

The role of behavioral economics in the real estate market: Example of Croatia

**Master thesis submitted in fulfillment of the degree of
Master of Business Administration**

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AFFIDAVIT

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ABSTRACT

After the financial crisis in 2008 the role of behavioral economics has gain on importance since it gave another view of the reasons behind the crisis. Behavioral economics incorporates psychology into economics science and explains the role of emotions in the decision making process. Furthermore, it explains biases which affect human behavior. Some of these biases are loss aversion, overoptimism, overconfidence, herding and anchoring.

This thesis aims to search for the impact of those biases on the Croatian private investors by using the example of the real estate market. Through the online survey and the analysis of responses it was established that Croatian financial market is under influence of the previously mentioned biases first introduced by two psychologists Kaheman and Tversky in 1979. It was established that people show more risk seeking behavior when faced with a loss which is the reason why people hold on to the assets which are losing value. Furthermore, even with the economic and demographic parameters showing differently respondents of the survey showed overoptimistic expectation of the future market prices. When it comes to estimations of their knowledge on the finance subjects' confidence was also evaluated high. Interestingly even with high self-confidence levels people still tend to follow the crowd and show herding behavior. Finally, people showed anchoring bias by connecting real estate prices to the time of the day although one is not related to the other.

Additionally, the goal is to encourage familiarizing with this part of economics since it can help in preventing or diminishing effect of any future crisis.

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1. INTRODUCTION

1.1. Research problem and objective

After every financial crisis one would think we have learned from it and the same scenario would not happen in the future. However, global economy has shown to work in cycles since crisis have still been happening over years. The last one in 2008 has left the world “injured” with very severe consequences. It is said that the 2008 crisis is “the crisis of confidence” (A.Akerlof, R.J.Shiller, 2009) because the trust in the financial system was ruined.

Considering some economists have predicted the crisis and its course before it began the question is which information did they hold in comparison to the rest of the world. One of these „prophets“ is Robert J.Shiller, a Nobel prize winner for the field of economics. In his book *Irrational exuberance* (2005) Robert Shiller predicted the burst of an housing bubble which happened only three years later. This Yale University professor is one of the main advocates of the behavioral economics. It is part of the economic science which incorporates psychology into the economics principles and disputes the existence of perfectly rational agents in the market. „At the core of behavioral economics is the conviction that increasing the realism of the psychological underpinnings of economic analysis will improve economics on its own terms - generating theoretical insights, making better predictions of field phenomena, and suggesting better policy“ (C.C.Camerer, G.Lowenstein, 2002). Behavioral economics defines which psychological traits affect decision making process with people and how do these traits manifest in every-day situations. It has been shown that human mind poses pitfalls which drive humans away from rationality. Some of these pitfalls, also known as biases, are loss aversion, overoptimism, anchoring, overconfidence and herding.

Considering the 2008 crisis started as a crisis in the housing market this thesis aims to focus more on this part of the financial system in order to understand behavioral principles as a whole. Since Croatia is a small market, which has been barely established, the aim is to verify whether the biases and behavioral principles are valid on this territory as they are in the US (as one of the most developed economies of the world). Taking into consideration that Croatian economy was relying on growth of the housing market as the main driver of the growth in other economic parameters it is important to explain the past and the outlook of this economic sector so important for Croatian economy. The objective is therefore to test the existence of biases in the Croatian market through the real estate market in order to raise awareness of this field of

economics and its possibilities in terms of future applications. Behavioral economics has not been much researched at the universities in Croatia and has not become an integral part of study in the economic sciences. By becoming aware of the truthfulness of its postulates, individuals and institutions would be able to understand the underlying reasons behind the decisions they made in the past but would also be able to optimize any future resolutions.

1.2.Thesis structure

The thesis is divided into five main sections. First one is introduction which gives a general and broad overview of the topic and research objectives. It gives a short insight into main topics which will be more discussed in the upcoming paragraphs. In the introduction one is acquainted with the term behavioral economics which is the light motive of the research paper and which is offered as an explanation for the financial crisis in 2008. Furthermore, the reason why the housing market is chosen has been explained through some main points.

The second sections, named “World financial crisis 2008” gives an overview of what has caused the crisis and what consequences has it brought to the global economy. In order to understand the role of behavioral finance it is vital to see how big impact financial sector and regulations have on the lives of each individual.

Thereafter comes the third section which describes the real estate market and its role for Croatian economy. It also gives an understanding of how was Croatia and its housing market affected by the spillover effects of the global financial crisis in 2008.

After giving an overview of the global and local financial markets and the 2008 crisis, fourth chapter gives an explanation of the shift in economic thought towards the behavioral principles and describes why psychology and biases are so crucial in understanding today’s world and the root cause of the crisis.

The paragraph called research analysis explains which approach was used to test the existence of the biases amongst the private investors in Croatia. Furthermore, it gives the results of the SPSS and Excel analysis. The influence and implications of these results are described in more depth through the findings section of the paragraph.

Finally, the summary of the thesis is given in the last chapter. This paragraph gives a broad overview of each chapter and of what has been discussed throughout the thesis. Also, some

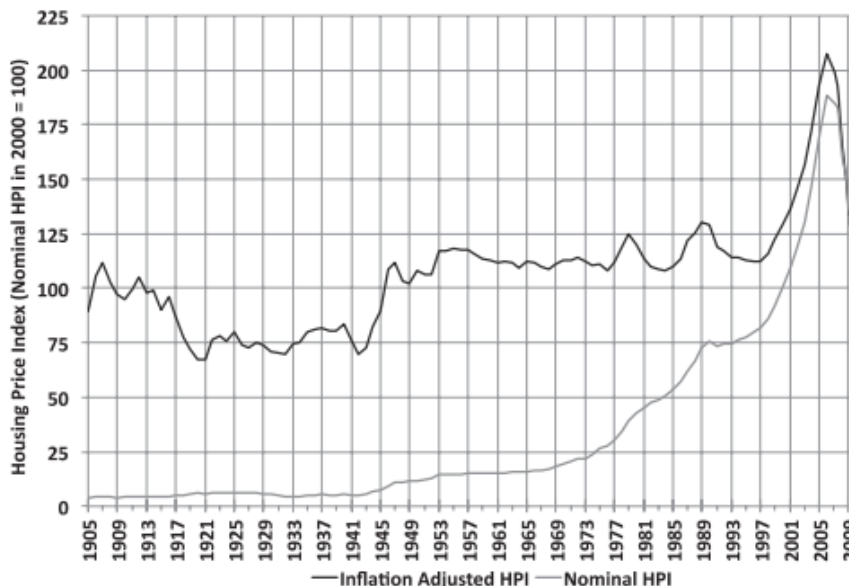
limitations have been highlighted which should be taken into consideration when drawing conclusions. Considering behavioral economics and finance is gaining more attention, the future research aspirations have been touched upon in the last section of the conclusion paragraph.

2. WORLD FINANCIAL CRISIS 2008

2.1.1. The causes of the crisis

In 2008 the world has been shook by yet another financial crisis, the first one in the 21st century but also one of the biggest since the big depression of 1930. The collapse of the subprime mortgage market in the USA is said to be the direct cause of the global financial crash (Holt, 2009). A so called housing bubble in the US has caused a spillover effect across the globe leaving no economy intact. Housing bubble is defined as the deviation of the housing prices from their fundamental values (Brunnermeier, 2008). To see the extent of these deviations in year 2008 Levitin and Wachter (2012) have calculated that the increase of property prices in the US was 188%. This increase relates to a nine years span, from 1997 to 2006. By 2009 the crisis deflated the bubble causing a drop of 33% in only three years' time (A.J. Levitin, S.M.Wachter, 2012). Figure below depicts these changes in prices since 1905 to 2009.

Figure 1: U.S. Nominal and Inflation-Adjusted Housing Price Indexes



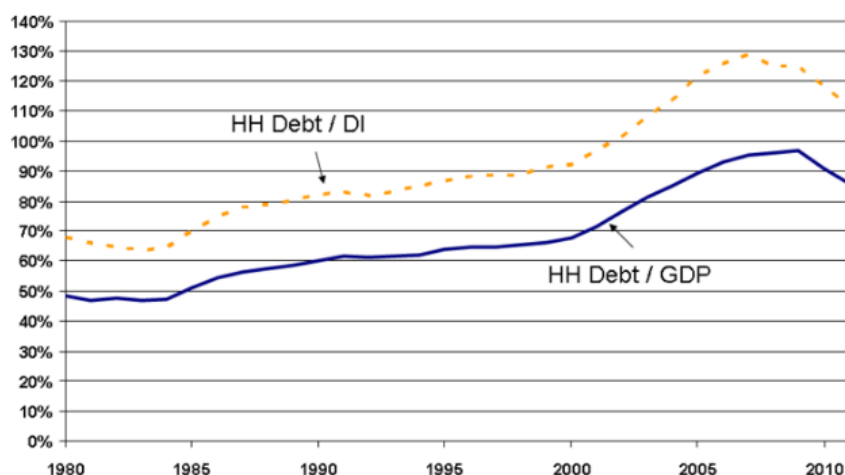
Source: (A.J. Levitin, S.M.Wachter, 2012)

More than ever has the globalization and interconnection of the leading countries taken its toll by causing the biggest economic crunch of the 21 century. The crisis has from the US virally

spread to Europe causing the debt crisis and the near breakdown of the European Monetary Union (Letica, 2010). The consequences of the crisis are still evident in many countries even nine years after. Not only have the world economies been put to test but also many economic theories have been discussed in trying to find the reasons and solutions for recovery.

When the crisis happen the first question is who is to blame. Was it the fault of the institutions, individuals, nature or something else? To be able to point a finger at the right offender the causes of the problem must be defined. It is considered by some analysts that the bubble started booming in the early 2000s. During this period the volume of mortgage sales in banks increased due to incentives banks earned through fees on mortgages (A.Akerlof, R.J.Shiller, 2009). Furthermore, liberalization of the capital markets has encouraged the making of new financial products and loosening of rules when approving loans. Bank loans became cheap and assessable to a variety of households no matter the reality of possible defaults (Letica, 2010). It was believed that ever increasing real estate prices will continue to boom and therefore banks asked for no collateralization for approved mortgages. Moreover, banks have become more fragile due to the increased leverage coming from the belief the housing market will continue to flourish. Moreover, by lowering the prerequisites for the down payments banks have made investments more appealing and affordable for the investors. The research done by Schularick and Taylor (2009) showed that during the crisis the growth of credits was much stronger than the growth of broad money supply and GDP. Addingly, due to low initial cash requirements and barely any risk exposure for the investors the potential rates of return have increased by double or even triple digits. On the other side this poor risk management leading to the high amount loans (many of which were destined for a default) made banks more financially fragile than in the times of the rigid landing standard. The growth of the US private debt in the years preceding the crisis can be seen in figure 2.

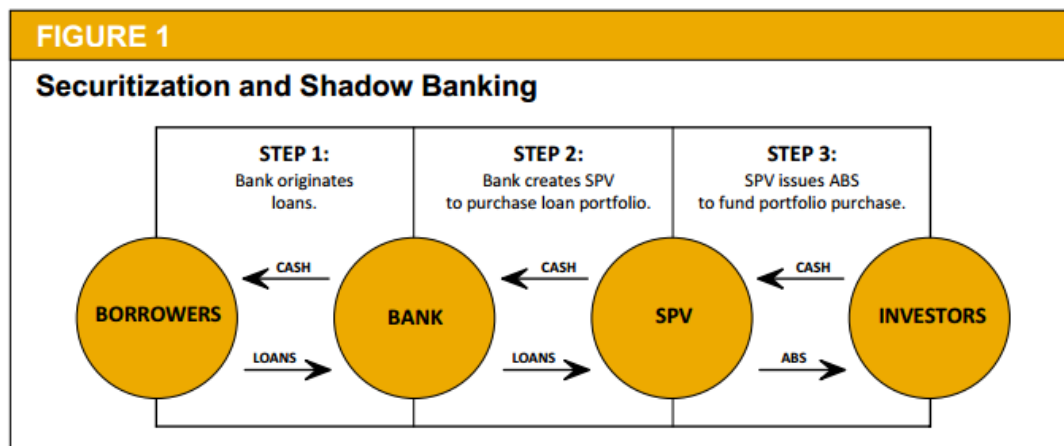
Figure 2: Growth of the U.S. private debt



Source: U.S. Federal Reserve (FRED), 2011

Due to the increasing liberalization of the market in terms of loosening of the regulatory rules banks used the secondary market to finance high demand for loans. Secondary market assumes the investment activities of the institutional investors that do not fall under regulatory frame commercial banks must obey. These institutions are usually cash funds, securities lenders, pension funds, finance companies and corporations that are highly liquid. These institutions want to put their money into short term but safe investments (Sanches, 2014). Banks would create a so called special purpose vehicles (SPV) or companies where all the loans would be sold and managed. These SPVs would then create Asset based securities (ABS) that would be sold to the investors in the capital markets. It was thought that ABS's were secure since they were collateralized with the loans from SPVs (Sanches, 2014). The gain was evident on more than one side; loans were easily assessable and average person could afford it, banks were earning on fees and their money was not captivated in loans but were sold through SPVs and finally, institutional investors were able to invest their money and earn on the secondary market. The flow of direction of money transfer is best visible in Figure 3.

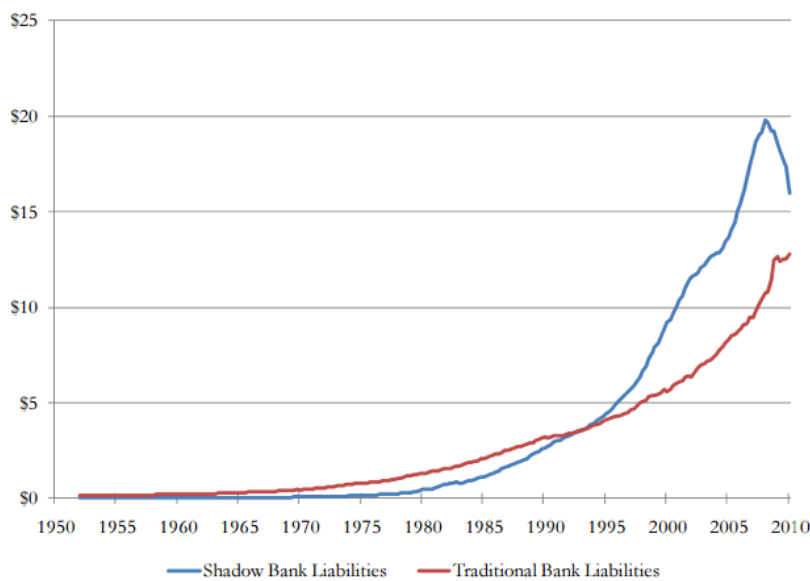
Figure 3: Securitization and Shadow banking



Source: Sanches, 2014

Furthermore, since commercial banks had rules that prevented them from acting through derivatives a so called shadow banking pleased everyone – regulators, investors and commercial banks. “The shadow banking system is the set of institutions that carry out function very similar to those of traditional banks but that are largely unregulated” (Sanches, 2014). Even though the term itself might sound negative and even illegal shadow banking is the reason for the low loan rates and source of capital for commercial banks. As such shadow banking was and still is an integral part of the capital markets as we know it. The increase in shadow banking in the years before the crisis is best seen from the figures issued by the Federal Reserve Bank of NY where the number of shadow liabilities went from around 3 trillion of US dollars in 1990s up to above 20 trillion in 2007 and 2008 which is shown in the Figure 4 below.

Figure 4: Shadow bank liabilities versus traditional bank liabilities in trillion US. dollars



Source: Pozsar, 2010

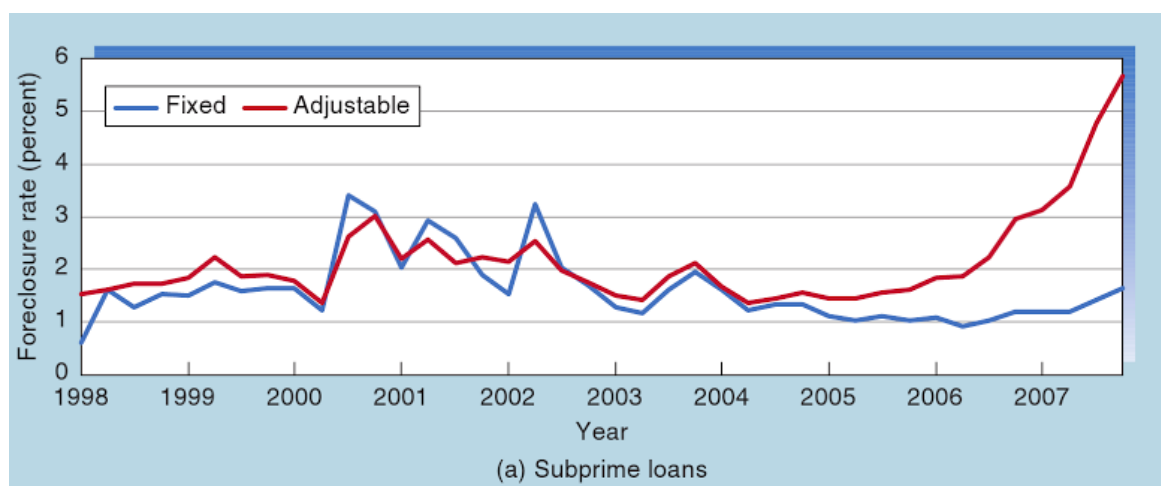
The crisis has put a question on how these systems are regulated but has not doubted the need for the secondary market per se. The fact is that the crisis of the 2007 has become global due to spillover effect created through the secondary market (Sanches, 2014).

