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Prediction of prices in housing market with the correlation-regression methods

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In the present paper, the positive dynamics in activity in the construction sector and real estate market is analyzed and is noted that it is required to increase the amount of provided realtor services and the improvement of quality to consumers. We should note that the analyzes of the paper allow one to assess productive characteristics and closeness of relationships between various factors (the price per 1 m² of residential real estate in the primary and secondary markets). Unfortunately, in the Republic of Azerbaijan offering the formation of such a mechanism is impossible. İn the real estate market often we meet inexperienced brokers and sometimes buying and selling operations are accompanied by the risks and losses, including speculative transactions. Of course, in our country, there is a need to establish a system that has been adapted to the characteristics of the local market and similar to the above-mentioned system. It should be noted that the level of real estate services market and its development, the characteristics of the national economy and improving its structure reflects the level of development. It is no coincidence that in the context of the realities of real estate market in many of developed countries the formation of a market economy and the deepening of economic relations are reviewed as important factors stimulating the development of other sectors of the national economy. Azerbaijan's real estate market would be advisable to use more advanced methods to study the experience of foreign countries in this field and it would be very useful to take serious steps to benefit from it.

Key words: realtor services; real estate market; realtor institutions of USA; escrow companies; the role of banks; seller and buyer relations; the primary and secondary market

Introduction

Realtor services market as a whole is considered the main part of real estate market and the economy of Azerbaijan. Therefore, any changes in real estate market, primarily due to changes in real estate market. The development of real estate services market is defined by a number of factors:
- The development of residential real estate market;
- Pace of residential construction and commissioning;
- The payment capacity of supply and demand in real estate market;
- The dynamics of prices of real estate objects.

Let's try to look through these factors in detail. The development trends of real estate services viewpoint of commissioning of apartments and in terms of its value indicators has been analyzed on the basis of statistical data of Azerbaijan (2015 edition) and given in the Table 1.

As it seen from the table's data, the amount of newly opened flats (total area of m² ×10³.) and the number of apartments in comparison with 2008, respectively decreased to 18.6 percent and to 21.0 percent in 2009, it means from 1845 m² ×10³, 17100 units dropped to 1501 m² 13500 units. Since 2010, in those figures began significant improvement and in 2013, reached to its peak (reached to 2403 m² ×10³ and 21100 units), while in 2014, this figure was a bit weaker again.

Table 1. The commissioning of residential real estate market of Azerbaijan and development trends of real estate services in terms of its value indicators

Years	Y1	Y2	X1	X2	X3	X4	X5
2005	502	737	80	8553,1	1593	16,1	15700
2006	577	795	100	8666,1	1583	16,5	13900
2007	718	1211	141	8779,9	1616	16,8	14700
2008	716	1445	198	8897,0	1845	17,2	17100
2009	686	1145	213	8997,6	1501	17,6	13500
2010	637	1079	239	9111,1	2049	17,7	17600
2011	621	1040	282	9235,1	2033	17,7	16100
2012	674	1140	315	9356,5	2147	17,8	19900
2013	899	1183	423	9477,1	2403	17,8	21100
2014	981	1303	444	9593,0	2197	17,8	17400

Y1 - 1 m^2 in the primary market, the price of residential real estate, in manat; Y2 - 1 m^2 in the secondary market, the price of residential real estate, in manat; X1 - the average monthly income per capita, in manat; X2 – the population calculated on January, 1 (people $\times 10^{3)}$; X3 - the number of new flats (total area, $m^2 \times 10^3$); X4 - an average of resident's area per person (m^2, by the end of the year); X5 - the number of new apartments.

