area and the main source of gathering information in this research. We collected the information required for solving our model from the data presented in Statistical Center of Iran during the years 2001 to 2011, and through the official site of this center.

We used modeling and methods of dynamic systems for systemic study. The way of communication and interaction of housing demand with the intended cultural factors were firstly identified to create the model of dynamic system problem. It is tried to draw causal diagram in an understandable and clear form with their help. The model flow diagram was drawn by using the system causal diagram. The simulated model and its long-term behavior were examined with the help of Vensim3 software. The purpose of simulation is to investigate the behavior of system variables over time.

Housing market cycle includes investment, construction, transactions, and several economic factors. But the important point is that any research has not been done conducted in the field of effect of cultural factors on housing demand.

System Dynamics methodology was chosen to evaluate the relationships between factors; because it was able to consider the mutual and simultaneous effects of these factors and the circles created in the model.

We considered six main variables of housing demand, life expectancy, new households, migration rate, women working in the society, and the number of family's children in this research to create the model. The main parameters of the model were defined as follows:

- Life expectancy: is a statistical indicator that shows how much is the average lifetime in a society. In other words, how many years each member of that society can expect for lifetime. Whatever the health indicators as well as therapeutic indicators improve, life expectancy will increase. Hence this indicator is one of the indicators of measuring the advance and backwardness of countries. Women's Life expectancy is a few years (four and a half years in the whole world) more than men in all societies. Life expectancy in Iran is 72. 6 years for women, 69.4 years for men, and 71 years in total. This is 5.5 percent higher than the global average. This puts Iran in the rating of 109 among 195 countries. However, the average age of dead people in Tehran in 2009 has reduced to 49 years and four months. This parameter as a variable
- New households: In fact, this parameter shows the number of newly formed households that are added to the total existing households. This parameter is affected by the number of marriage and divorce.
- Migration rate: the purpose of migration is a form of geographical mobility or local leaving that takes place between two geographical units. This geographical mobility is the change of residence from the origin or place of movement to destination or place of entry. Such migrations are called permanent migration. The purpose of migration in this article is permanent migration out of the intended country or entering the country.
- Unmarried life: means a type life without official marriage.
- Working women: means the number of women without head who are responsible for providing life.

Firstly, we determined the type of relationships between the variables with the help of reference diagrams as well as the contents mentioned in the subject literature. Then, we modeled the relationships by providing causal diagrams. Finally we investigated the system behavior over time by providing inventory flow diagrams and by using Vensim software.