However, the problem did not start there but through it it spread to all the markets and all the countries. As mentioned earlier, the prices of real estates were rocketing and both banks and small investors believed in the continuity of the trend. Due to this belief banks were easy on issuing low-quality mortgages. When the risky borrowers started to default on their loans banks were left with their houses that served as collateral for the loan. Furthermore, as more houses became available on the market the prices of real estates started to go down.

The bust was worsened by the situation in which most of the subprime loans were issued as adjustable-rate mortgages (ARMs) as opposed to fixed- rate mortgages. Fixed- rate mortgages mean that the interest rate does not change over years or until the repayment of the loan, making the loan payments predictable. The only situation when it becomes more expensive is in the times of big inflation or high interest rates. Big inflation in the 80's was the reason why the ARMs were invented. The purpose was to make the loans more affordable in the start, connecting the interest rates with the short-term market rate which were usually very accessible (Zandi, 2010). In the years that are marked as the beginning of the financial breakdown the

interest rates started soaring, increasing therefore the monthly rate that needed to be paid by the loan takers. Taking into account the fact that ARMs were previously given only to the buyers with higher incomes and better credit capabilities it is not surprising that loosening of those rules lead to inability to pay of mortgages. The biggest problems were with the people that would not have been marked as creditworthy in the early 90s. Some statistics show that the rate of ARMs in total loans reached a level of 90% in 2006 in comparison to 20% of total loans in years before (Zandi, 2010). Figure 5 shows the increase of the ARM's in times before the crisis.

Figure 5: Fixed and adjustable rate mortgages for subprime borrowers

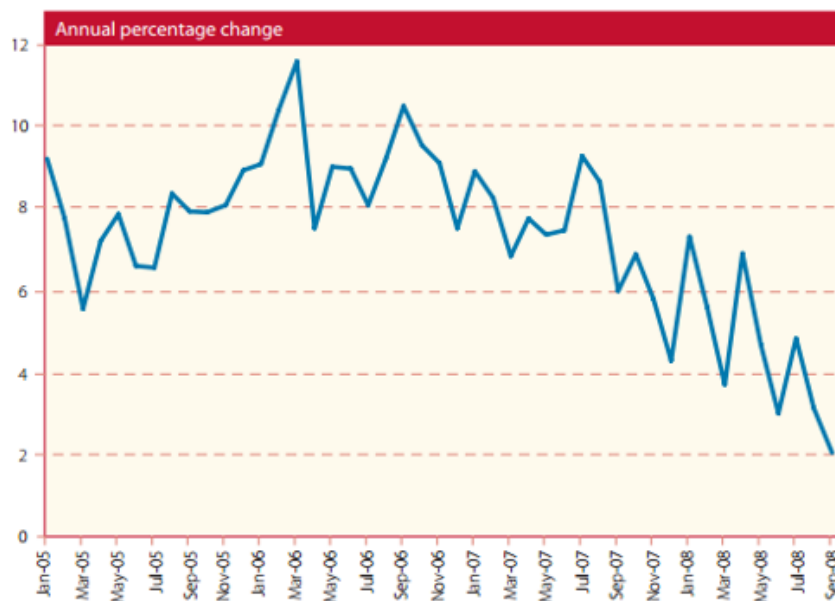


Source: (James D. Gwartney, 2014)

2.2.The consequences of the crisis

After the boom in the real estate prices that ended around 2006, the bust that happened in the following years caused a crisis so severe that it is often said to be the second biggest global crisis since the big depression in 1930's (Stewart, 2008). The subprime mortgage crisis that started in the real estate market caused the fall of the stock market globally, further causing a crisis in the real sector of most economies in the world. The extent of the negative effects of the crisis on the world trade volumes is shown in Figure 6 below.

Figure 6: Growth of world trade volume January 2005- September 2008

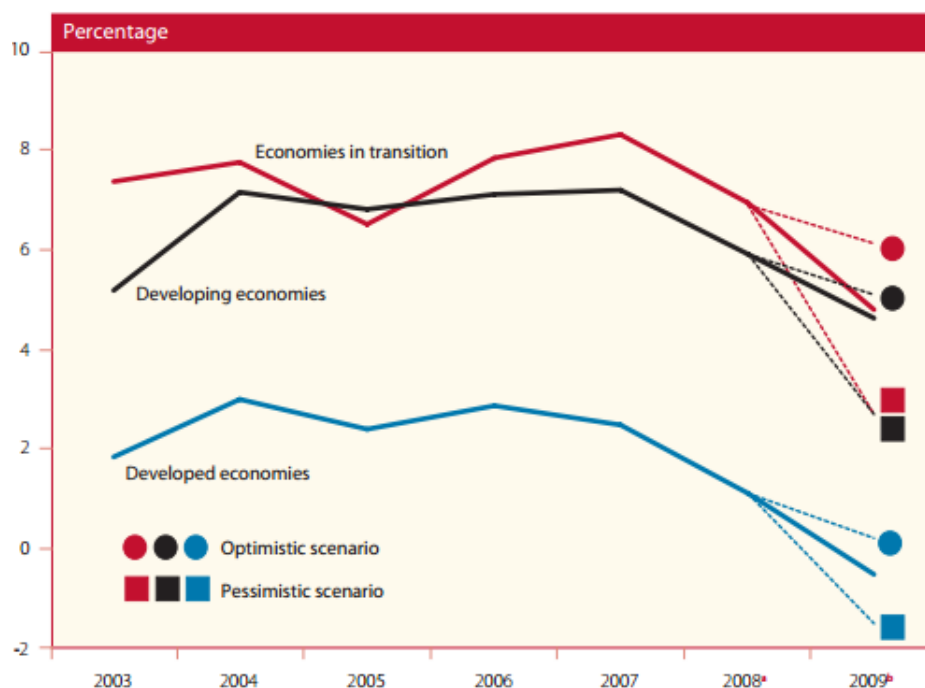


Source: www.cpd.nl, 2015

The crisis shut down doors of some of the biggest financial institutions in the US but also worldwide that were thought to be invulnerable. Some of those were Lehman Brothers, Washington Post, Fannie Mae and Freddie Mac. Lehman Brothers was the American investment bank that went bankrupt in 2008. The day of its bankruptcy is considered by some to be the beginning of the world's longest recession of all times (Robert H. Smith, 2010). Fannie Mae (Federal Nation Mortgage Association) and Freddy Mac (Federal Home Loan Mortgage Corporation) was saved by the US government putting both agencies on the US budget. The price the US tax payers paid for saving these two institutions is yet unknown but it is said to be over \$100 billion dollars (The economist, 2008). Furthermore, other two giants had to be saved with the government intervention since they were said to be “too big to fail”. Those were American International Group (AIG) as one of the most influential insurance companies and Citigroup as a leading global bank. The US government paid a total of \$476 billion to prevent the crisis becoming more severe for the American financial stability (Mlikotic, 2009).

The situation was no different in Europe or elsewhere in the world. Global economies seemed to be “synchronized” in recession (figure 7).

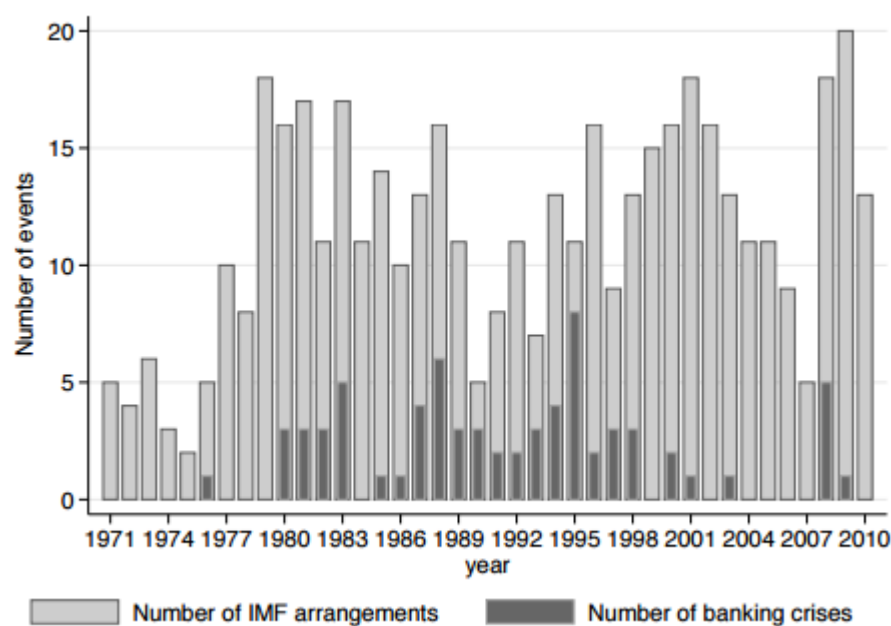
Figure 7: Synchronized global slowdown led by a recession after 2008



Source: www.un.org, 2016

As stated in the World Economic Situation and Prospect 2009 report issued by the UN two Belgian banks were on the edge of financial failure- Fortis and Dexia. ING, AEGON and SNS REAAL the biggest banks and insurance companies in Netherlands also called the Dutch government for help. The Dutch government then injected €200 billion in the span of three years to help with the recovery of the financial market (www.government.nl, 2015). In addition, some countries suffered more than others. Iceland was on the edge of declaring bankruptcy with the fall of its three major banks. To prevent it from happen Iceland went to ask for help to International Monetary Fund together with Hungary who was another country in the EU to suffer the most. Following their example Ukraine, Belarus and Serbia also went to the same resource asking for help. Figure 8 shows that in forty-year span (ever since 1970s) IMF has not had so many arrangements as after the crisis in 2008 when it issued 18.3 billion U.S. dollars of loans to 65 countries. (www.imf.org, 2016)

Figure 8: Banking crises and IMF lending arrangements



Source: Luca Papi, Andrea F. Presbitero, Alberto Zazzaro, 2013

Finally, some claim that none of the best and most influential economists of the world, entrepreneurs or governmental officers would be able to estimate the extent of the crisis, duration of its consequences or its meaning for the contermorary economic and social science (Letica, 2010).

3. CROATIAN HOUSING MARKET

3.1.Croatia and its real estate market

Croatia has become an independent country in 1991 by declaring independence from Yugoslavia. This declaration of Croatian parliament caused a five-year war with Serbia. The war consequences affected not only the mentality but also caused long economic recuperation. Since then Croatia has been going through a long transition period from being a socialist country to becoming a member of the European Union. Moreover, it took over 15 years to earn EU membership. Many have expected that a lot would be gained from entering into a new form of Union. Its citizens wanted better standard and greater work possibilities, its leaders an increase in economic parameters, while markets and professional investors expected more opportunities.

When it comes to the real estate market there has been a great change in the last twenty years, not only price wise but also in terms of ideology. In socialist Yugoslavia having an apartment was practically basic human right as having the right to education. This housing right was a result of governmental policies. The policy established in 1954, which has been implemented until the fall of Yugoslavia, said housing to be a basic legal institute, which allows an employed person one of the essential conditions of life. This is why the government has ensured a roof over the heads for most of its citizens through lettings of the so called governmental apartments at a very low cost. Those same apartments could have been bought by its tenants for only 10% of their market value (Pollitika.com, 2007). A housing issue was therefore almost not even an issue in times of socialism.

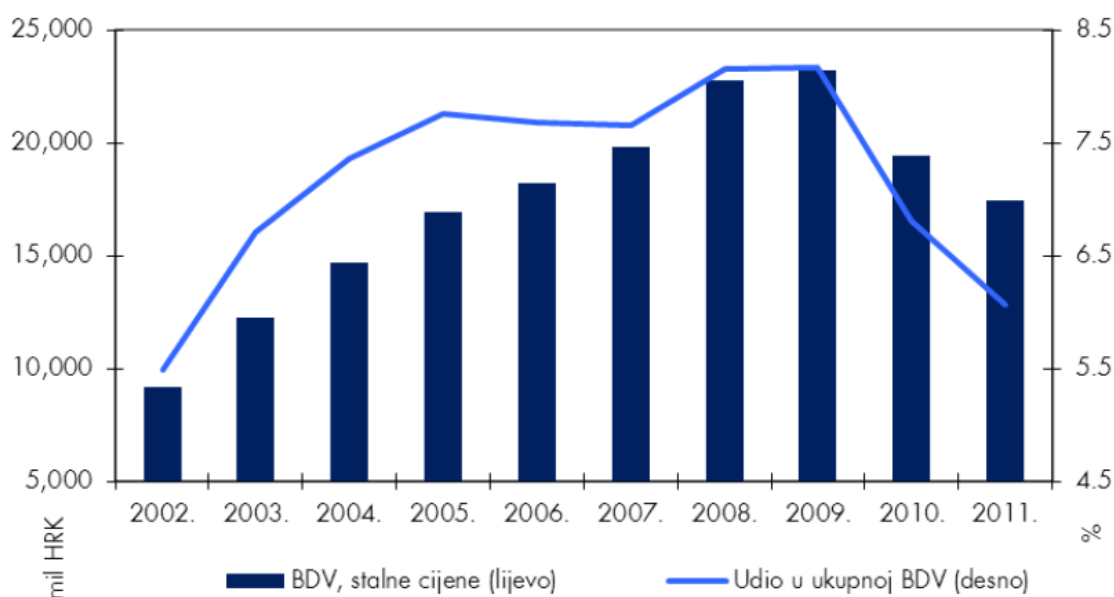
By becoming an independent country Croatia has gained power over its laws and regulations. The switch in ideology when it comes to the housing right was seen already in 1990 when the housing act was passed saying that „Working people and citizens meet their personal and family housing needs through their own funds: through construction, purchase and lease of the apartment” (N.Music,2011). This new principle opened the door to the privatization of housing rights aligning Croatia with most of the capitalistic world.

In the beginnings of its nascency Croatian housing market movements could have been explained by watching the political scene. During the war times number of dwellings was cut to half in comparison to the years preceding 1991, numbering a total of only ten thousand

residencies being constructed annually¹. After the war end until the global financial crisis both the number of residencies being constructed and their prices almost doubled. It was estimated that between years 2006 and 2008 over 24.000 dwellings were being built annually (globalpropertyguide.com, 2016). The reason lies in more regulated market with cheap housing programs.

The death of the first Croatian president in December 1999 and the subsequent election of a new government led to substantial reforms in the economy and a sudden increase in house prices in 1999. As a result, construction surged to 17,487 completions in the year 2000. Around 18,000 dwellings were completed annually from 2002 to 2005. During 2006-2008, completions rose even further, exceeding 20,000 units annually (globalpropertyguide.com, 2016). The construction industry was flourishing which is shown in figure 9 that depicts the proportion of the construction sector in the total national GDP in times before and after the crisis.

Figure 9: The proportion of construction industry in total GDP of Croatia between 2002 and 2011



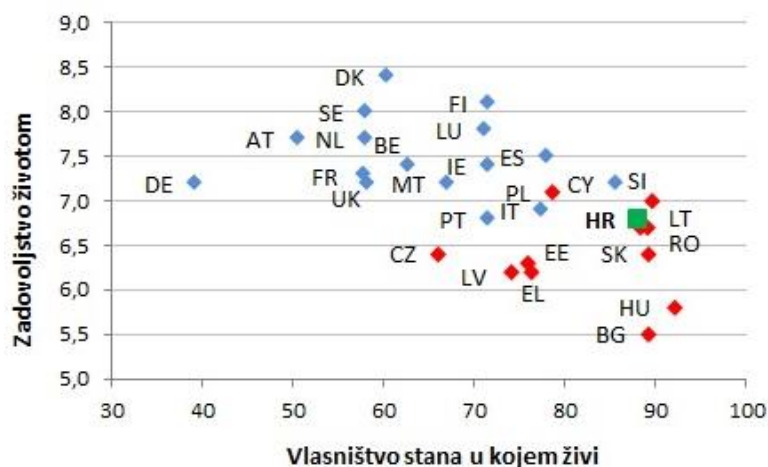
Source: (www.dzs.hr, 2012)

While owning a real estate has been accessible for many Croatian citizens, who were able to solve their housing issues mostly through loans, it is only interesting to notice that this possibility has not increased the quality of life for these people. On the contrary the research

¹ Nađi referencu

done by the Eurofound (Figure 10) shows a negative relationship between home ownership and happiness within the EU. Post-communist countries which on average have more homeowners also have lower levels of life satisfaction whereas in countries where homes are usually rented people have declared themselves on average more satisfied in life.

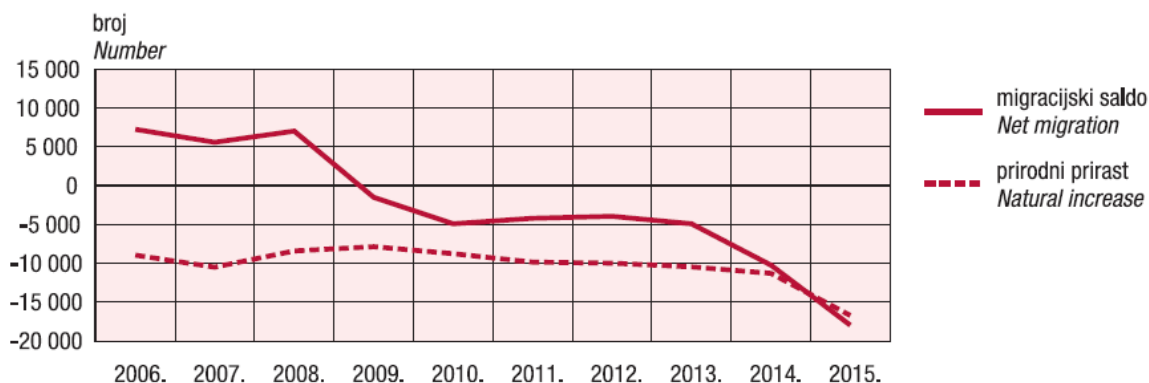
Figure 10: Homeownership and life satisfaction



Source: (eclectica.hr, 2016)

Furthermore, while the number of dwellings and bank loans may suggest the increase in the demand for the real estate, the geopolitical situation of Croatia indicates a different future. Over the last 10 years rate of people emigrating from Croatia has been in constant increase or in different words net migration has been constantly negative since 2009 onwards (Figure 11).