The analysis shows that in the prices of residential real estate in the primary market or 1 m^2. in the secondary market have been decreased during the period of 2008-2012, while in 2013-2014, this figure has significantly increased. Thus, if the primary market during the period of 2008-2011, the prices of residential real estate down from 716 manat to 621 manat per 1 m^2, which have been increased since 2012, and in 2014, the cost of residential area increased by 1.6 times in comparison with 2011 and totaled 981 manat per 1 m^2 If during the period of 2008-2011, in the secondary market 1 m^2 of residential real estate prices dropped in 1040 manat from 1445 manat, it has been increasing since 2012, and in 2014, the price of residential area per 1 m increased by 25.3 percent compared to 2011, and reached to 1303 manats (Fig. 1).
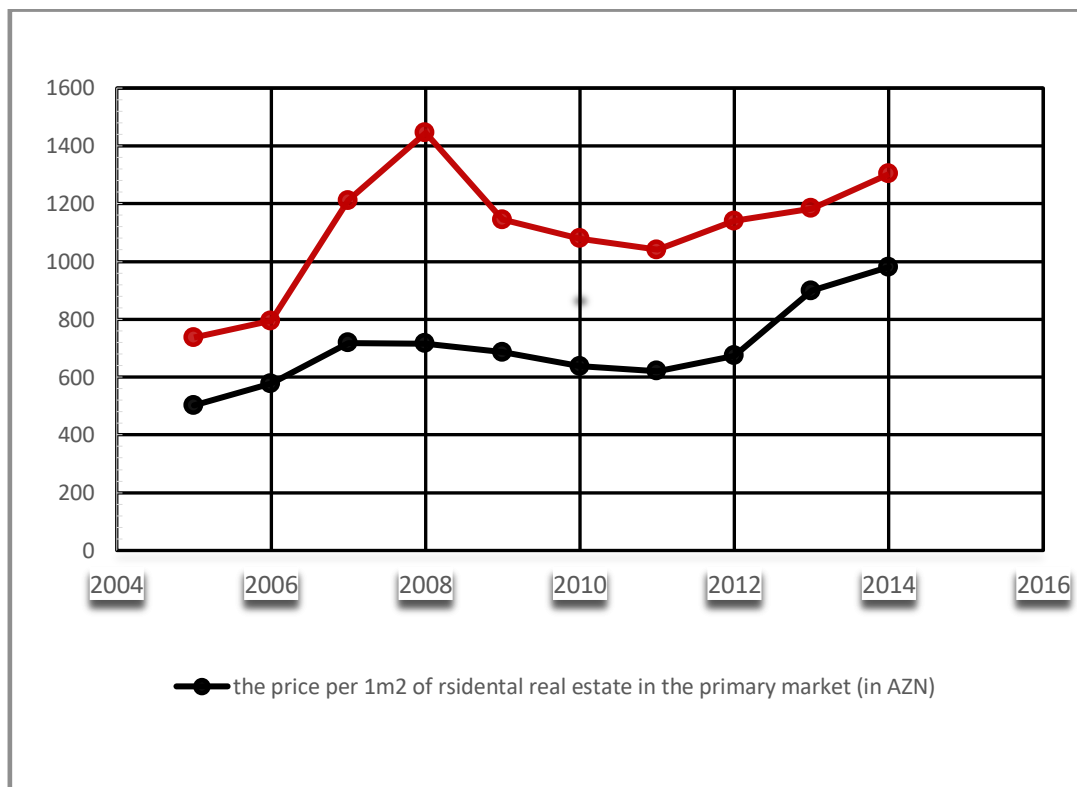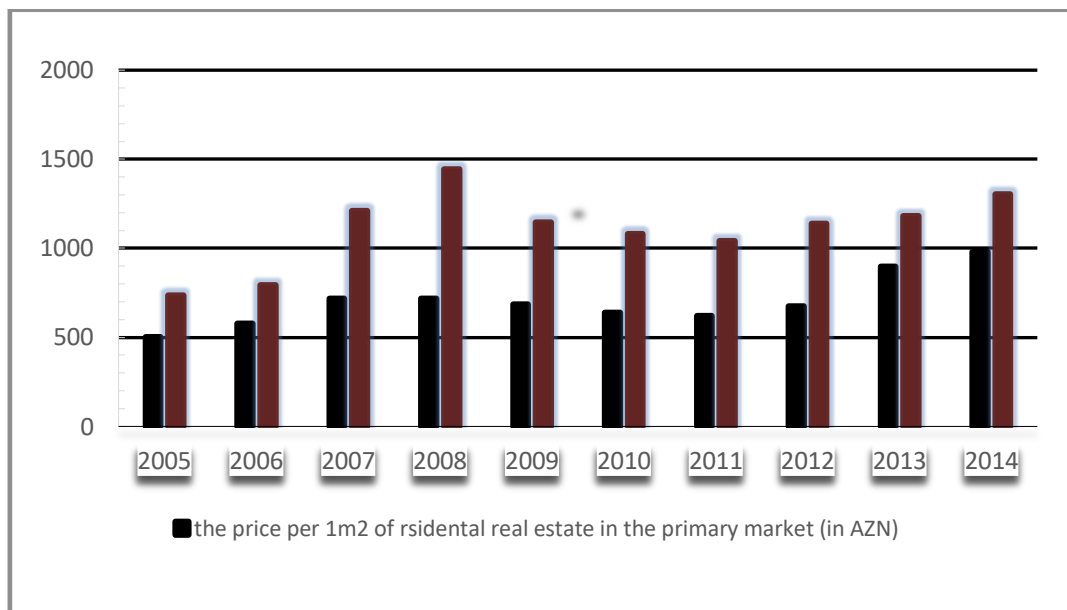