RESULTS AND DISCUSSION

Firstly, it was tried to identify the relationships existing among several variables by using reference diagrams. The other relationships were also determined based on the models specified in the subject literature. The time series diagrams of number of licenses registered in the country, the economic participation rate of the population, marriage and divorce registered in the country have been compared in Figure (1).
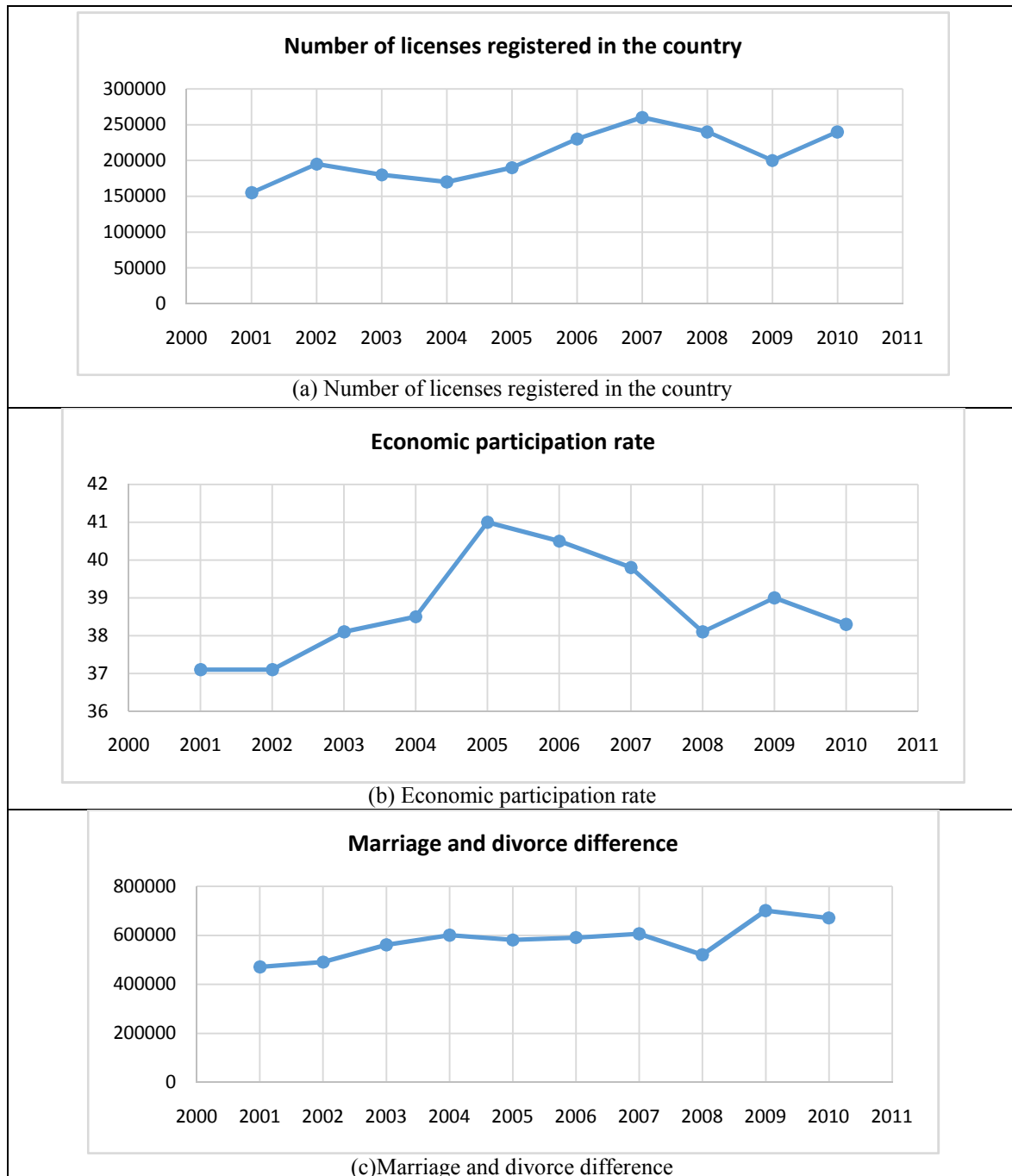

(a) Number of licenses registered in the country

(b) Economic participation rate

(c)Marriage and divorce difference

Figure 1: Comparison of reference diagrams

An interesting point is understandable according to Figure (1). This point is that the process of economic participations as well as the licenses issued in the country has been almost with same behavior over these years. This means that the effect of economic participation on the licenses registered in the country is almost a positive or same-direction effect.

Meanwhile, the two variables of marriage rate and divorce rate have positive and same-direction effect on each other in Figure (1) by comparing the number of marriages and divorces in the country. Also, the number of issued licenses has been with almost ascending and similar trend by increase of family formation rate in the country during 2004 and 2005.

Causal diagram was made after investigating the subject literature and by investigating available reference diagrams. The causal diagram has been shown in Figure (1). The following variables have been investigated in this diagram. Each variable has been considered as rate or level based on the studied subject:

- Life expectancy: we considered this parameter as an exogenous variable and considered its effect as positive effect on the population. In fact, it is assumed that the increase of life expectancy increases urban population.
- Urban population: This parameter is a variable of level that actually represents the number of people in a city.
- Mortality rate: This parameter is a variable of rate and will be displayed as the mortality rate. In fact, the increase of this rate reduces the population.