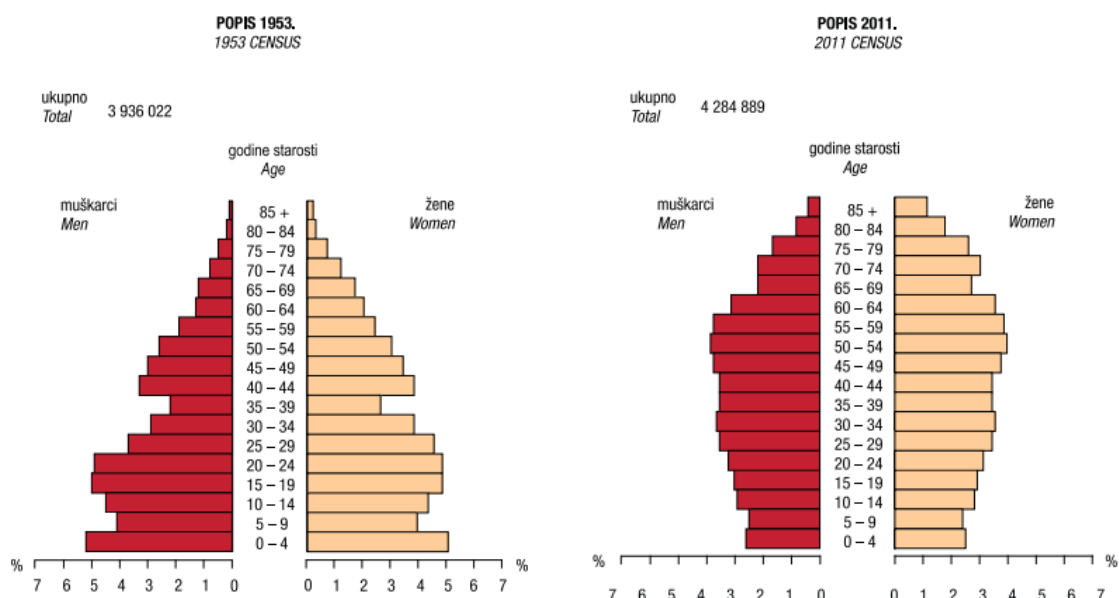
Figure 11: Natural increase and net migration of population 2006 - 2015



Source: (www.dzs.hr, 2016)

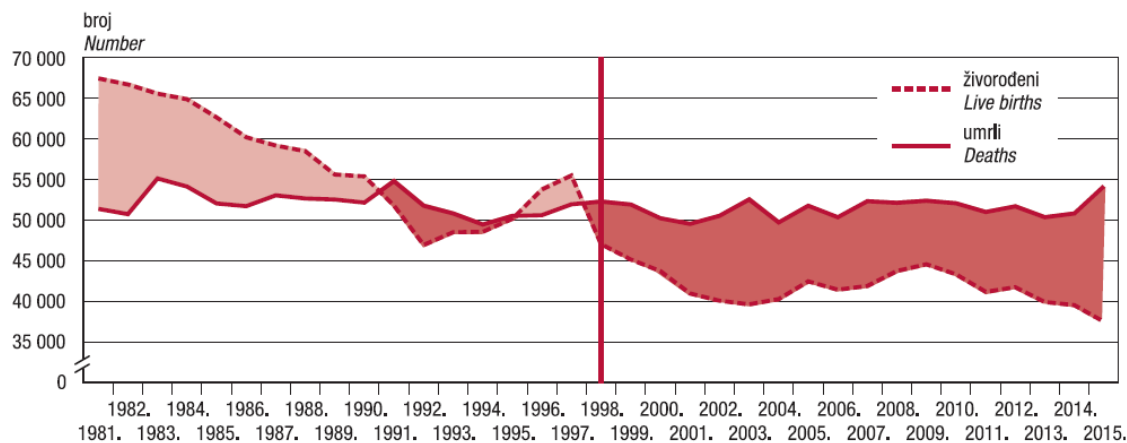
With the entering to the EU in 2013 and stagnation of the economic parameters emigration problem has developed even more. However, this is not the only concern which affects the future of Croatian economy. The negative trends are also visible in the structure of its population. Due to high emigration, decrease in number of marriages and a drop in the birth rate, Croatia has also been affected by the negative population growth. The change in age structure of Croatian population is shown in the Figure 12 below while Figure 13Figure 13 depicts almost exponential growth rate at which population is ageing.

Figure 12: Population in Croatia by age and gender, census 1953 and 2011.



SOURCE: www.dzs.hr, 2016

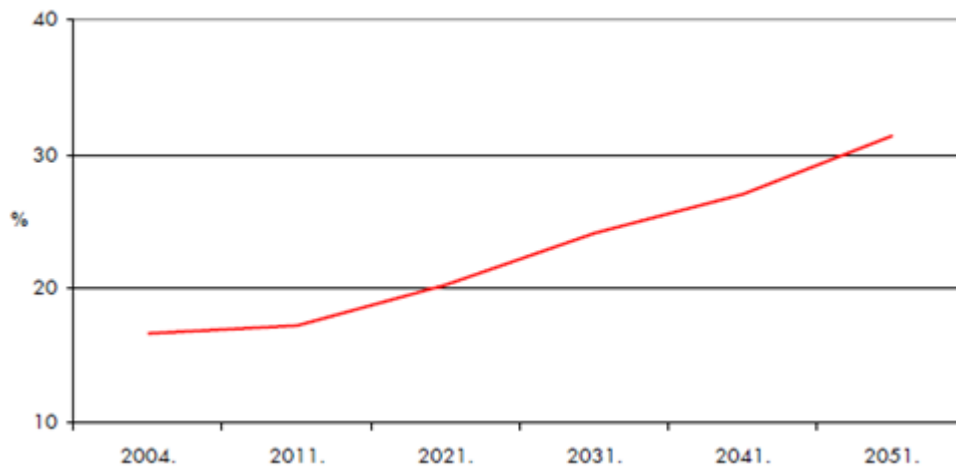
Figure 13: Natural change in population, 1981 - 2015



Source: www.dzs.hr, 2016

Moreover, a research done by the Raiffeisen bank's analysts suggests that the share of the population over 65 years of age will represent a third of total Croatian population in 30 years' time. Figure 14 shows the estimated trend of average age of Croatian citizens by year 2051.

Figure 14: Estimation of share of people above 65 years of age in Croatia

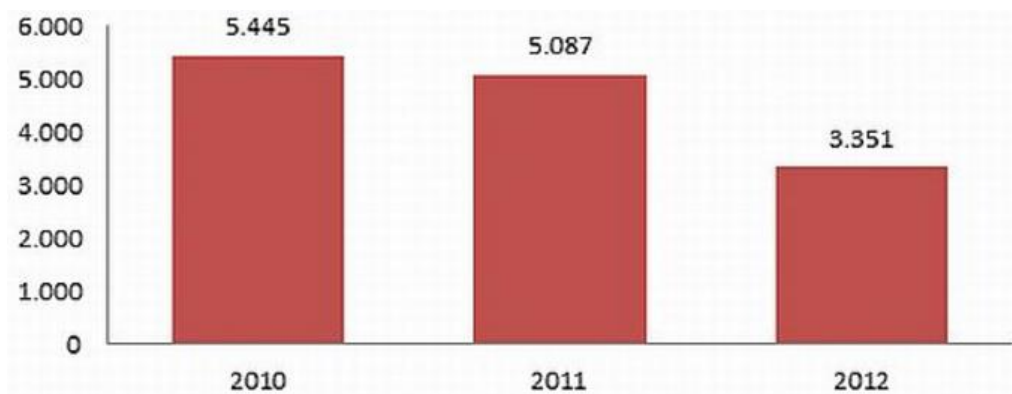


Source: limun.hr, 2012

With the emigration, less young families, and the negative population growth it is expected that there will be less homes needed in the future, therefore the possibility of earning or at least keeping the invested in the real estate market comes under question. Moreover, Croatia is one of the countries in the EU with the highest rate of young unemployed people and it is not surprising that above 29% of highly educated people leave the country. (www.poslovni.hr, 2015) With the current scenario the number of potential real estate buyers is decreasing and will continue to do so. Furthermore, the low flexibility of labor market psychologically aggravates the decision to buy a home.

Another disappointment for the Croatian economy was a lack of expected inflow of foreign money after Croatia enters the EU. It was thought that the real estate will be more accessible and attractive for the other Europeans which would increase a demand of apartments especially on the coast. However, the trend has been going in the opposite direction as it can be seen in the Figure 15.

Figure 15: Number of foreign citizens making transactions in the Croatian real estate market



Source: www.zane.hr, 2013

To further explain, after its independence most of the Croatian population was working for a state-owned company. According to data by Bendekovic (2000) it was a total of 97,5% of people which were employed by the government. With the privatization of the state owned companies there came also an initiative to resolve property and legal issues which existed in the land registries. These two processes starting in 1990s had a high economic and social impact affected by the high rates of post-war corruption.

Croatian constitution states that the property right is one of the most important values guaranteed by the Croatian law (Kontrec, 2015) however this right has come under question by many investors in the recent years. Namely the process of settling land registries has proven to be inefficient. Even today with the advanced technical solutions land registries differ from the true proprietorship causing an inability to file for ownership where there is potential for a buying agreement. Furthermore, it has been estimated that over 30 billion kunas of state property represents a “dead capital” due to lack of government will and money to govern this process (glas-slavonije, 2016). Moreover, administration process around legalization of the properties and ownership-solving causes bureaucratic burden which many investors decide not to undertake. The end result is failed projects mainly for the coastal area of Croatia planned by the investors from China, Katar, Turkey, Emirates and others. One of the key people from the international real-estate consulate stated that “once the investors see what they have to go through, how much time and money they need to spend to start their investments many of the foreign clients which had any interest decided to quit investing in Croatia immediately” (poslovni dnevnik, 2010). This scenarios have become part of the Croatian reality which will take still a long time to change.

Consequently, with the discouraging economic, demographic, and geopolitical situation Croatian housing market is not showing a bright future. While the government has put a lot of its resources (lower taxes for the first real estate, state incentives for housing loans, etc.) and hopes into this market as polygon for economic increase of the other sectors, the financial crisis in 2008 has proven this to be the wrong direction, not only for its economic parameters but most importantly for its people.

3.2.Croatia during 2008 crisis

It is no surprise that the real estate sector is highly affected by the overall economic situation in a certain country. With the expansion of the housing market Croatian economy was facing times of prosperity however in the peak of the crisis in 2008 the same economy failed to respond to the crisis in an effective manner. With the increase of the unemployment rate from 2008 onwards and also with the plummeting of the other economic factors like the national GDP and GDP per capita the real estate market has failed to decrease the prices enough to balance out the supply and demand (Josip Tica, 2012). After 2008 the supply has by far outreached the demand, however the price levels did not reflect this difference which caused accumulation of the unsold real estate. The consequence of such a market behaviour is that in times of economic expansion the country faces falling backlog and rising prices. On the other hand in times of an economic downfall, instead of falling prices, there is above-average decline in production and employment in the construction industry (figure 16) and a strong growth in non-performing loans in commercial banks (Tica, 2011).

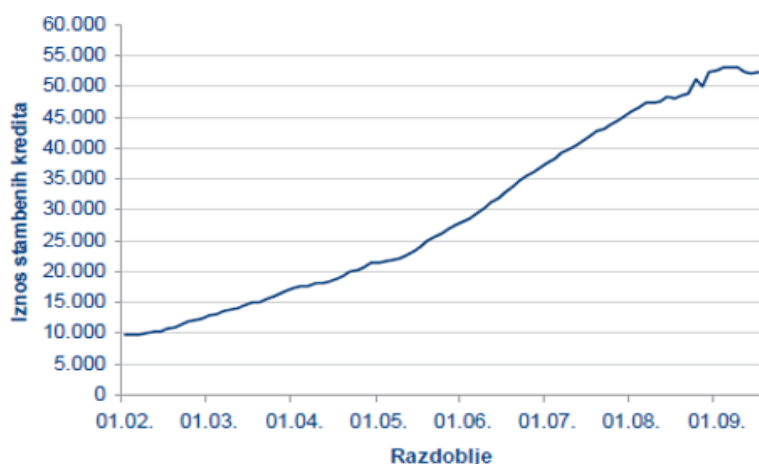
Figure 16: Yearly change in the employment rate in the construction industry



Source: www.dzs.hr, 2016

To ease the administration and complexity of acquiring a loan the banks in Croatia have abandoned the system of loan guarantors and co-debtors who were previously being charged the credit installments the debtor could not pay. Furthermore, not only were the loans this way more easily approved but low interest rates and underdeveloped renting market made ownership more appealing to a wide range of Croatians. Therefore, according to the data of the Croatian National Bank which is also shown in Figure 17 the total amount of housing loans increased by around 17 billion HRK in 2002 to almost 55 billion HRK in 2008. Between 2005 and 2008 the increase in bank loans approvals was over 144% (Kreitmeyer, 2010).

Figure 17: The amount of home loans in millions of HRK approved by the banks from January 2002 until July 2009

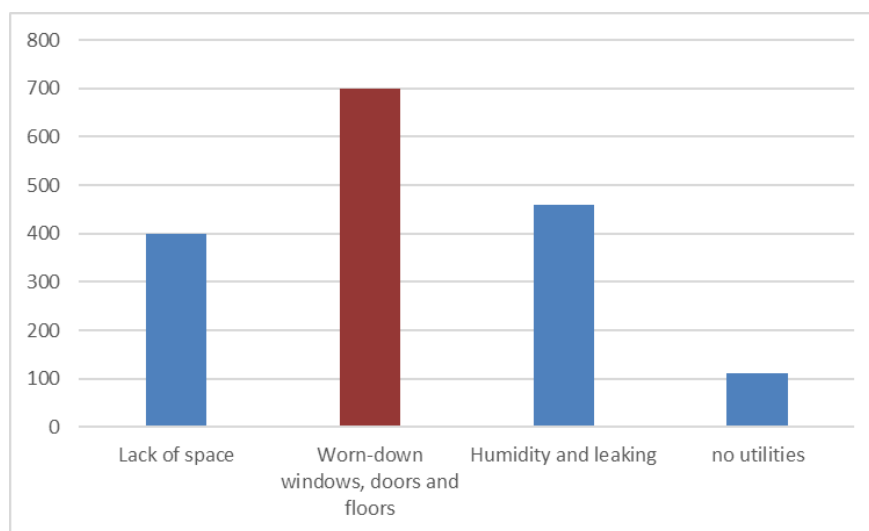


Source: [nekretnine](http://nekretnine.hr), 2009

As mentioned earlier, other significant factor which supports the will to buy a home is the underdeveloped rental market. This is not the consequence of only poor legal framework around real estate rentals which does not protect either of the parties but also of the psychology of the Croatian population. In one of the studies of the Croatian real estate market done by Kreitmeyer (2010) the results show the attitude of Croatians which states that one just feels better when they are in a house they own. This research shows that owning a property has an additional psychological value due to an impression of security which will be passed on to the further generations and which can therefore be called a home. This feeling is something one cannot achieve by renting a residence. On contrary the feeling around renting is that one pays a lot and leaves nothing behind for their successors (Kreitmeyer, 2010). The perception is that it equals paying for the rent and for a loan. What is neglected is the cost of maintenance of an owned property which is something renting usually omits.

Figure 18 best shows what people declare as their biggest real-estate problems which will require investing.