Fig. 1. In the primary and secondary housing markets the rate of change of dynamics of real estate prices, in manat. In the primary market the price of residential real estate per 1 m^2, manat; in the secondary market the price of residential real estate per 1 m^2, in manat.

Price rising due to high levels of insufficient supply and demand in the primary and secondary housing markets. The basis of these cases are the followings: on one hand, increasing the level of income of population, the development of mortgage lending, the lack of a clear housing policy. In the result of those factors the level of demand increased than the level of supply and has led to increase the total price in housing market.

If we compare the dynamics of prices in the primary and secondary housing markets, we can see that the price trends are separated from each other, thus ready apartments decreased more rapidly than the apartments under the construction. This is because the builder needs to recoup their costs from the material. If in 2009, the prices in primary housing market dropped

in amounted to 4.2 percent, it was 20.8 percent in the secondary housing market (Fig. 2).

Therefore, the positive dynamics in activity in the construction sector and real estate market is required increase the amount of provided realtor services and the improvement of quality to consumers. Realtor services market contains a complex system for studying. The use of tools of correlation-regression analysis allows you to simulate the processes occurring in the real estate market.

Fig. 2. In the primary and secondary housing markets the comparison of pace of change of average price per 1 m^2 of residential areas, in manat (figure legends as in Fig. 1)

In realtor services market demand and supply of real estate objects form under the influence by the needs of the population and economy, and determines with a number of factors: population, its growth rate, the volumes of existing housing market and non-residential areas, levels of income and spending of population, rates of economic growth, cost of real estate service, the volume of new apartments, the price of 1 m^2, and etc. factors. Under the influence of these factors formed different subjects: state, households, socio-economic relations between the financial and intermediary organizations. Directly supply and demand of the real estate market, the number of deals, the realtor companies that depend on price and situation play important role in formation of these relationships.

Immovability of real estate determines its dependence on regional factors. Therefore, in the basis of researches of real estate market and realtor service's market stands city's economic potential that means the basis of local market. Concretely, during the analysis of local markets would be advisable to apply the analysis of population and property complexes close to the cities, including application of systematic and comparative approach.

The study of correlation in the analyzes of presented scientific work allow to assess productive characteristics and closeness of relationships between various factors (the price per 1 m^2 of residential real estate in the primary and secondary markets). The application of regression analysis allows one to make the equation reflecting the correlation relationship between the results of some factors.

The terms of correlation analysis are understood as the analysis of dependence of random variables of random arguments, and the regression analysis, is considered the analysis of random variables dependence on non-random arguments. Correlation analysis is applied under the certain conditions:

1.   Y and X random variables (in multivariate case, X1, X2, ... Xp) is an example of two-dimensional large sets of selection (multi-dimensional) by the law of normal distribution;

2.   The individual observations are independent stochastic;

3.   Y f (X), the analytical expression of approximation of experimental curve, (in multidimensional case, X1, X2, ... Xp), should be line in comparison with its parameters;