Diagram 1: Causal diagram of socio-cultural factors affecting the housing market
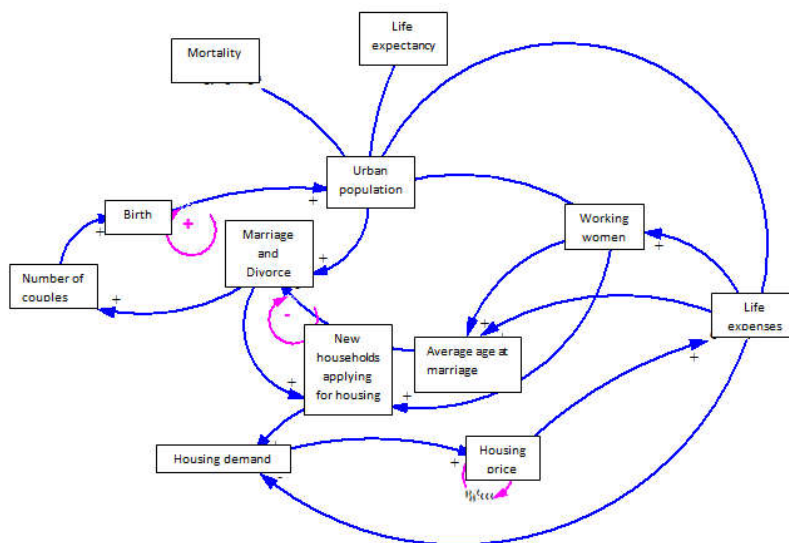

- Birth rate: This parameter is a variable of rate and will be displayed as the birth rate. In fact, the increase of this rate will increase the population.
- Marriage and divorce rate: In fact, this variable shows the number of marriages registered in each period. It is actually a variable of rate. Its increase enhances the number of couples in a society and in fact will increase the production rate.
- Number of couples in society: This is a variable of level. It has a positive effect on the number of births.
- Working Women: This variable shows the number of women working in a society. In fact, it shows the employment rate of women. Whatever the number of working women of society become more, the age of marriage will go higher.
- New households applying for housing: This is a variable of level. In fact, it increases the total number of housing applicants.
- Housing price: In fact, this variable is the price of per square meter of a residential unit. Its increase indirectly reduces the demand, because it increases the household expenses. It is a variable of rate. This is because it displays the rate of increase or decrease in price over month.
- Life expenses: this variable represents the amount of costs of an individual over a month and is a variable level.

Also, the modeled system has several negative loops and a positive loop according to the above causal diagram. Therefore, it can be predicted that the system behavior to be goal-directed and does not display exponential and uncontrolled behavior due to the negative loops.

Inventory flow diagram can be provided by determining the problem variables and by identifying the causal diagram. The system behavior can be simulated with the help of Vensim software. Inventory flow diagram of the intended can be seen in Figure (2):

Diagram 2: Inventory flow diagram
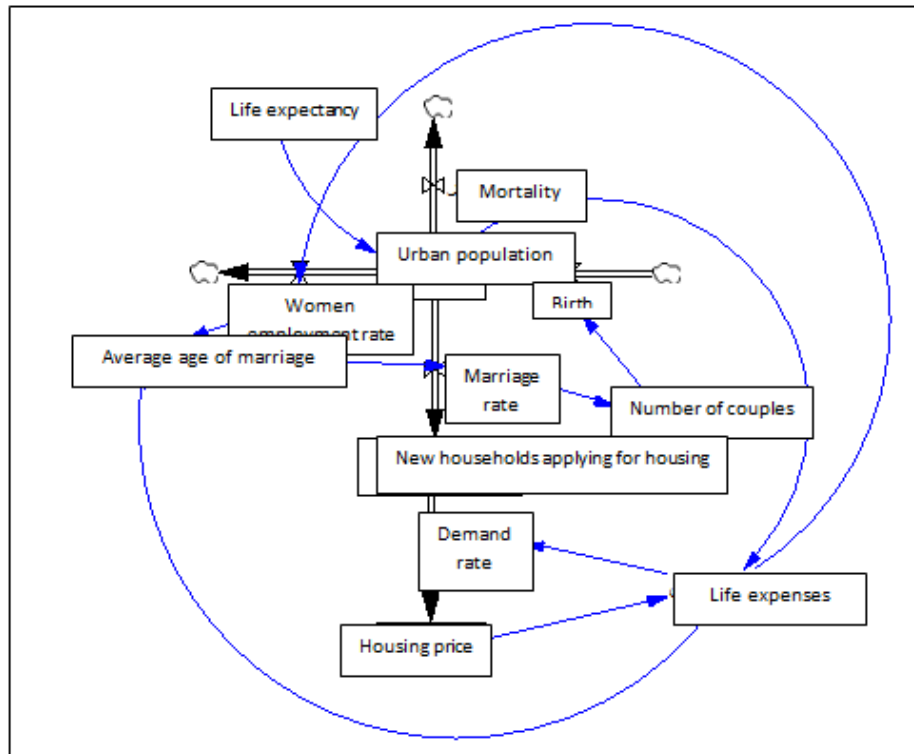
Now we will investigate the system behavior and its basic variables over time by simulating the above model. We simulated the above model based on 100 periods. In addition, we assumed that the urban population had been initially 500 thousand people. We considered birth rate only two children based on per family. We also considered 70 years for life expectancy. The purpose of simulation was to investigate the behavior of main variables of the system in long-term, such as price, demand, population and the average age of marriage.