Figure 18: Share of household who have declared the following problems: lack of space; worn down windows, doors and floors; humidity and leaking; no utilities (WC) in the apartment

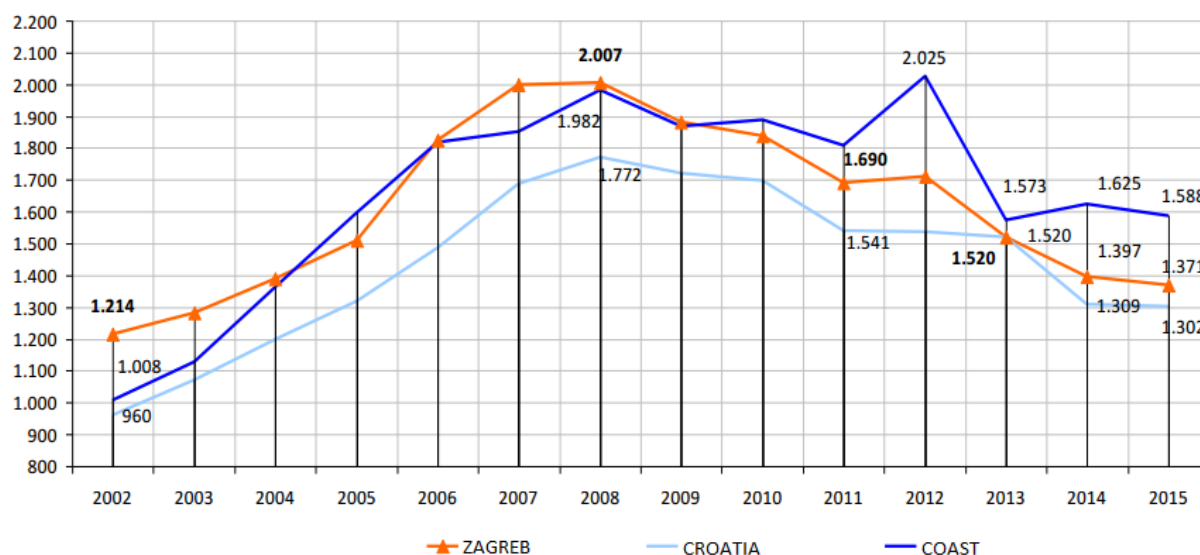


Source: www.zane.hr, 2013

Furthermore, it is not enough stressed that with the loan terms in Croatia one pays almost double the price of a real estate through a long period of time. When it comes to the loans, during the

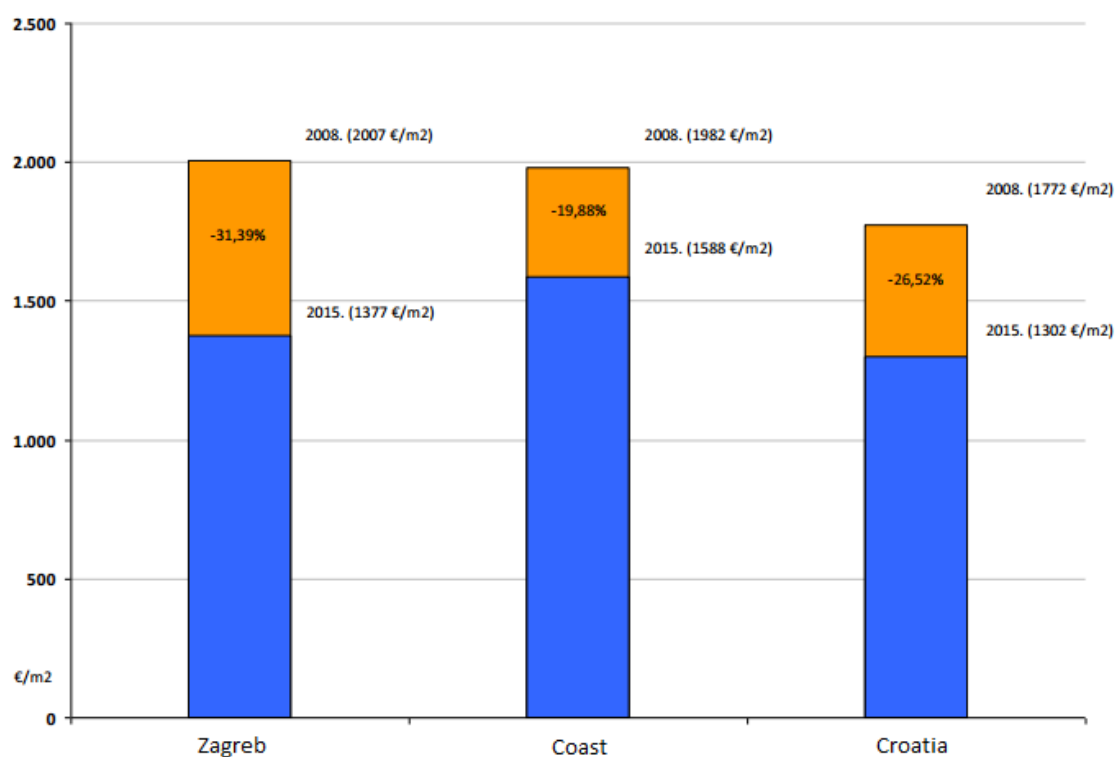
times of prosperity on the Croatian real estate market loans were approved based on the market value of the real estate. At the same time customer credit potential was highly neglected because it was thought that the real estate market is an ever growing market which would ensure minimization of the credit risk due to the high liquidity and good possibilities of selling properties for higher prices (Tica, 2011). The only credit insurance banks had was the pledge on the property. With the global crisis and impossibility of people to pay for loans, banks were left with real estates which were losing value and were impossible to sell. This was a vicious circle because it let to the increase of the supply of the properties and thus further decline of the prices. The prices before and after 2008 are shown in Figure 19 while the decline in the value of residential real estate is shown in Figure 20.

Figure 19: Achieved average price for apartments 2002-2015



Source: www.hgk.hr, 2017

Figure 20: Decline in the value of residential real estate 2008-2015 (Zagreb, Coast, Croatia)



Source: www.hgk.hr, 2017

Finally, faced with the increased costs of lending Croatian economic activities began to slow down during 2008 while from 2009 began a period of great recession with the double digit rate of declines in industrial production and retail sales. The recession period was declared to have ended only in May 2015.

4. SHIFTS IN THE ECONOMIC THOUGHT

4.1.From efficient market and rational consumer to behavioral economics

Economic science has been developed based on the assumption of the existence of perfectly rational individual also known as „homo economicus“, as firstly introduced by J.S. Mill in the 19th century. The term is widely spread in the books on economic thought and it identifies an individual who acts perfectly rational and is driven exclusively by his personal interests with the purpose of maximizing his well-being. Why homo economicus is always rational is for two reasons: firstly, he has all the relevant information needed to make an optimal decision and secondly, he has a capability to identify all the alternatives together with their costs and benefits (Franicevic, 1995). This means that each individual is logically consistent, knows the rules of probability and uses those rules for decision making. Furthermore, this person, as do all others, processes information solely through reason while emotions and psychological factors have no influence what so ever (Brajkovic, A., Radman Pesa,A., 2015). Finally, he/she also adapts and updates his/hers expectations when the market is influenced by a new information (Kapor, 2014). These assumptions were the corner stone of Eugene Fama's theory on Utility maximization (UM) as the prerequisite to efficient capital markets. As Fama explains the ideal is the market where the price serves as a signal for resource allocation; the market in which companies optimally decide what to produce and where to invest and finally the market where investors can choose among the shares which reflect companies' true value (Fama, 1970). This model of efficient market has become a starting point for many economic theories studied at colleges and universities around the world. While for some time market efficiency was taken as a given variable with most of the researchers, others have started to pin point anomalies that refuted the core of standard economic thought – the rationality. These anomalies include errors in reasoning which rational market participants should not make. Consequently, such errors affect prices and returns, making the market inefficient.

Even though such a behavior has intensively become a subject only recently, going one century back and stopping in Adam Smith's time we find that in his book *The Theory of moral sentiment* he theorized about a different approach to human behavior. He talks about a person who acts for altruistic reasons and makes a decisions based on feelings and compassion and does not purely try to maximize his wealth. Adam Smith is therefore considered to be the founder of behaviorism in economics (N.Ashraf, C.F.Camerer, 1999).

In simple words, behavioral economics shows the impact of psychology on decision making process. Thaler and Mullainathan further explain: “Behavioral Economics is the combination of psychology and economics that investigates what happens in markets in which some of the agents display human limitations and complications” (S. Mullainathan, R.H.Thaler, 2000) .

Furthermore, it tries to underpin why and how do market participants make systematic errors which affect market prices and resource allocations making the market all but perfect. As opposed to the „standard“ economic theory, the core of the research in this field of economics is the irrationality of economic agents. Even though it has been present since 1980s² this field of economics has come into attention only after the financial crisis hit the global economy in 2008.

According to Schinckus (2011) there are three main subjects researched within behavioral economics: psychological assumptions that affect persons' decision-making process, frame dependence and inefficiency hypothesis. As Schinckus further clarifies market participants simplify financial reality which affects decision-making process. People often use rules of thumb and past experiences for decision making which is not optimal but is second best or just good enough for certain set of objectives. These techniques are also known as heuristics. When it comes to the second subject, the frame dependence, it describes the phenomena when people's reactions are dependent on the formulation (frame) of the problem (Schinckus C., 2011). While traditional economics theory assumes that frames are transparent and rational agents can recognize between two same but differently described scenarios, Shefrin explains that frames describing a problem are actually dim and as such cause difficulties because an individual makes decisions depending on the frame used (Shefrin, 2002). This concept is best described in a so called prospect theory first disclosed by Kahneman and Tversky in 1979. Finally, coming as a result of the first two, inefficiency hypothesis assumes that prices do not reflect all the necessary information as it was thought in Frama's efficient market hypothesis model (Schinckus, 2011). Table 1 shows the main differences between the traditional and behavioral economic theories.

Table 1: Differences between traditional and behavioral economic theory

² In 1979 prospect theory was created by Kahneman and Tversky as one of the first behavioral economic theories

Traditional economic theory	Behavioral economic theory
People are perfectly rational and use only logic when deciding	People are irrational and led by emotions
People process data accurately	People use rule of thumb to process data
Framing does not affect decisions	Framing affects perception of risks and decision making process
Markets are efficient and prices reflect true value of a company, real estate, assets etc.	People's imperfections (heuristics) cause market inefficiency making the prices sometimes disproportional to the true value of the asset

Source: Author

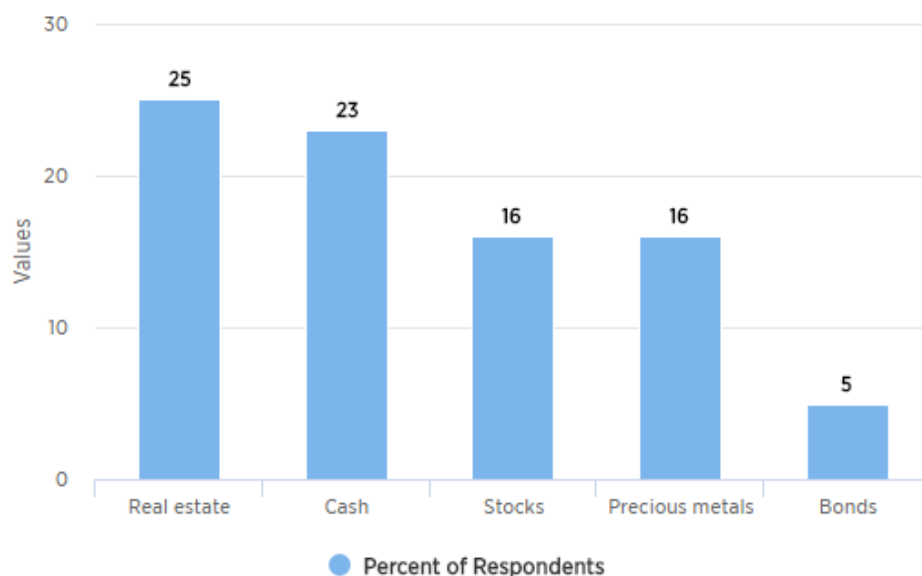
When expressing problems in the world of economics words like recession, depression, slowdown, stagflation, or crisis are most commonly used. But when describing the situation from 2007 onwards we climb a scale up on the ladders of seriousness by using the words like economic breakdown or catastrophe to describe the situation as credible as possible. As by now it is widely known the crisis started due to the burst of a „bubble“ on the real estate market in the US, spilling over to all the other sectors and countries around the world. While the efficiency of the market has been discussed for a while, with the crisis understanding the psychology of its participants has come into focus more than ever before.

Collapse of the housing market has led to many papers and researches which would uncover the causality of the events and this is where behavioral economics has appeared useful if not inevitable part of economic theory. Deutsche Welle describes it as „the missing link in the financial crisis“ (www.dw.com, 2016).

When talking about the real estate market in the general terms people think of the building, offices, apartments that are not theirs but are rarely aware that their home is part of this term as well. We tend to look at our houses and apartments with more sentiments than at most of the other assets like stocks or shares in an investment fund. Neglecting this emotional variable of the equation has shown to lead to economic dead-ends (like the one from 2008).

As shown in figure 21 investments into properties are usually the biggest part of the investment portfolio in most of the households in the US.

Figure 21: Preferred investment for money not needed for 10+ years among the US citizens



Source: www.cnbc.com, 2016

While this trend has been noticed by various authors, like Goetzmann (1993), Kullmann and Siegel (2003) and Cauley, Pavlov and Schwartz (2005), the question is why is this so and what affects such preferences with people. In the survey made by Shiller and Case on two occasions in 1988 and 2002 they found out that people consider property buying as an almost risk free investment and a long term saving. People consider that real estate market is indeed efficient in terms that prices reflect true momentary values of the properties which if high at the moment is expected to rise in the future and justify the high price in the present. Furthermore, people see each day as a unique home-buying opportunity due to the previously mentioned expectations that prices will most probably rise (K.E. Case, R.J. Shiller, 1988).

In their book *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism* (2009) Robert J. Shiller and George A. Akerlof have tried to explain the causes of such thinking and the importance of emotions in the judgement process. By using the term animal spirits³ they wanted to emphasize the true strength of sentiments which drive people far

³ This term was first used by J.M. Keynes in his book *The General Theory of Employment, Interest and Money* to refer to emotional mindsets (www.economist.com, 2016)

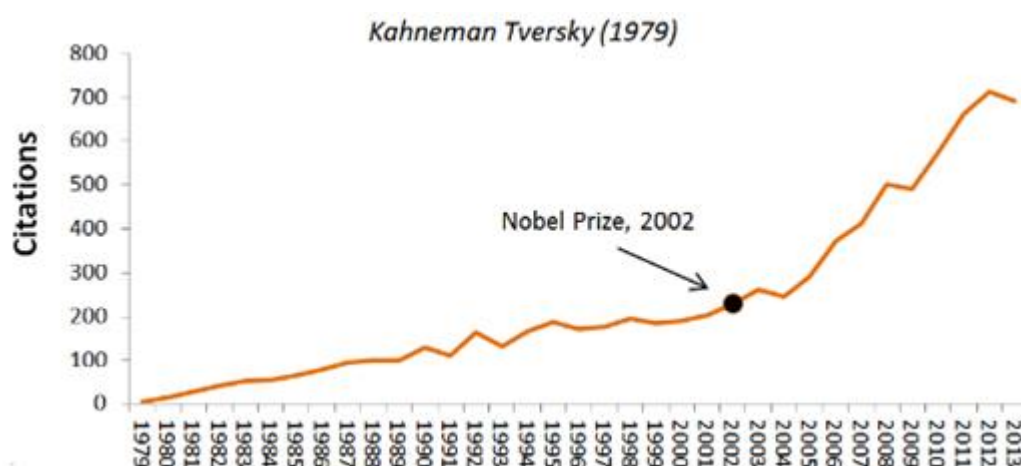
from being rational and optimal in decision making process. In their work, by using cognitive psychology, they explain some biases that affect human behavior. Amongst those biases are loss aversion, overconfidence bias, anchoring, herding and over-optimism bias.

4.2. Prospect theory and loss aversion

Prospect theory and loss aversion

Econometrica is an economics journal where all the important research in field of economics has been published for years. It is said that the paper of the two psychologists Kahneman and Tversky has broken all records when it comes to the most cited papers of econometrica journal since 1975 and one of the most cited papers in economics (Cartwright, 2011).

Figure 22: Prospect theory number of yearly citations



Source: www.datacolada.com, 2016

Prospect theory was developed as a disproof of expected utility theory dating from the early 18th century. Expected utility theory has been a dominant model for explaining behavior of rational people when faced with uncertainty. This theory explains that in case one is not sure which result one's acts will bring one should choose the act with the highest expected utility. In standard economics this theory serves as descriptive theorem which shows how people act (plato.stanford.edu, 2016); meaning that all people, with mathematical accuracy, rate the probability and the utility of each possible outcome of their behavior. For the perfectly rational people this might be the case, however Kahneman and Tversky (1979) claim that this theory shows inconsistency in the real-life situations where people showed not to be as rational as

standard economics proclaims. Through their work those two psychologists have shown that „people underweight outcomes that are merely probable in comparison with outcomes that are obtained with certainty.“ (D. Kahneman, A.Tversky, 1979). This postulate of behavioral economics shows that when faced with situations where the probability of losing is higher, people will take more risk when deciding, meaning they are risk seeking. On the other side, when certain scenario brings more probable gain people tend to be more risk averse.

The fundamental difference between expected utility and prospect theories is that in the latter one „the carriers of value are changes in wealth or welfare, rather than final assets“ (D. Kahneman, A.Tversky, 1979). In more simple words prospect theory says that people decide based on the simple fact if they gain or lose and not based on the utility of the final outcomes of their choice.

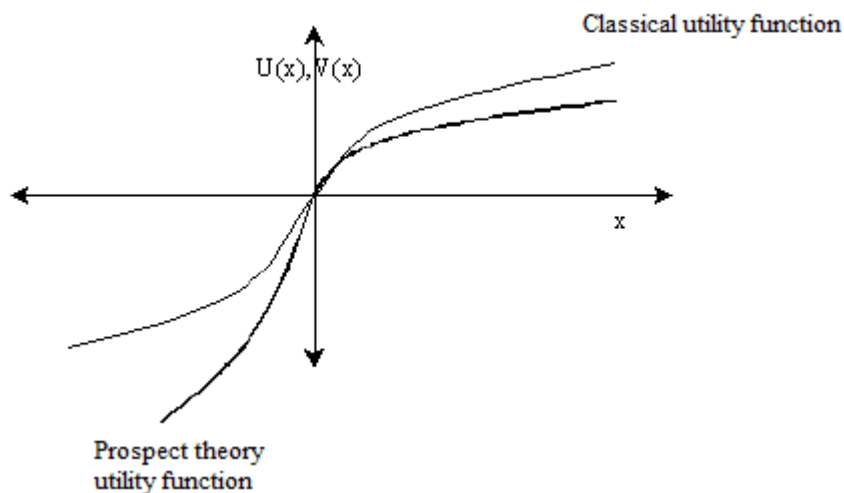
Moreover, the core principle of the theory is that people view each situation as an independent event in terms of gains and losses to ease their decision making (a so called isolation effect). This means that people do not judge the outcome based on the total wealth they have generated with a certain decision but instead they judge the magnitude of change in wealth generated with a gain or a loss (D.Kahneman, A.Tversky, 1983). For example, if a person buys a lottery ticket for 5 dollars bringing a possible gain of 50 dollars this person will not mentally add up these 50 dollars to the real market value of all his/hers total assets (savings, apartment value, etc) in order to judge the final outcome of the decision whether to buy the ticket or not. Instead he/she will just judge the attractiveness of this particular situation which offers a possibility to win 50 dollars with investing only 5.