4.   The dispersion of Y random quantity stays on permanently when changes X quantity.

The terms of application of regression analysis, considers the absoluteness of implementation of 2 - 4 items of correlation analysis. It is closely related to the analysis of correlation. But regression analysis suggests less stringent requirements for the initial information. During the correlation analysis followed the next conditions: the existence of quantitative of necessary observation about the values of result's indicators and researched factors have quantitative dimension and reflected on information (the statistical indicators of Azerbaijan, 2014) resources. With the purpose of determination and correlation indicators, in the primary and secondary markets (according to the Y1 and Y2), between the special price indicators of 1 m^2 of residential real estate, including using the method of regression analysis carried out the assessment of the connection between dependent variability (according to Y1 and Y2), and random variables. After selecting a model by an author determined the forecast cost in the primary and secondary market until 2019, per 1 m^2 in the residential real estate.

Table 2. The forecast price of residential real estate per 1 m² in the real estate market.

| Years	Y1	Y2
2005	502,00	737,00
2006	577,00	795,00
2007	718,00	1211,00
2008	716,00	1445,00
2009	686,00	1145,00
2010	637,00	1079,00
2011	621,00	1040,00
2012	674,00	1140,00
2013	899,00	1183,00
2014	981,00	1303,00
2015	900,86	1313,23
2016	937,29	1350,65
2017	937,72	1388,07
2018	1010,15	1425,49
2019	1046,58	1462,91

Real estate index and analyzes of current position of real estate market in Europe

Another important issue is that there should regularly carried out the investigations of real positions of real estate market and the necessity of using from the international experience in this sphere. The index by "Deloitte" company is very interesting and their directions are followings: the current position of real estate in Europe; intensity of construction of real estate; the amount of fund of real estate; private and rented apartments; flats volume (number of rooms); the cost of maintaining the apartment; comparison of the cost of housing in the European cities and countries; the average price of contracts to be signed for the new buildings in countries; the average price of contracts to be signed for the new buildings in cities; opportunities of the apartment acquisition. The collection, published in 2016, is reflected in the analysis of information associated with the current situation in the housing market in the 19 countries of Western and Eastern Europe. As a result of investigation of the real estate market in different European countries and cities revealed that prices of real estate vary greatly differences in European countries and cities. The most expensive real estate in London is (18.1 ×10³ euros per 1 m²), Paris (10.7. ×10³ euros per 1 m²), Tel Aviv (7 ×10³ euros per 1 m²) cities, the cheapest real estate is in Hungary, in Debrecen (997 euro per 1 m²), Yekaterinburg (1007 euros per 1 m²) cities.
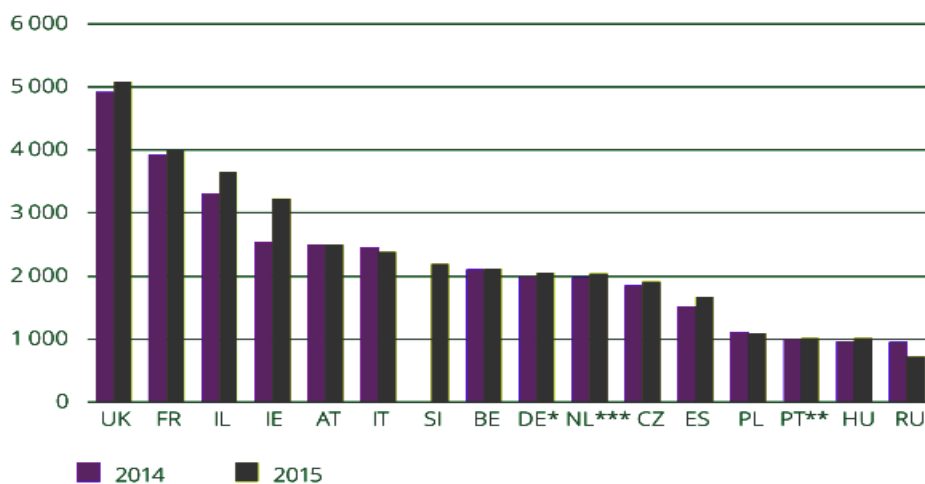
Fig. 3. Professional participants of realtor market. Source: National Statistical Authorities, Euro monitor International, calculated by Deloitte, Property Index.