Accordingly, you see the price behavior over time in Diagram (3). Price shows a sinusoidal behavior that its general trend is ascending according to this. In fact, this diagram shows that the ascending and descending price of housing is in sinusoidal form during some periods. However, the prices' trend will be as ascending and increasing over the years.

Diagram 3: Price behavior over time
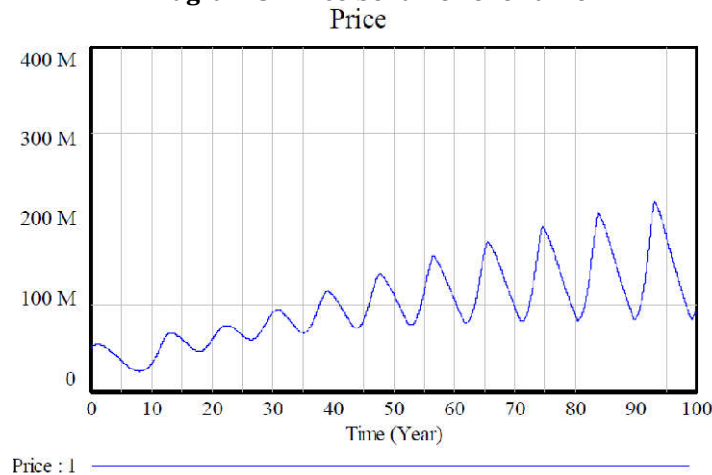
You also see the behavior of the three other main variables of the system means demand, urban population, and average age of marriage in diagram (4). This diagram also represents the sinusoidal behavior of demand. The more interesting point is that the increase of prices usually represents a delay comparing to the increase of demand. Also, population has increasing trend. Marriage age also increases over time.

Diagram 4: Behavior of main variables of system over time
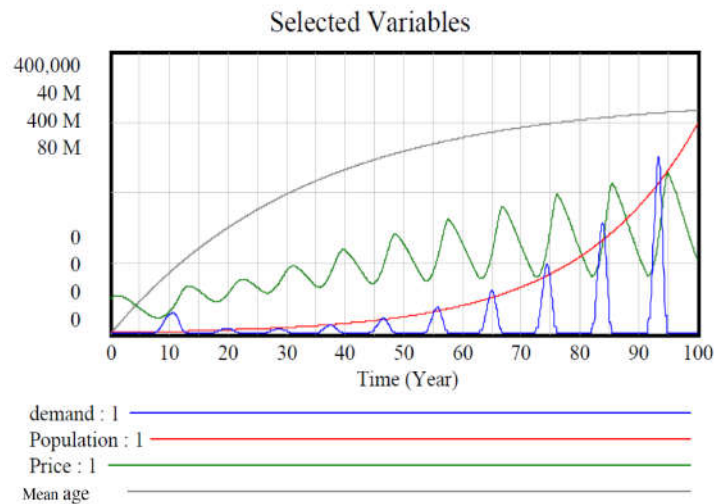
CONCLUSION

It was tried in this research to investigate the housing market system from the aspect of social issues like marriage and divorce rate, average age of marriage, women's employment and such issues. Firstly, causal model was drawn during the research by investigating the reference diagrams, as well as the subject literature and models provided in the papers. Then the system behavior over time was investigated by providing the inventory flow diagram of the simulated model and based on the conducted simulation. Accordingly, the behavior of price over time, as well as demand over time is sinusoidal. Price always has a delay compared to the demand.

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