Furthermore, as said before expected utility theory assumes people's rationality where they always choose the outcome of the biggest expected utility with the purpose of maximizing their wealth. On the other hand, Kahneman and Tversky have shown that people do not always optimize their choices in terms of fortune due to the fact that they are not able to objectively judge the probability of appearance of uncertain events (D.Kahneman, A.Tversky, 1983). Through their psychological experiments the two psychologists have established that when the probabilities of uncertain events are low, lack of objectivity in decision making is much higher than in situations with a high probability of occurrence.

Finally, the standard expected utility theorem as well as the prospect theory says people are risk averse showing this through the concavity of the value function (Figure 23). Expected utility function shows that the utility of gaining certain \$800 is greater than the utility of 80% possibility of gaining \$1000 even though mathematically these two outcomes have the same monetary expectation (D.Kahneman, A.Tversky, 1983). However, the crucial difference

between two theories of choice is the fact that in the standard economics the value curve is thought to be symmetrical whereas prospect theory shows different. Symmetrical value curve means that the same amount gain and loss have the same utility. On the other hand in prospect theory, in absolute value, the asymptote for the gains is lower than the asymptote for the losses meaning that loss „hurts“ more than the same amount of gain brings happiness (D. Kahneman, A.Tversky, 1979).

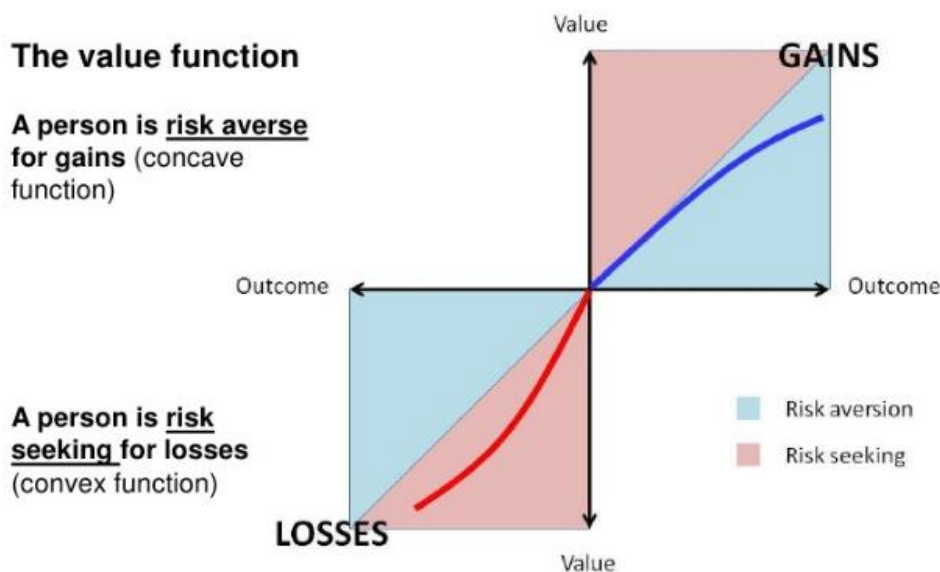
Figure 23: The difference between classical and behavioral utility functions



Source: Vojinic, 2010

In other words prospect theory says that people tend to underweight gains and overweight losses. Furthermore, it states that considering people value loss more than the same amount of gain they tend to enter into risky behaviors in order to prevent or lower the amount of losing, whereas when in a territory of a certain gain people tend to hold on to their assets and avoid gambling. This is shown in the figure 24 below.

Figure 24: Prospect theory risk averse and risk seeking value functions



Source: J. Devos; D.Deschoolmeester, 2011

4.3.Overconfidence bias

As mentioned through the prospect theory paragraph people are different when it comes to taking risks. Even though prospect theory shows people are in general more risk seeking when it comes to losses still we are all different in terms of magnitude of this risk seeking behavior. Furthermore, behavioral economics theory has shown that our perception is not only different to what standard utility theory suggested when it comes to gains and losses but our perception is also somewhat wrong when it comes to judging ourselves. This is another cognitive bias known as overconfidence bias.

Overconfidence has been offered as an answer to questions regarding war, high volumes of M&As which most often fail, overtrading despite the lack of knowledge and high costs, high entrepreneurial entries despite high failure rates, but also as a cause to labor strikes and litigations (D.A.Moore, P.J.Healy, 2007).

As another result of overconfidence people value their possessions above their fair value at which the assets could be sold on the market (B.M. Barber, T.Odean, 2001). Implications of overconfidence stated by Shefrin in year 2000 are that people tend to underestimate the lack of information or fail to recognize there is one and therefore are more prone to taking bad bets. Apart from taking bad bets they also show improvident tendency for excessive market activity leading to high trading volumes (Shefrin, 2002). Shiller goes a step further claiming that overconfidence is in fact a „fundamental factor promoting the high volume of trade we observe

in speculative markets“ (R.J.Shiller, 2000). Shiller further says that if it were not for overconfidence bias people probably would not trade at all. History has shown that behavior of the markets can rarely be predictable and, as opposed to the postulates of the standard theory, people do not have access to all the information and at the same time choose different outcome even if the set of information they have is the same. Therefore, predictability, market efficiency and beating the same market seem to be utopia in the eyes of behavioral economists.

In today's world we are taught to be self-confident because this characteristic gives us more credibility. While this might be good in a day to day communication or in terms of managerial skills the fact that the golden middle is hard to find with people makes this characteristic dangerous for the world of finance but also for people's budgets. In his work dating back in 1993 Plous says that „no problem in judgment and decision making is more prevalent and more potentially catastrophic than overconfidence" (S.Plous, 1993). Edgar E. Peters found that overconfidence might be a biological mechanism for survival since in many situations people are forced to make decisions based on the limited information. For such conditions brain might be structured in a way to make decisions to be as confident as possible (E.E.Peters, 1991).

Furthermore, people like to avoid unknown situations or at least try to make it as much comfortable as they can. When at the party or at an assembly people will try to find someone they know first and then they will go widening the circle of people they talk to. The same way our mind functions when faced with uncertainty. To ease decision making we will try to find familiarities with the past events just to make a judgement believing that things cannot be much more different. This characterizes also the notion of overconfidence because we disregard the likelihood that a certain event will repeat.

In the interview Kahneman gave to The Guardian in July 2015 this Nobel prize winner said that out of all the flaws and biases caused by our mind the most hazardous is overconfidence itself. If he could be a superhero Kahneman would first eliminate the strong influence of this human characteristic out of sight. But he further says that overconfidence “is built so deeply into the structure of the mind that you couldn’t change it without changing many other things” (www.theguardian.com, 2015).

4.4.Framing and anchoring bias

When making decisions we are not independent of the surrounding nor the initial input. Initial input being the way the question or a problem is formed. Through their experiments Kahneman

and Tversky (1979) have noticed that when a problem is formed in two different ways both bringing the same outcomes, people make different choices. To explain with more clarity if outcome of a gamble is formed as a loss people choose differently than when the same outcomes are formed as a gain. Furthermore, people show risk averse behavior when frames are formed positively and risk seeking behavior when they are shaped negatively.

The fact that we are influenced by the way people talk to us may not come as a big surprise but in comparison to expected utility theory this notion does put another lighting on this theory. Namely one of principles of the expected utility theory is a so called invariance which means that rational agents should not be affected by the way alternatives are framed because otherwise they do not maximize their wealth (D. Kahneman, A.Tversky, 1979).

Another bias that serves to ease decision making in the environment of incomplete information is anchoring bias. In his work from year 2002 Gilbert states that this heuristic is the most important in explaining how people make almost all conclusions.

Anchoring heuristic could be defined as a form of concluding in which based on arbitrary data we make particular judgements and generalized conclusions on a set of unrelated phenomena (Bokulic, Polsek, 2010). Due to the existence of this heuristic Mussweiler (2003) talks about relativity of human decision making process and generalizes this statement by saying that all our judgments and conclusions are entirely dependent upon the standards of comparison (Mullweiler, 2003).

In the experiment performed by Tversky and Kahneman in 1974 they asked the respondents of the survey to answer whether they thought that the number of African countries which are part of the UN is bigger or lower than some arbitrary number which was chosen accidentally by turning the wheel of fortune. The results showed that respondents comparing the number of African countries in the UN with the higher anchor (bigger arbitrary number) on average estimated bigger number of African countries belonging to the UN than the ones using the lower arbitrary number as a standard of comparison (D.Kahneman, A.Tversky, 1974). In his work Logic and conversation, Grice (1975) tried to give an explanation of this bias by saying that people use anchoring as an indication of the real or true value. Even though the anchoring

heuristic has first been established almost 40 years ago there is still no clear explanation of the psychological mechanisms that would explain why this happens (Bokulic, Polsek, 2010).

4.5.Herding bias

Market would maybe not be such a relevant term if its agents were not a crucial part of its existence. Market and people participating are interdependent meaning that people's reactions affect market flows and vice versa. We as people are social beings and as such we urge to belong somewhere. That somewhere being a particular group of people we can relate to, identify with or which we could imitate. However, aside from this social part we also receive information from the interactions with others. This is particularly important in the times of crisis and uncertainty when one, maybe even without personal experience applicable to a certain situation, chooses to follow others. Using the principle „others know better „, people assimilate their judgements to the behavior of others. This behavior is a so called herding bias which is important in explaining market bubbles and breakdowns.

Aside from the reason that bigger number of people are probably always right, according to Phung (2010) the other reason for this behavior is the social pressure which occurs due to the fact that people want to feel accepted by others more than being stigmatized as unaccepted individuals. Therefore, following others is the ideal way to become a part of a group. Finally, even if one as an individual may not be convinced that a certain idea is not rational he/she will still in most cases choose to follow the herd believing in the judgment of the group more than in his/her own (A.Phung). In the capital markets the example of herding behavior exists on a daily basis. People with limited information follow the ones they think are better informed or have better knowledge. The same is with investors when they imitate one another's portfolio. This behavior is once again refutation of the rationality of market agents assumed by standard economic theory.

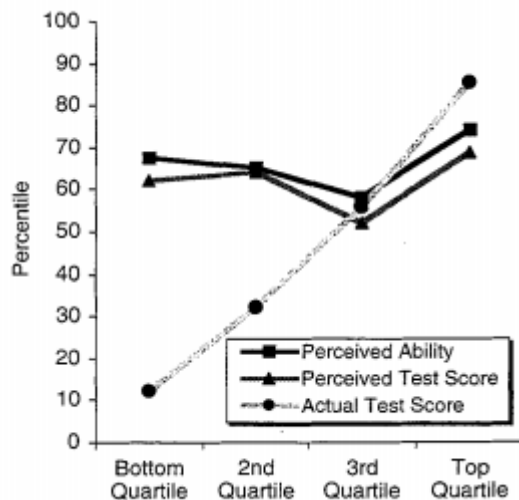
4.6.Over-optimism bias

Overconfidence bias is closely linked to another average human behavior called over-optimism. If asked over 95% of drivers considers themselves to be above average good drivers, almost all the newly-weds believe that there is no possibility of divorce, while less than 5% of MBA

students think their competences are below median value. Also over 94% of university professors believe they teach better than their colleagues do (Banka.hr, 2013).

Although when making some choices most of us show optimism, psychological research have shown that overly optimistic are mostly people with lower capabilities (figure 25).

Figure 25: Perceived logical reasoning ability and test performance as a function of actual test performance



Source: J.Kruger, D.Dunning, 1999

In favor of this claims goes Kahneman's research proving that the problem of excessive self-confidence is especially highlighted with people considered to be experts in their fields. "As respectable people in important functions (doctors, politicians, bankers) many people look up to them but on the contrary their judgements are on average less correct than a probability that a chimpanzee hits the center of a dart board" (The New York time, 2016). Combination of being overconfident and overly optimistic has led some into catastrophe. Going back into history and remembering of some leaders one could easily see that influence of such people cannot be neglected considering the power they had over groups of people. The same situation happens in our micro worlds where we trust and like more people that radiate optimism. We like them because we want to believe them. This is the situation with investment consultants, our private bankers or real estate agents.

Overoptimism can be defined as person's tendency to overrate possibility of positive outcome and underestimate possibility of negative outcomes in comparison to others (Hirshleifer, 2001). Optimism can be good when soundings are tough but what happens when people make wrong

judgements encouraged by their optimism? Being persistent and disregarding unfavorable surroundings can be the best and the worst thing optimism can cause. Finally, economics theory has been acquainted with optimism ever since Keynes whose words on optimism were as follows: „In abnormal times in particular, when the hypothesis of an indefinite continuance of the existing state of affairs is less plausible than usual even though there are no express grounds to anticipate a definite change, the market will be subject to waves of optimistic and pessimistic sentiment, which are unreasoning and yet in a sense legitimate where no solid basis exists for a reasonable calculation.” (P.Davidson, 2007)

4.7.Behavioral economics and the housing market

While most of the literature explains that 2008 global financial crisis started with the real estate crisis there is a difference in views what is the root cause of this crisis which led to the global economic crunch (L.Ureche-Rangaua, A. Burietzb, 2013).

Some authors like Watkins and McMaster claim that standard economic models do not offer the explanation behind the price movements of real estate (C.Watkins, R.McMaster, 2011). They go a step further by saying that the flaws of the conventional economics theory could be diminished by bridging it to psychology which could explain what lies in the core of a certain economic process. This approach has been supported by the behavioral economists like R.J.Shiller, G.A.Akerlof, R.Thaler and D.Ariely. The first person from this list, i.e. R.J.Shiller was the first to have warned of a housing bubble which might potentially lead to a serious crisis. In his book *Irrational exuberance* Shiller started by questioning price increase by asking: „Are powerful fundamental factors at work to keep the market as high as it is now or to push it even higher, even if there is a downward correction? Or is the market high only because of some irrational exuberance—wishful thinking on the part of investors that blinds us to the truth of our situation?” (R.J.Shiller, 2000). Later in the book he predicted the 40% fall of the prices after 2005 which indeed happened only three years later.

Those factors he mentioned that blinded us were the biases and cognitive errors humans make when trying to take an optimal decision. Those errors have been described in paragraphs before and refer to loss aversion, overconfidence, herding, anchoring, overoptimism and many more.

As explained earlier overoptimism means expecting the bright future and in terms of properties this alludes overestimating the rise of future prices. In their experiment from 2003 Case and

Shiller established that on average people in the US expected a 38% rise of properties' prices year over (K.Case, R.J.Shiller, 2003).

When it comes to overconfidence some authors state that this bias contributed to the size of the housing crisis (Bucchianeri, 2011). By believing one can predict how the market will act in the future one tends to enter into risky investments which hold no reasonable ground. Therefore, overconfidence caused, both with institutions as with private investors, the inability to estimate the true risk value of participating on the housing market, which led to excessive activities and ended up creating a housing bubble.

However, in case there exists a suspicion the information in hand is not proper or full people will try to align with other investors on their expectations of the asset values in the future. This will ease their decision making and make the illusion their investments are “a good bet” (Michelle Baddeley, 2005). This is how herding behavior pushed the expectations of the future prices in the wrong direction and made people feel comfortable with their investments.

As Kahneman and Tversky have shown in their paper from 1979, people dislike losing very much and would therefore rather risk of losing more than make peace with the perceived loss. In terms of the real estate prices loss could have been visible when the house prices started to go down. However, what is important to see is that the loss comes from the fact that one could no longer sell the house for the same price for which he bought it and would then rather risk a default than enter into the “loss zone”. The fact that people anchor the value of the property to the value for which they bought the property makes them disregard the current market situation as an important factor for setting a price.

Finally, Mayer and Sinai (2013) conclude: “The question of whether psychology matters in the housing market has been settled long ago: the answer is yes”.

5. RESEARCH ANALYSIS

5.1.The aim of the research and the research approach

Taking into consideration how fairly new this field of economics is the question is how aware are the people of the „traps“ their mind is setting. Since behavioral finance has been mostly researched in the US the aim of this paper was to find out whether the situation on the Croatian real estate market can be explained with the help of behavioral finance.

Table below depicts the biases which are analyzed in this paper among the people of Croatia.

Table 2: Implications and consequences of the behavioral biases

Name of bias	Implications	Consequences on the real estate market
Overconfidence	→ People overestimate their abilities and precision of their knowledge (Lichtenstein et al., 1982)	→ Excessive investment activities due to perceived ability one can beat the market and predict the course of events
Overoptimism	→ Expecting the bright future and perceiving that good things happen to one more than to other market participants (Weinstein, 1980)	→ The perception that the prices will recover even if they are currently dropping so the investment is not endangered
Loss aversion	→ Avoiding the pain of losing by intaking more risk	→ Refusing to sell real estate for lower price than it was bought for regardless of the market dropp
Hearding	→ Assuming the public or others know better and should therefore be followed	→ Following the trend of buying a property even if one's credit capabilities are poor.
Anchoring	→ Being influenced by an arbitrarily chosen reference point (anchor) when making estimations (G.B.Northcraft , M.A.Neale , 1987)	→ Using the buying value as a baseline for evaluation of current value of the real estate neglecting the market situation

Source: Author

5.2.Methodology and data collection

Considering the complexity of human psychology sometimes it is hard to identify what drives a certain action with each individual. Therefore, psychology often uses open-ended interviews or experiments by which person's reactions could be brought into a full context. On the other

hand, if conclusions are to be generalized a bigger number of people should be examined in order to make a research representative for a certain population. Even though behavioral economics has more elements of psychology than standard economics its postulates were grounded through simple social experiments and surveys that have proven to generate accurate results. Moreover, by conducting surveys and simple experiments behavioral economists have been able to draw conclusions that have led to a new postulates of the economic science.