Accordingly pay attention to the current situation, in the primary real estate market in European countries would be advisable and in European countries, in 2015, in average 2.8 the new flat fall per 1000 population.
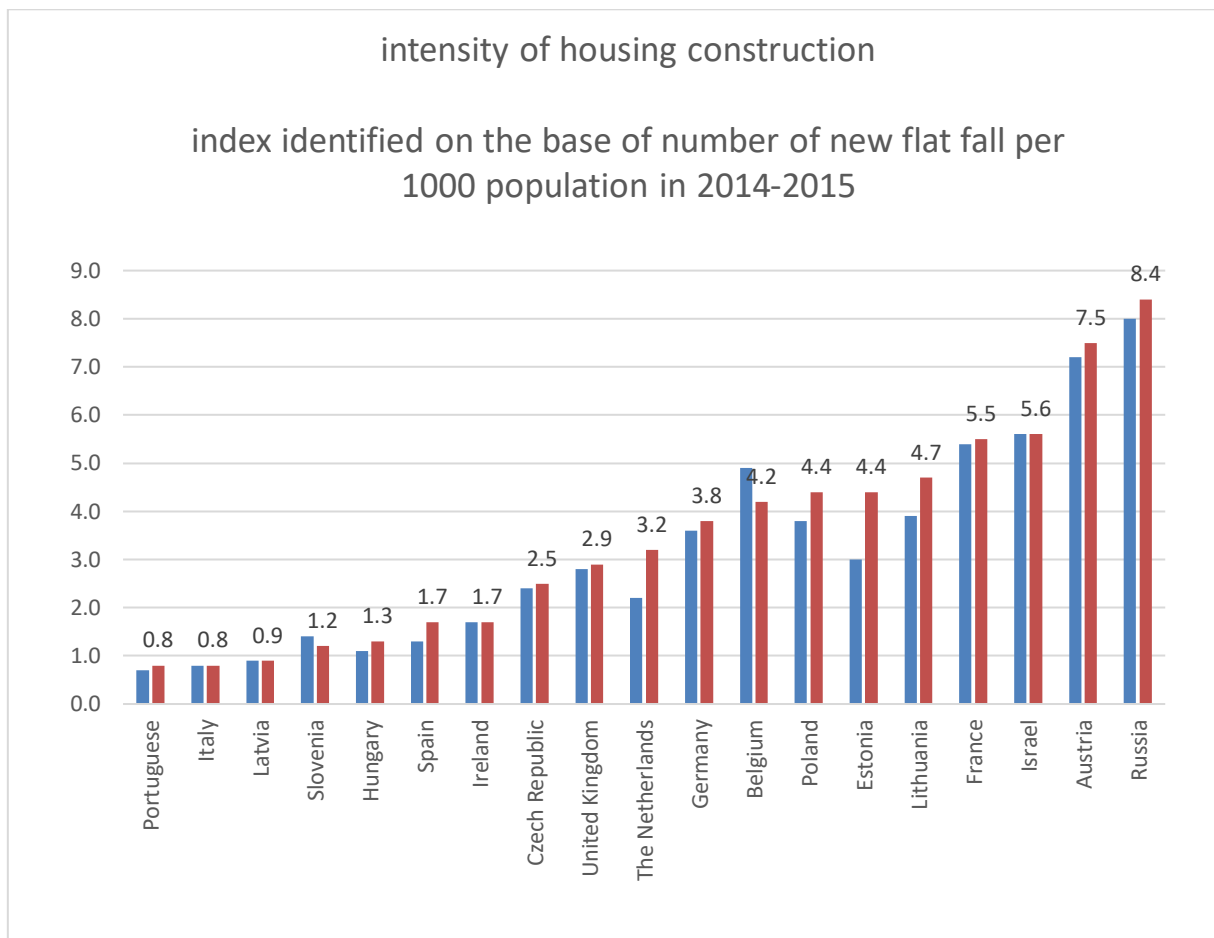
Fig. 4. Index of the intensity of housing construction in the structure of world countries (calculated based on the number of apartments per 1,000, 2014-2015). Source: National Statistical Authorities, Euro monitor International, calculated by Deloitte, Property Index (intensity of construction of real estate; index identified on the base of number of new flat fall per 1000 population in 2014-2015).