Since the aim of this paper is to see the results across population of Croatia the most convenient way to conduct research was through online survey by which the bigger number of examinees could be reached. Furthermore, considering the aim was to test different psychological pit falls in humans, online questionnaire allows people to respond with more honesty assuring confidentiality for the participants.

The development of the survey was structured through couple of phases which contained:

- Forming of the survey depending on the hypothesis that needed testing
- Distributing of the survey online to a various number of people which were asked to include any other interested party
- Collection of the responses and preparing data for the analysis
- Data analysis through SPSS and excel outcomes

There were two surveys formed with only one question of difference the purpose of which was to test the loss aversion. Both surveys contain 26 questions and were distributed to the working population reason being that they are more likely to participate actively in the real estate market transactions. Furthermore, the premise is that both men and women are equally unaware of the behavioral biases and are prone to psychological errors, therefore the survey included both genders of different educational background and yearly income scales. The method used for analysis is the comparative method to establish whether differences amongst different groups of respondents exist. This paper shows comparison of answers across different gender and age groups to test how social-demographic factors influence bias intensity. If the differences prove to exist further analysis for similarities and differences will be conducted.

Other than testing biases the aim is also to see the level of awareness and understanding of the financial markets because people tend to overestimate their level of knowledge which can be harmful when having to make a financial decision.

The survey is composed out of three groups of questions:

- Questions which state hypothetical situations with the goal of examining the biases
- Questions set to test people's knowledge of the situation on the financial markets
- Questions formed for understanding people's preferences through scaling of their choices
- Demographic questions which give the frame for testing

The total number of responses equals to 293. After eliminating the incomplete answers and missing responses the number of valid surveys was adjusted to 272.

The demographic profile of the respondents is shown in the table below and it depicts gender, age, education level as well as the monthly income of the people which populated the questions.

Table 3: Demographic of people answering the questionnaire

Profile of Sample Respondents	Total count	Total %
Which gender are you?		
Female	152	56%
Male	120	44%
Total	272	100%
Which age group do you belong to		
< 25	17	6%
26 - 40 god	178	65%
41 - 50 god	38	14%
iznad 50 god	39	14%
Total	272	100%
What is your monthly income		
< 5.000 kn	52	19%
5.000 – 15.000 kn	189	69%
> 15.000 kn	31	11%
Total	272	100%
What is your level of education		
highschool education	25	9%
Bachelor's degree	13	5%
Master's degree	196	72%
Post-graduate degree	33	12%
PhD	5	2%
Total	272	100%

Source: Author

5.3.Hypothesis tested

Based on the literature review and the evident importance of psychology for the decision making process the hypothesis tested aimed to verify the impact of the five biases on the private investors in Croatia. Biases tested were loss aversion, overoptimism, overconfidence, anchoring and herding. Hypothesis used are listed below.

1. Demographic factors do not affect the influence of biases on the private investors in Croatia
 - a. Gender does not influence the demonstration of behavioral biases with private investors in Croatia

- b. Age does not influence the demonstration of behavioral biases with private investors in Croatia
 - c. Education level does not influence the demonstration of behavioral biases with private investors in Croatia
- 2. Knowledge of behavioral economics basics influences the level of behavioral biases on the private investors in Croatia
- 3. Private investors in Croatia show Loss aversion bias
- 4. Private investors in Croatia show Overoptimism bias
- 5. Private investors in Croatia show Overconfidence bias
- 6. Private investors in Croatia show Herding bias
- 7. Private investors in Croatia show Anchoring bias

5.4. Analysis and results

To assess the instrument reliability, the internal consistency was verified using Cronbach Alpha Coefficient for consistency. Table below gives Cronbach Alpha coefficients for all the biases being measured.

Table 4: Cronbach Alpha for every measure part

Scale	N of items	Cronbach's Alpha
Loss Aversion	4	0.623
Herding	2	0.814
Anchoring	4	0.897
Overconfidence	3	0.832
Cognitive Dissonance	2	0.609

Source: Author

The closer Cronbach Alpha coefficient is to 1, the internal consistency is greater; accordingly, the results were statistically acceptable since the value is greater than 0.60 which is acceptable to administrative and human sciences (Sekaran, 2003).

To further test a degree of multicollinearity between variables in a regression model Variance Inflation Factors (VIF) were calculated for all the variables. Variance inflation factor provides an estimate of how much will the variance of the regression coefficient increase, due to the linear dependence with the other independent variable.

For most work in the social sciences the centered VIF (and tolerance) are the most appropriate ones for making inferences about the relationships between the independent and dependent variables in the range for which we have data (O'Brian, 2007).

When testing multicollinearity through VIF model if values of Variance inflation factors exceed a value of 10 then multicollinearity exists. Some have argued that the threshold which suggests multicollinearity problem should be as low as 2,5 (Alison, 2012) but nevertheless in this analysis all the VIF factors are below the value of 2 which eliminates the problem of multicollinearity and confirms that the predictor variables are not correlated in the regression model.

Table 5: Collinearity testing through VIF factor with Loss aversion as dependent variable

Model	Collinearity Statistics	
	Tolerance	VIF
Herding	0,994	1,006
Anchoring	0,997	1,003
Overconfidence	0,993	1,007
Cognitive_Dissonance	0,989	1,011

a. Dependent Variable: Loss_aversion

Source: Author

Table 6: Collinearity testing through VIF factor with Herding as dependent variable

Model	Collinearity Statistics	
	Tolerance	VIF
Anchoring	0,992	1,008
Overconfidence	0,987	1,014
Cognitive_Dissonance	0,992	1,008
Loss_aversion	0,983	1,017

a. Dependent Variable: Herding

Source: Author

Table 7: Collinearity testing through VIF factor with Anchoring as dependent variable

Model	Collinearity Statistics	
	Tolerance	VIF
Loss_aversion	0,989	1,011
Herding	0,994	1,006
Overconfidence	0,987	1,013
Cognitive_Dissonance	0,988	1,012

a. Dependent Variable: Anchoring

Source: Author

Table 8: Collinearity testing through VIF factor with Overconfidence as dependent variable

Model	Collinearity Statistics	
	Tolerance	VIF
Loss_aversion	0,99	1,01
Herding	0,994	1,006
Cognitive_Dissonance	0,992	1,009
Anchoring	0,992	1,008

a. Dependent Variable: Overconfidence

Source: Author

Table 9: Collinearity testing through VIF factor with Cognitive dissonance as dependent variable

Model	Collinearity Statistics	
	Tolerance	VIF
Loss_aversion	0,985	1,015
Herding	0,998	1,002
Anchoring	0,992	1,008
Overconfidence	0,99	1,01

a. Dependent Variable: Cognitive_Dissonance

Source: Author

To test how demographic factors influence the way behavioral biases are manifested ANOVA analysis was used. ANOVA or the analysis of variance is a statistical technique for analyzing measurements depending on several kinds of effects operating simultaneously, to decide which kinds of effects are important and to estimate them (Sheffe, 1999). In more simple words it is a statistical method used to examine the effect of one or more independent variables to the one dependent variable. The independent variables are also referred to as factors of influence and they have more levels which affect the level of the dependent variable.

The ANOVA analysis was conducted to examine if gender affects the level of biases in the model.

Hypothesis 0: Influence of behavioral factors does not differ within different genders

Hypothesis 1: Influence of behavioral factors does differ within different genders

Table 10: ANOVA-Testing difference between demographic factor gender and BIAS at the 95% confidence level

BIAS type	Column1	Sum of Squares	df	Mean Square	F	Sig.
Loss_aversion	Between Groups	2	1		2	0,638
	Within Groups	650	270		2	0,425
	Total	652	271			
Herding	Between Groups	3	1		3	2,302
	Within Groups	368	270		1	0,130
	Total	371	271			
Anchoring	Between Groups	1755	1		1755,02	0,003
	Within Groups	157789876	270		584406,95	0,956
	Total	157791631	271			
Overconfidence	Between Groups	0	1		0,05	0,228
	Within Groups	61	270		0,22	0,633
	Total	61	271			
Cognitive_Dissonance	Between Groups	0,000632095	1		0,00	0,003
	Within Groups	62	270		0,23	0,958
	Total	62	271			

Source: Author

Considering that at the 95% confidence level all the p values in the table were above 0.05 it can be concluded that there is no statistically significant difference between males and females when it comes to any of the biases. This suggests that the null hypothesis could not be rejected at the 95% confidence level.

Other demographic factor that was tested against the biases was age. Table 11 shows analysis of variances which was conducted for this purpose.

Hypothesis 0: Influence of behavioral factors does not differ within different age groups

Hypothesis 1: Influence of behavioral factors does differ within different age groups

Table 11: ANOVA-Testing difference between demographic factor age and BIAS at the 95% confidence level

BIAS type	Column1	Sum of Squares	df	Mean Square	F	Sig.
Loss_aversion	Between Groups	20.027	3		6.676	2.833
	Within Groups	631.528	268		2.356	
	Total	651.555	271			
Herding	Between Groups	5.223	3		1.741	1.276
	Within Groups	365.714	268		1.365	
	Total	370.938	271			
Anchoring	Between Groups	1110106.17	3		370035.39	0.633
	Within Groups	1,57E+08	268		584.632.555	
	Total	1,58E+08	271			
Overconfidence	Between Groups	0.322	3		0.107	0.478
	Within Groups	60.233	268		0.225	
	Total	60.555	271			
Cognitive_Dissonance	Between Groups	0.122	3		0.041	0.175
	Within Groups	62.286	268		0.232	
	Total	62.408	271			

Source: Author

The results of the ANOVA analysis suggest that age does not alter the level of herding, anchoring, overconfidence and cognitive dissonance variables however it does affect the level of the loss aversion variable. Table 11 shows statistically significant difference ($p < 0,039$) between demographic factor age and bias loss aversion at the 95% confidence level meaning that the null hypothesis could be rejected.

By rejecting the null hypothesis, one concludes that the mean of the groups are not equal.

To be more exact, when ANOVA test is conducted one attempts to determine if there is a statistically significant difference among the groups that are not related to sampling error. If there is a difference, then there is a need to examine where the groups' differences may lay. Therefore, the post-hoc tests tell the researcher which group in particular which groups differ from one another.

To further test the connections of age and loss aversion additional analysis was done on those two variables. Moreover, to test if the significant relationship exists between age and loss aversion Scheffe's ad hoc test was conducted in SPSS.

Table 12: Sheffe's test on the correlation between age and loss aversion

(I) Which age group you belong to?	(J) Which age group you belong to?	Mean Difference (I-J)	Std. Error	Sig.	Interval	
					Lower Bound	Upper Bound
do 25	26-40	-,55155	,37428	,539	-1,6045	,5014
	41-50	-,67337	,43021	,486	-1,8837	,5369
	above 50	,22474	,42850	,965	-,9808	1,4303
26-40	up to 25	,55155	,37428	,539	-,5014	1,6045
	41-50	-,12182	,26348	,975	-,8631	,6194
	above 50	,77629	,26068	,033	,0429	1,5097
41-50	up to 25	,67337	,43021	,486	-,5369	1,8837
	26-40	,12182	,26348	,975	-,6194	,8631
	above 50	,89811	,33607	,070	-,0474	1,8436
iznad 50	up to 25	-,22474	,42850	,965	-1,4303	,9808
	26-40	-,77629	,26068	,033	-1,5097	-,0429
	41-50	-,89811	,33607	,070	-1,8436	,0474

Source: Author

The results of the regression show that at the 95% significance level p value was 0,033 for the group of age between 26 to 40 and the group above 50 meaning that there really is a correlation between age and loss aversion behaviour for these two groups. To determine in which direction the correlation goes additional analysis was conducted and is shown in the tables 13 and 14 below.

Table 13: Differences between age groups and loss aversion bias (count)

Count

	Which age group you belong to?				Total
	up to 25	26-40	41-50	above 50	
Loss_aversion 4,00	2	7	3	5	17
2 5,00	1	28	5	11	45
6,00	6	28	7	7	48
7,00	5	59	9	8	81
8,00	3	30	3	7	43
9,00	0	20	9	0	29
10,00	0	6	2	1	9
Total	17	178	38	39	272

Source: Author

Table 14: Differences between age groups and loss aversion bias (percentage)

	Which age group you belong to?				Total
	up to 25	26-40	41-50	above 50	
4,00	12%	4%	8%	13%	6%
5,00	6%	16%	13%	28%	17%
6,00	35%	16%	18%	18%	18%
7,00	29%	33%	24%	21%	30%
8,00	18%	17%	8%	18%	16%
9,00	0%	11%	24%	0%	11%
10,00	0%	3%	5%	3%	3%
	100%	100%	100%	100%	100%

Source: Author

Finally, the results show that people belonging to the group age of 26 to 40 are less risk averse than people above 50 years of age.

Furthermore, ANOVA analysis was used to test if education level affects the level of biases. The result of the SPSS analysis is shown in the table below.

Hypothesis 0: Influence of behavioral factors does not differ within different levels of education

Hypothesis 1: Influence of behavioral factors does differ within different levels of education

Table 15: ANOVA-Testing difference between level of education and BIAS at the 95% confidence level

BIAS type	Column2	Sum of Squares	df	Mean Square	F	Sig.
Loss_aversion	Between Groups	5	4	1	0	0,743
	Within Groups	647	267	2		
	Total	652	271			
Herding	Between Groups	7	4	2	1	0,287
	Within Groups	364	267	1		
	Total	371	271			
Anchoring	Between Groups	3167488,271	4	791872,068	1,367	0,246
	Within Groups	1,55E+08	267	579.117		
	Total	1,58E+08	271			
Overconfidence	Between Groups	1,143	4	0,286	1,284	0,277
	Within Groups	59	267	0,223		
	Total	61	271			
Cognitive_Dissonance	Between Groups	0,81	4	0,203	0,878	0,478
	Within Groups	62	267	0,231		
	Total	62	271			

Source: Author

By checking the level of significance for each of the variables it can be concluded that there does not exist significant differences within people of different education levels since p value was below 0.05 for all the biases tested. Therefore, the null hypothesis could not be rejected at the 95% confidence level

Along with testing of the influence of the demographic factors onto the bias variables additional ANOVA analysis was done to see if the fact that people have heard of behavioral economics affects the level of biases. The result of the analysis is shown in the table 16.

Hypothesis 0: The notion of behavioral economics affects the level of behavioral biases

Hypothesis 1: The notion of behavioral economics does not affect the level of behavioral biases

Table 16: ANOVA-Testing difference between being acquainted with the concepts of behavioral economics and BIAS at the 95% confidence level

BIAS type	Column2	Sum of Squares df	Mean Square	F	Sig.
Loss_aversion	Between Groups	5	4	1	1
	Within Groups	646	267	2	0,709
	Total	652	271		
Herding	Between Groups	2	4	0	0
	Within Groups	369	267	1	0,847
	Total	371	271		
Anchoring	Between Groups	1077781,843	4	269445,461	0,459
	Within Groups	1,57E+08	267	586.943	0,766
	Total	1,58E+08	271		
Overconfidence	Between Groups	0,519	4	0,13	0,577
	Within Groups	60	267	0,225	0,679
	Total	61	271		
Cognitive_Dissonance	Between Groups	0,749	4	0,187	0,811
	Within Groups	62	267	0,231	0,519
	Total	62	271		

Source: Author

The results do not oppose the rejection of the null hypothesis since for none of the biases significance level was not below the threshold or $p > 0.05$ at the 95% confidence level. Therefore, the null hypothesis can be rejected.

When it comes to the investment preferences with private investors in Croatia a 4-point scale was used to estimate which type of investment they prefer the most. The aim was to see how rational their choices are with respect to the current market situation in Croatia and to see how high or low are real estate investments ranged in their list of preferred investments.

The respondents were asked to range four most common types of investments – bank deposits, shares, real estate, and bonds based on their level of preference in the range of 1 (mostly preferred) to 4 (the least preferred).

Table 17 gives the outcome of the analysis where it was shown that bank deposits and real estate share the first two places of the most preferred investments among the private investors in Croatia. Results show that 45% of the respondents would prefer bank deposits as the ideal type of investments while the real estate takes the high second place with being the most preferred type of investment for 31% of the people. Furthermore, it is interesting to note that only 11% of people answering the question see bonds as their preferred type of investment even though it is, along with bank deposits, considered to be the safest in terms of gains and losses of invested money through time.