In 2015, more new housing in the Russian Federation (7.6 apartments per 1,000 persons) were built. As the leading countries in Europe, can be shown Austria (6.2 apartments per 1,000 persons), France (5.5 apartments per 1,000 persons). At the same time, the high level of average of European indicators has been observed, in Poland (3.8. Apartment), Slovenia, Germany, Estonia, Lithuania, the Netherlands, Belgium. The weakest indicators observed in Portugal (0.7 apartment), Italy, and Hungary (0.8. apartment).

Analysis shows that the real estate prices sharply differ from one another in European countries. Because with the same amount of money can be found big living area in European countries, and in other countries can be found quite small living area. İn European countries, there are many factors, which affect the value of real estate. But, among them economic situation and demographic changes play a huge role.

İnvestigation the role of foreign experience formation and development of realtor services market in the Republic of Azerbaijan. In order to clarify the issue is required pay more attention to some of nuances that used for the structure. First of all, we could consider what structural elements have in the modern realtor market. The structure of realtor services market - related demand and supply, including subjects and factors of creative elements, activity, which oriented to the solving a number of issues in the real estate market is analyzed. The traditional elements of the market - may be provided services, prices, location and incentives, as well as in relations real estate sale-purchase-rentals between the parties. However, it should be noted that to the structure of the modern real estate market has entered a new element and factors. Here is talking about the inclusion of new elements and factors to the traditional structure.

Accordingly, we can consider the following structures:

- All attracted sides mean the participants of realtor services market. Realizing the sale of services, customers, as well as future customers included to this category;

- Physical factors are considered affecting the relationship between customer and vendor buying and selling. The production of services and demand are included to the technical conditions.

- Realtor services or procedures and activities, including the process of submission of proposals, above-mentioned elements of

economic sectors had an impact in the realtor market and ultimately led to new professions. For example, the real estate agents, experts for evaluation the real estate conditions and etc.

İn the subjects of realtor market can be considered a seller (real property lessor), buyer (lessee), professional participants of the market.

It should be noted that the mass of professional participants is considered key contributor of real estate market. Professional participants are divided into institutional and non-institutional participants.

Professional participants of real estate market are.

Table 3. Professional participants of realtor market (Electronic...., 2012)

İnstitutional:	Non-institutional
technical inventory bureau	private realtor
Bureau of urban architecture	brokers
design offices	appraisers
notarial	financiers
construction organizations	lawyers
developer organizations	engineers
registering property rights institutions	
insurance agencies	

As seen in the picture, real estate services market reflects the process of the establishment of complex, dynamic and ever-shifting structure, as well as specific forms of property relations between different subjects All of these increase the importance of use of regulatory functions and role of the state. Because they can monitor the real estate services of the state and the foreign experience should be addressed specifically. Sometimes paying attention to the organizations of the realtor institutions of USA would be advisable.

For the first time, on May 13, 1908, the National Association of Real Estate Exchanges was founded in Chicago, USA. This organization was called as The National Association of Real Estate Boards in 1916 and as The National Association of Realtors since 1974. According to the information of 2008 years, there were 1.2 million realtors in the membership of Association. In 1913, was adopted "ethics code" America's first legal document regulating relations between realtors and their clients. Although made many amendments to the document until the modern era, however, this document is believed to be the main document of realtors that identify ethical behavior. "Ethics code" sets out the standards of behavior in this area of business, the main provision to faithfully serve the interests of other realtors and customers, determined the boundaries of relations with other realtors, there was not any acceptable action would harm relations between their clients.

At the present-day, the realtor business is regulated by the legislation adopted by the Chapter 696 of the Real Estate and Escrow Operations in 2009, but at the same time the changes in the law are carried out in accordance with the requirements of the services market on a regular basis. According to the laws of the United States in every two years, for improving the level of realtor training must be presented the certificate to the relevant authorities. For this, the realtors should pass minimum 4 times and 20-hour of training course (the hours of preparation vary according to states). The first course devotes to the changes in legislations of the state on realtor market. Other courses can be devoted to different aspects of the realtor activity. But in most cases, realtors can choose courses according to their interests. For improving professional development created NAR association with the system of private realtor's titles and rates.

Operation participants related to real estate in the US are followings: Buyer; the buyer's agent; Bank of the seller of real estate; the seller's agent; merchant bank; Escrow companies (lawyers are intermediaries between buyers and sellers, and coordinate the transactions). Described above model of relationship between real estate market participants reflected in Fig. 5.
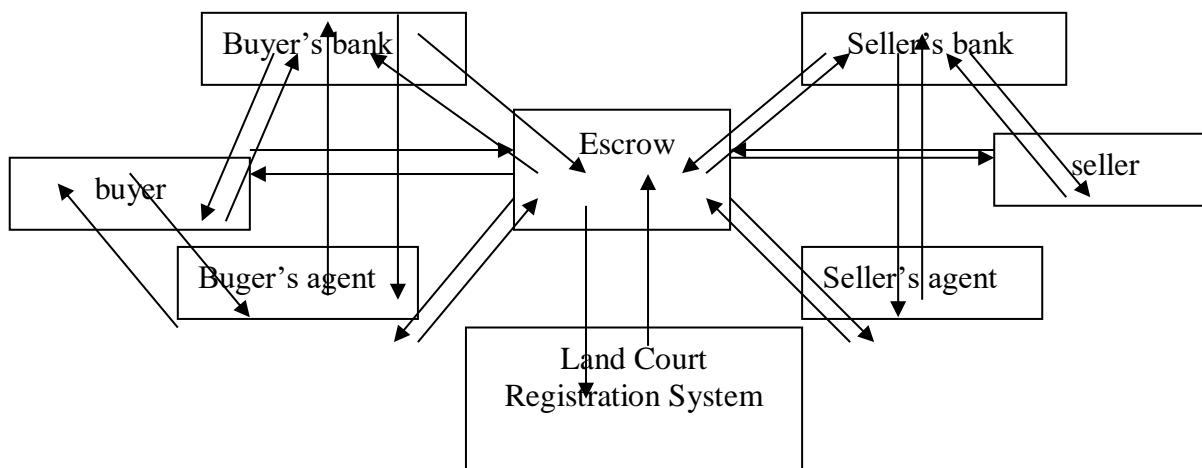
Fig. 5. American model of real estate purchase and sale in the sample of Hawaii. Source: Dafner, 2012.

In above picture, has shown the purchase and sale of real estate on diagram. The buyers can search the purchase of real estate themselves; also have opportunities to apply the real estate services. In most cases, the buyer is using the services of realtors, because realtors are familiar with contracts (offers), market, and transaction processes. It should be noted that the buyer connects with the agent, bank and escrow companies, but never make direct contacts with the sellers. Buyer after conclusion the contracts sends some amount of money to escrow company. The total amount of balance the buyer sends to the escrow company after whole deal of contract are fulfilled.

The buyer's agent - or the realtor through their agents gave information about the situation in the market, the mortgage banks and etc. also give necessary recommendations. Then buyer's bank will finance the agreements. With such a sequence of real estate attend other participants the process too. All of these already very complicated, but we know that established system's mechanism is very safe.

Unfortunately, in the Republic of Azerbaijan offering the formation of such a mechanism is impossible. İn the real estate market often we meet inexperienced brokers and sometimes buying and selling operations are accompanied by the risks and losses, including speculative transactions. Of course, in our country, there is a need to establish a system that has been adapted to the characteristics of the local market and similar to the above-mentioned system. It should be noted that the level of real estate services market and its development, the characteristics of the national economy and improving its structure reflects the level of development. It is no coincidence that in the context of the realities of real estate market in many of developed countries the formation of a market economy and the deepening of economic relations are reviewed as important factors stimulating the development of other sectors of the national economy. Azerbaijan's real estate market would be advisable to use more advanced methods to study the experience of foreign countries in this field and it would be very useful to take serious steps to benefit from it.

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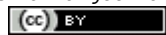
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