Table 17: Investment preferences of private investors in Croatia (total count)

	I prefer the most	I prefer to great extent	I prefer to a lesser extent	I do not prefer
Bank deposits	123	66	39	44
Shares	29	70	97	76
Real estate	84	88	62	38
Bonds	36	48	74	114
TOTAL	272	272	272	272

Source: Author

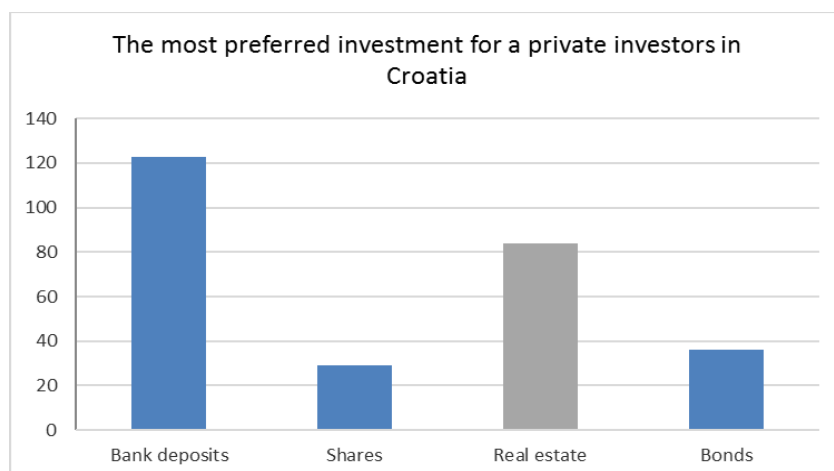
Table 18: Investment preferences of private investors in Croatia (percentage)

%	I prefer the most	I prefer to great extent	I prefer to a lesser extent	I do not prefer
Bank deposits	45%	24%	14%	16%
Shares	11%	26%	36%	28%
Real estate	31%	32%	23%	14%
Bonds	13%	18%	27%	42%
TOTAL	100%	100%	100%	100%

Source: Author

Chart below depicts the extent of the liking of real estate investments in front of bonds and shares. To be more exact, as preferred type of investment real estate investments have advantage before shares and bonds for high 18 percentage points.

Figure 26: Investment preferences of private investors in Croatia



Source: Author

Furthermore, respondents were asked to rate their knowledge of the financial markets from 1 to 5 where 1 meant the lowest level of knowledge and 5 the highest level. For the simplicity reason people which rated themselves with rates from 1 to 3 were marked as average when it comes to their knowledge of the financial markets in Croatia and the others were marked as the above average. Cross tabulation analysis was done to see who are the people that prefer real estate as type of investment – the ones with average or above average knowledge. Table below depicts the results of the analysis.

Table 19: The distribution of preferred investments based on the self-rated level of knowledge

		1st place				Total
		bank deposit	shares	real estate	bonds	
How would you rate your knowledge of the Croatian financial market	Average	92	22	73	29	216
	Above average	31	7	11	7	56
Total		123	29	84	36	272

Source: Author

The cross tabulation analysis shows that it was mostly people who rated themselves as average that put a highest rank to real estate as their most preferred type of investment. To be more exact it is 34 % of the people with average knowledge while 20% of the people who rated themselves above average ranked real estate as number one type of preferred investment.

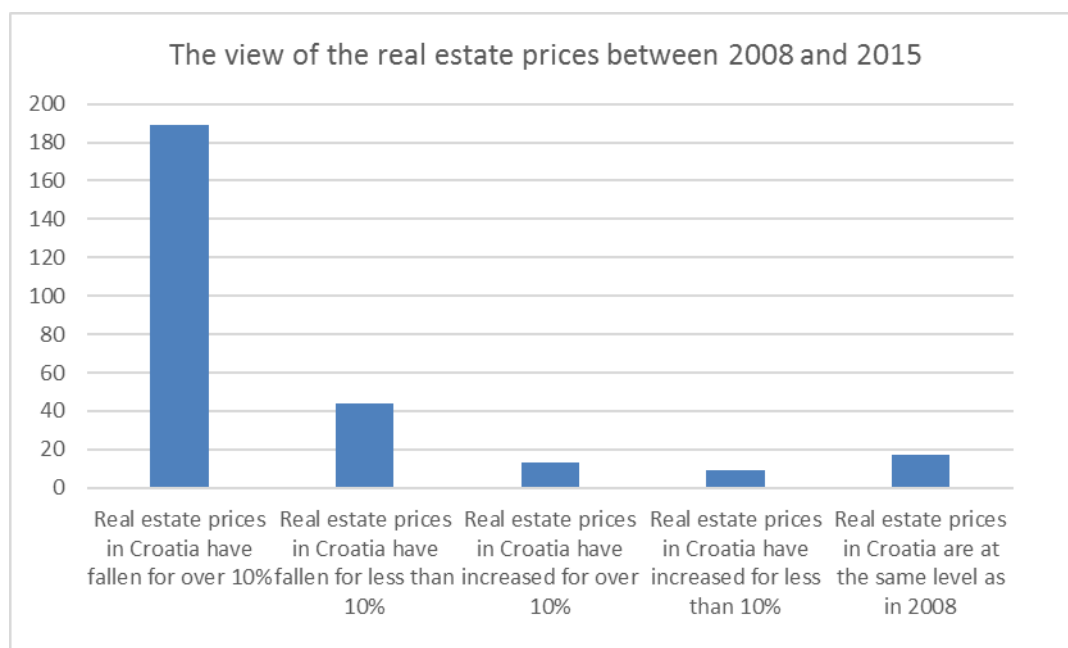
When it comes to the awareness of the seriousness of the crisis people showed to have a good perception. They were asked to estimate the in which direction and by how much have the property prices developed in Croatia. Table 22 depicts the real situation whereas Figure 30 shows the distribution of peoples' answers.

Table 20: Average price per square meter of property in Croatia from 2008 to 2015

Year	2008	2009	2010	2011	2012	2013	2014	2015	2015/2008
Avg. price for a sq.m	1.722 kn	1.720 kn	1.698 kn	1.541 kn	1.537 kn	1.520 kn	1.309 kn	1.405 kn	
Yearly movement		-0,1%	-1,3%	-9,2%	-0,3%	-1,1%	-13,9%	7,3%	-18%

Source: burza nekretnina, 2016

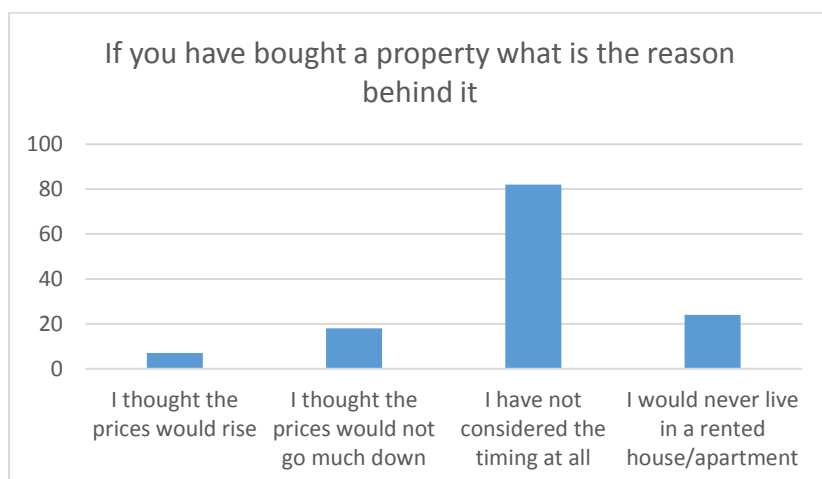
Figure 27: Direction of properties' price movements in Croatia between years 2008 and 2015



Source: Author

Furthermore, considering their knowledge of the Croatian real estate market the goal was to further see people's reasonings behind their own investments. Therefore, in the survey they were asked whether they have bought a property in recent years. The ones that have were afterwards given a few reasons to choose between as the reason behind their purchase. Out of 131 people that have bought a property recently over 60% of them have not considered the timing in terms of market trends. Those people have not thought through whether the prices are at their peak or if they have hit the bottom. The distribution of answers is shown in figure 31.

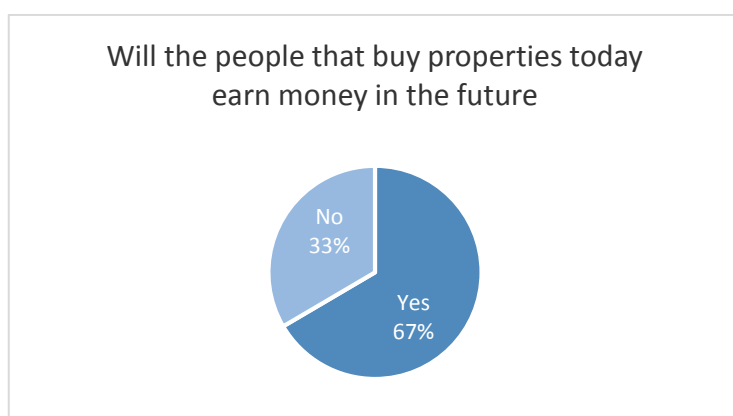
Figure 28: Distribution of answers given as a reason for the property purchase



Source: Author

Moreover, if the people have not considered the current market trend the question is what are they expecting the future will bring. To see whether they are optimistic people were asked if they expect a profit or a loss to happen in the future for the ones that buy a property today. 67% of people answered they expect a profit even after 60% of people perceived correctly the magnitude of the price drop in the last 7 years. Answers are depicted in figure 32.

Figure 29: Peoples' perception on whether the ones buying a property can earn on this property in the future



Source: Author

Furthermore, out of this 67% of people who believed in the positive outcome of the future market trends 50% were the people that did buy a property in the recent years. To be more exact

181 people out of 272 viewed the optimistic future. Out of 181, 90 people were the ones that have participated in buying of an apartment or a house in recent years meaning that 68% of home buyers was optimistic about their earnings in the years to come. Table below gives the distribution of answers of the home buyers regarding their future expectations.

Table 21: Future expectations on earnings of the people that have bought a property in the recent years

If the answer to previous question is "Yes" in which year did you buy a property* Overoptimism Crosstabulation			
	Do you believe people that buy a property today will earn money in the future		
Year	Yes	No	Total
2004	1	0	1
2005	2	1	3
2006	6	2	8
2007	9	6	15
2008	14	4	18
2009	12	3	15
2010	5	6	11
2011	1	8	9
2012	8	3	11
2013	10	3	13
2014	9	3	12
2015	9	1	10
2016	4	1	5
Total	90	41	131

Source: Author

One of the first finding of behavioral economics was loss aversion. As mentioned before loss aversion paradigm states that the feeling of dislike towards loss with people is more intense than the feeling of happiness when they are faced with the same level of gain. Due to these sentiments people are more keen to taking risk when they are faced with losing which is another example that opposes the rationality of “Homo economicus”. In order to test this the same

question with two different choices which offer the same outcome was given to different groups of people.

The question goes as follows:

You have gained 50 HRK however you are faced with two options out of which you have to choose one:

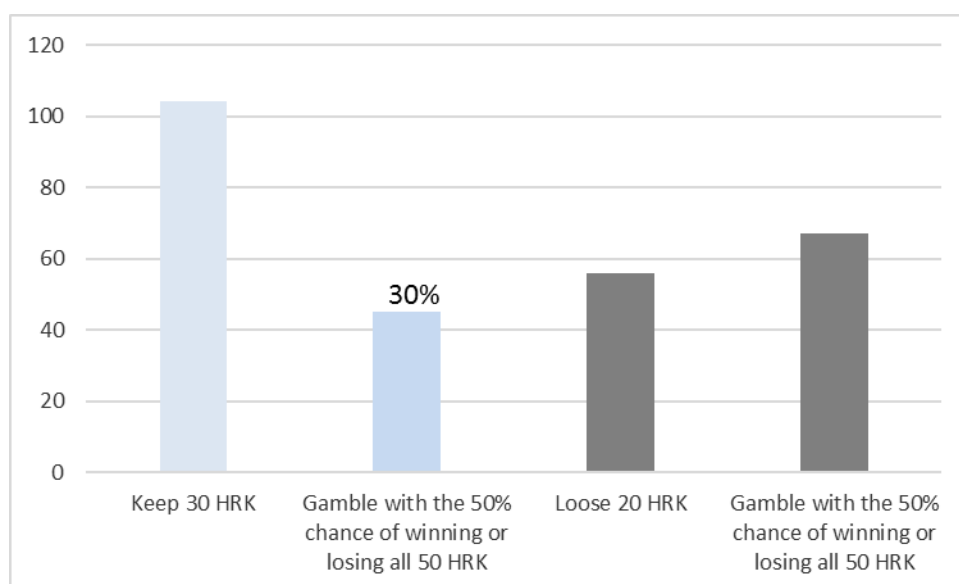
- 1) Keep 30 HRK
- 2) Gamble with the 50% chance of losing or winning all 50 HRK

1a) Loose 20 HRK

2a) Gamble with the 50% chance of losing or winning all 50 HRK

One group of people was offered choices 1 and 2 while the other was offered choices 1a and 2a. Choices 1 and 2 effectively offer the same outcome of winning 30 HRK. However the key difference is that the first group of people perceived the secure gain while the second one the secure loss. The summary of answers of two groups is shown in the figure below.

Figure 30: Loss aversion amongst two groups of respondents



Source: Author

The figure shows that the group of people faced with a secure loss was more keen to taking risk and gambling for more than the first group of people which mostly chose to keep the money they have secured. To be more exact 70% of people in the first group chose to keep 30 HRK while only 46% of people in the second group chose the loss of 20 HRK which would make them keep the other 30 HRK. The effect of being faced with a secure loss led to 54% of the people taking risk of winning or losing all.

However, this was not an isolated example where people showed the same pattern of behaviour. In another question respondents were put in the hypothetical situation where they face market drop. The price at which they bought an imaginary house costed 1.900 € per square meter. The question was which price would they ask if forced to sell it.

The result of the question showed that 40% of people would ask for the same price at which they bought it or even higher than that while 60% would ask for less than 1900€ per square meter.

A similar type of question was given but with shares. In this situation, also faced with market breakdown 70% of people decided not to sell their shares when they see the prices begin to drop while the other 30% would sell the shares if the market situation start to show negative trends.

Another behavioral principle which was put to test was anchoring. In the questionnaire people were asked to write the current time in the form of XXXX meaning that if the current time of answering the questionnaire was 10:55 they would write 1055. After that question they were asked to estimate the average price of the square meter for the apartment in Zagreb. The purpose is to see whether the number they wrote before really affected their estimates of the average price of the real estate in Zagreb. The result of the analysis is shown in tables below.

Table 22: Change in estimates of average price per square meter depending on the time of the day (hour of filling in the questionnaire)

Hours	Average price	% change
04-07 h	1.262,00 €	0%
07-10 h	1.490,87 €	18%
10-13 h	1.528,33 €	3%
13-16 h	1.567,84 €	3%
16-19 h	1.600,00 €	2%
19-21 h	1.520,00 €	-5%
21-24 h	1.574,07 €	4%

Source: Author

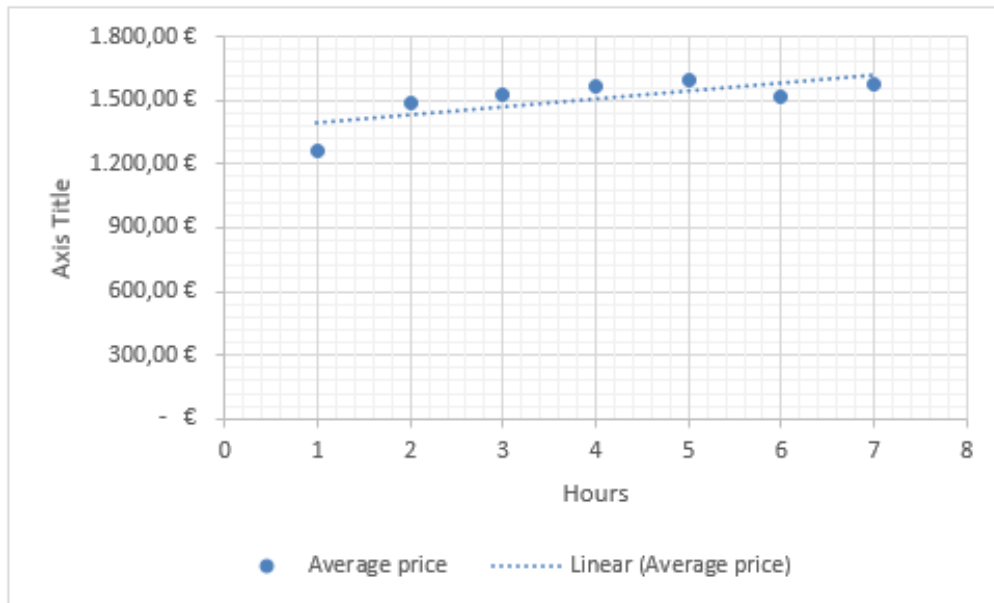
Table 23: Average change in estimates of average price per square in the morning and in the evening

Hours	Average price
04-13h	1.501,13 €
13-24h	1.563,36 €

Source: Author

Tables show that by every hour the price rose for a certain percentage even though the time of the day does not have direct impact of the real estate market prices. In other words people who wrote a lower number on the account of the time of the day when they were filling in the questionnaire on average put a lower price to the average square meter of the apartment in Zagreb whereas people who were answering questions in the later hours on average put a higher value to the average Zagreb's square meter of the real estate. The average difference between the people who answered questions until 13h and after 13 hours was 63€. The results are depicted in the chart below showing a graduate rise of the prices by the hour.

Chart 1: Average change in estimates for price of a square meter of apartment in Zagreb depending on the hour of the day



Source: Author

5.5.Findings

When conducting research the aim was to see if the behavioral biases influence behavior of the Croatian private investors. Through the online survey people were able to respond in the honest manner without being afraid of their identity being disclosed.

As previously shown in the Analysis paragraph statistical finding have given a solid ground for drawing conclusions considering that the variables chosen formed an internally consistent model. Furthermore, it was shown that multicollinearity amongst the variables did not exist and was therefore not a problem for the further analysis.

Interestingly all the biases which were tested were proven to exist even in such a small market as one would consider the Croatian market to be.

The analysis showed that no other demographic factors but age affect the level of behavioral biases. While there was no significant difference in behavioral biases for different genders, education levels or for people that have had some knowledge on the behavioral finance it was shown that the difference does exist amongst different age groups. The bias for which this

difference existed was the loss aversion bias. As one of the corner stones of behavioral economics is the loss aversion theory which states that people tend to enter into risk seeking behavior once they face a loss, whereas they are more risk averse when they perceive a gain. When the further analysis was done it could be concluded that younger people in the age group of 26 to 40 are less risk averse than people above 50.

These results go in line with some other researches done by Johnson, Gachter and Herrman who have shown through their questionnaire that loss aversion increases with age (E.J.Johnson, S.Gachter, A.Herrmann, 2006). Furthermore, Arora and Kumari have also concluded that people in age groups of 25-40 are less risk averse than the ones ageing from 41 to 55 (M.Arora, S.Kumari, 2015). One of the explanations they offer is that older people have less time to compensate for the loss and are therefore more willing to gamble. Also Arora and Kumari (2015) state that younger people might not have as much to lose as older ones who have worked for their assets a long period of time. In order to determine what reason lies behind such a distribution of loss aversion amongst different age groups further research should be conducted. Nevertheless the existence of loss aversion and its deviations through age groups has proven to exist.

Furthermore, loss aversion was also tested through the questionnaire where it was shown that the group of people which was put in a situation where they choose between a certain loss of a sum of money and an opportunity to gamble would more often choose to gamble than the ones which were offered to choose between a gain and an opportunity to gamble for an even higher gain. As stated before both groups were effectively offered the same amount of money to keep but nevertheless the results were different depending on their perception. This shows that loss aversion affects decision making process with private investors in Croatia as it does with the ones in the US market where it was first identified through the research done by Tversky and Kahneman in 1979.

Loss aversion behaviour with people is what behaviorists see as part of the reason for the housing bubble in 2008. People are reluctant to sell their houses below the price for which they bought it because they do not want to lose the money originally invested. When faced with the market fall down people would rather hold on to their assets than not gain as much as they perceive as fair even though there might be no realistic reason to believe the markets are ever to be recovered. This was proved to be true through another question in the survey where even when faced with the hypothetical market drop, 40% of people would still ask for same or higher

price for the real estate they bought earlier. In Croatia people perceive their houses to be their homes and not only brick constructions. The attribution of emotions to their properties is part of the reason why they value their homes more than the market does. This is also due to the fact that Croatians do not move a lot over their life time. Most of them find work in the same cities they grew up in. In line with this statement, Croatian bureau of statistics states that during 2015 their residences within Croatia has changed only 75 927 of Croatians, which is around only 2% of the whole Croatian population (www.dzs.hr, 2015).

What is interesting to notice is that when it comes to shares people answered in an even more loss averse manner than with real estate. One of the explanations might be that people are aware how volatile Croatian stock market is and are therefore prone to be optimistic and believing that market drop would eventually turn around. However, what the market itself has shown is that this is not always the case. The most famous IPO in Croatia was the one of the Croatian Telekom in 2007. It was highly advertised and 330.000 of small investors went on to buy their packages of HT shares which was then worth 265 HRK per share (www.poslovni.hr, 2008). A few days after an IPO the share reached its peak being worth 419 HRK per share. Ever since the share has never crossed the value of 200 HRK per unit. It has been ten years since then and today these shares are worth 175 HRK each (www.zse.hr, 2017). Therefore, it would be misleading to believe that markets that go down should eventually recover because the reality shows different.

This example with the shares of Croatian Telekom shows not only loss aversion where people hold on to their assets rather than facing a loss but this is also an example of herding behavior. Considering Croatia has ended a war in 1995 and has ever since been trying to reassemble its economy it is fair to declare Croatian financial markets to be underdeveloped and unstable in comparison to other European financial markets. Nevertheless 330.000 of Croatian citizens have decided to participate in one of the most famous IPOs in Croatia in 2007 (www.poslovni.hr, 2008). This is above 8% of the population or in different words every 12th citizen has bought their package. It is said that this IPO was so successful due to euphoria which existed at those times in Croatia which led many financially uneducated small investors to invest because others were doing so (www.slobodnadalmacija.hr, 2015). Behavioral economists have identified this behavior as a so called herding bias. Amongst the people answering the questionnaire 52% of the respondents have declared that themselves or a close member of a family have participated in the HT IPO in year 2007.

Herding bias has shown to be dangerous in times of the crisis when people withdraw their assets from the banks in order not to lose them. However, in times of prosperity economists fear that herding behavior as type of reliance on other's knowledge and collective information may be the cause of price deviations from their intrinsic values and might therefore mislead to be seen as a profitable investment opportunity (Hachicha, 2010). When it comes to the real estate market in Croatia, the amount of loans, which was skyrocketing in the times preceding the crisis, (shown in Figure 16) is also one of the consequences of herding behavior in Croatia. Considering the easiness of getting a loan and the amount of people that were requesting it the decision of buying a home was thought not to be that difficult and this is why people did not even consider the timing of purchase as shown in the questionnaire.

Furthermore, loss aversion is not the only reason why people choose not to sell below a certain price regardless of the current market situation. Another bias researched by the behavioral economists is also anchoring bias. This bias makes people connect their estimates to some anchor which might or might not be necessarily linked to what is being estimated. What the analysis of the questionnaire has shown is that the price people ask for their property might be connected to a random number they were exposed to moments before. People were asked to write an exact time (hour and minutes) during which they were filling a questionnaire and were right afterwards asked to estimate an average price of a square meter for an apartment in Zagreb. Eventhough one is not in any manner connected to another it was shown that people were still influenced by the number they stated before and average price showed to change depending on a time of the day. In this example hours and minutes were the anchor people used to be more confident around giving an estimation of an average price. In reality when it comes to the real estate this anchor is usually the price they paid for their property. Anchoring bias exists not only with private investors but also with institutions. During the peak of the crisis when many loans were proven to be bad and banks could only take over the property for which the loan was given they also chose not to sell the properties at a loss or a lower price which would not cover the granted loan (lider.media.hr, 2012). These institutions have therefore influenced keeping an unrealistically high prices on the real estate market due to which the market could have not corrected itself fast enough. Former Croatian minister for construction sector said in year 2012 that it is not the market or the investors which hold the real estate prices high but it is the banking sector (www.danas.hr, 2012).

Due to the effect of anchoring on people, marketing and sales industries could make a great use of this bias considering that people might be influenced to accept higher prices depending to

what were they exposed to before the first contact with a price information. In an experiment done by Campbell and Sharpe real estate agents asked the students to price different real estate properties which had previously listed prices. The authors confirmed their hypothesis that students anchored values which were previously assigned to properties even if the price was not adequate to the properties' market value (S.D.Campbell, S.A. Sharpe, 2009). By being humans this is hard to avoid but trying to gather the right set of information before deciding to purchase one could diminish an effect of this mind "trap".

Another characteristics that identifies us as being humans is the want to be right. In the behavioral economics world this is manifested through overconfidence but also overoptimism bias. Overoptimism bias was shown through the example where people believe the future brings earnings for the people who invest in the real estate today. What is more important this belief is especially spread among the ones that have participated in the real estate market in recent times. The reason for such positive predictions hold no real ground since economic and demographic situation in Croatia indicates that due to low birth rate, ageing population, high emigration and slow economic recovery Croatia could end up with surplus of properties which would influence a decrease in prices for real estate in the future. Therefore if a rational agent would take all the current aspects in the equation he/she would probably be more pessimistic about the future outcome of the property investment. Nevertheless, overoptimism and the strength of a will to believe one was right will push one's believe in the direction to justify the acting in a certain way.

Just like being overoptimistic people also tend to have high opinions of their knowledge. The results of the survey show that 63% of people rated their knowledge of the Croatian financial market as average and above. Moreover, when asked if in 2007 they were told that the crisis was coming would they have believed such a statement 64% of respondents stated they would even though 2007 was the year of prosperity for Croatian economy when the real estate prices were still rising. Contrary to their statement in mentioned questions, the majority of these people think institutional investors like the pension funds hold high percentage of property investments in their portfolios. The reality is that property investments represent on average only around 5% of their total portfolio due to the low liquidity and high uncertainties in the real estate market (A.Andonov, et al., 2012). Moore and Healy state that overconfidence is defined through its three versions. First one alludes "overestimation of one's actual performance", the second "overplacement of one's performance relative to others" and the third "excessive precision on one's beliefs" (D.A.Moore, P.J.Healy, 2007). Some authors have suggested that overoptimism

is good for a professional life in terms of credibility but have warned that the same bias leads to „faulty assessments, unrealistic expectations and hazardous decisions“ (D.D.P. Johnson, J.H.Fowler, 2011). Believing that one „knows better“ and can beat the market by predicting its course of movement is one of the causes to the housing bubble because of a belief that there will be an agent who will be willing to pay more in the future.

6. CONCLUSION

6.1.Summary

One only becomes aware of the strength of vulnerability of the world in the times of crisis. It is then when we start to realize the effect consequences of economic policies might have on our private lives. When the 2008 crisis hit the economies around the world many people were left homeless, many lost their jobs and some lost their savings due to the fall of some of the biggest institutions in the world (Sard, 2009).

By loosening the control over financial sectors people that were previously not eligible were now able to get a loan and buy a house. The reason why banks were asking for less collateral is due to their activities on the secondary market where they could sell these loans and release additional liquidity for further investments. Since the housing prices have been in a constant growth in years preceding 2007 many believed the trend would continue in the years after. Therefore, the situation was as follows – loans were very accessible for a wider public, interest rates went down, the demand for real estate pushed the prices up and finally money was cheap because the securitization and shadow banking allowed commercial banks to participate on the secondary market and look for additional liquidity by selling derivatives to the financial institutions that were looking to earn money through speculations. This irrational exuberance as R.J.Shiller calls it has led to a so called bubble on the housing market which had to burst eventually.

When bad loans started to take its toll and debtors could no longer repay their debt the rate of foreclosures started to skyrocket. Moreover, not only were people not paying their loans but the prices of the real estate started to deflate and banks could no longer recover even through selling of the real estates they took away from the bad debtors. The crisis of the credit market led eventually to the crisis of the financial sector due to the interconnections of bad loans and derivatives which further on spilled over to the other sectors and caused the global financial crisis. This crisis is sad to be the biggest since 1930s and has reached such a scale that the costs are measured in tens of trillions of US dollars. Bloomberg news states that the US has suffered a cost of 12,8 trillion US dollars (Bloomberg L.P., 2012) while The Telegraph estimates that additional 11,9 US dollars were put into global economy for bailouts by the IMF (The Telegraph, 2009).

Considering that Croatia is a small and a highly dependent economy the spillover effect has not bypassed its grounds. After becoming independent in 1991 Croatia has gone through many economic changes in order to transition from the socialistic onto the market-led economy. The post-war times were marked with privatization of the state companies, corruption repressions and EU accession which finally happened in 2013. While in terms of financial regulations and economy Croatia has indeed transitioned from the socialistic times however, peoples' mindset have not entirely. When it comes to their homes people have kept the mindset which existed in former Yugoslavia which alludes that each individual or at least a family should own its property. In times of socialism the state had ensured housing rights to many individuals who could buy a state apartment for a very low price. Housing ownership was almost regarded as a basic human right like education. Therefore, in time of global euphoria on the housing market in Croatia, irrational exuberance was part of this country's reality as well and everybody felt entitled to their own apartment or a house. The demand on the real estate market was in a constant growth before 2008 leading housing prices high up. Loose rules on loan grants led to an increase of debt of the private households which eventually led to the US scenario with the credit crisis spilling over to the whole Croatian economy.

When the crisis made everybody feel its presence the whole world was questioning its root cause and why its proportions were so large-scale. While many agreed that the prices on the housing market were inflated and that the housing bubble was the trigger for the crisis the core of this problem was not something standard economic theory offered explanations for. Instead new approach to the problem was starting to be more appreciated since it offered different motives, other than profit, for such a market behavior which led to the crisis. This new approach is called behavioral economics and had its first big appearance in 1979 when two psychologists Daniel Kahneman and Amos Tversky developed prospect theory. This theory gave a different view of decision-making process and put to question the concept of human rationality. Instead of good sense the role of psychology was introduced as a dominant factor which shapes behavior of market participants. The biggest switch in views from the standard economic principles was the statement that people are under influence of different biases which cause the flaws and irrationality in their decision making process. Some of these biases include loss aversion, herding, overconfidence, overoptimism and anchoring.

Loss aversion is part of the prospect theory and it explains that the pain of losing is greater than the same amount of gaining. These feelings cause a risk seeking behavior when one is experiencing a loss and a risk averse behavior when experiencing a gain. Herding bias states

that people believe the group and tend to follow it whereas anchoring bias gives an insight into the process of giving estimates or setting expectations based on anchors or any available information which is not necessarily connected to what is being estimated. Anchors give our mind a sense of direction and more comfort in the decision making process. Finally, overoptimism is showed as expecting positive outcomes regardless of the realistic factors while overconfidence is the feeling of being dominant in the level of knowledge.

The objective of this paper was to test whether behavioral biases have the effect on the participants of the Croatian financial market with more focus put onto the real estate where the crisis started from. In order to test rationality of Croatian market agents a questionnaire was distributed online in order to reach the wider public. A total number of respondents equals to 272. Valid responses were distributed to form variables for the statistical analysis which was necessary to test the different hypothesis. Tests which were conducted in the SPSS were Cronbach Alpha, VIF model, ANOVA analysis and Sheffe's test. Moreover, additional analysis were also done though Microsoft's Excel program.

The data analysis has shown that private investors in Croatia are indeed affected by the behavioral biases when making a decision. Moreover, even the notion of having heard of behavioral economics has proven not to diminish its influence on people. What was proven is that in principle the affect of biases does not differ by gender, education or age however, with one exception. The extent of loss aversion bias was shown to alter within different age groups. People from 26 to 40 years of age were proven to be less loss averse than people above 50 which goes in line with researches of other authors. This suggests that people above 50 tend to take more risk when losing but this would have to be further researched in order to explain it in more depth. Nonetheless, the analysis showed that in a hypothetical situation, on average, people which were presented two options out of which one was a loss and the other a gamble did tend to choose the riskier option in comparison to the people which were presented a gain and a gamble options. Furthermore, people showed the tendency to being overoptimistic in their estimations of the future especially if they have something in stake in terms of assets which are expected to bring a gain. When it comes to overconfidence most of the respondents showed to believe they have average or above average financial knowledge which they rely on when making decisions. When this was tested above 60% of people have showed having wrong information regarding the real estate investments and market situation. Finally, anchoring and herding biases also proved to be present when making simple estimates. Respondents showed to be influenced by the input of others when making an investment decision. Also, people were

led to anchor the time of the day to the average price of a square meter of an apartment in Zagreb. Depending on the time of the day the average estimates for a square meter price deferred even though realistically hour of the day should not matter for the estimations.

The implication of these findings could serve to a great extent to the private investors in order to try to reduce the impact of the behavioral biases in an everyday life. It is not only the ordinary people that fall into the “mind traps” but so do the institutions and governments which are, in the end, led by these same people. However, becoming aware of the flaws of our mind one can make an effort to correct them or at least recognize its influence. Such an effort could also mean a prevention of potential financial crisis in the future.

To conclude, all but one of the hypothesis tested proved to be true. The only exception is the interconnection of age and loss aversion bias which was thought not to be correlated. Also, the results of the analysis showed that Croatian private investors could not be considered rational agents since they are not perfectly informed of the market situation nor do they base decisions on previously well observed parameters. As a matter of fact, most of them make decisions based on the “good feeling” not even considering if the investment timing is optimal. Therefore, there is a significant influence of the behavioral biases and psychology on the Croatian investors.

6.2.Limitations of the study

For the research purposes of this thesis data was gathered through the internet based survey. Respondents analyzed in the survey come mostly from Zagreb and represent a minor part of the Croatian population. Considering there exist limitations in sampling in terms of availability and accessibility of respondents’ any firm generalization should be avoided.

Moreover, making financial decisions might sometimes be demanding and requires putting more time and effort if the sum of money in question is extensive. Considering this was an online based survey where respondents are more relaxed and easy-minded while answering there might appear discrepancies between these hypothetical examples in the survey and the real life situations.

6.3.Future research

Considering behavioral economics is very contemporary subject and is considered fairly new there is a variety of topics which would offer interesting and educative findings. Since biases tested in this thesis are not the only ones which were identified by the economists and psychologists it would be interesting to test all the other biases on the example of Croatia.

Furthermore, since in this thesis it was shown that age affects the loss aversion bias, future research could test this collinearity by further segmenting of the age groups to better understand the effect and the threshold of change in behavior.

In addition, considering Croatian study programs offer only very limited amount of subjects connected to behavioral economics it would be of use to conduct the same survey in the environment where there exists better knowledge of the matter. The aim would be to see how does education affect the presence of biases with people in order to encourage further education with people.

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APPENDIX

Survey on Real estate market in Croatia

- 1) Have you participated in the real-estate market (either through buying or selling transactions) in the last 10 years?
 - a. Yes
 - b. No
 - a) If yes, please state the year
- 2) If you have bought a property what was the reason?
 - a. I thought prices will increase
 - b. I thought prices will not fall any further
 - c. I didn't consider whether the moment of my transaction was optimal or not
 - d. I would never live in a rented house/apartment
- 3) From 1 to 5 how would you rate your knowledge on the Croatian financial markets (1 low level of knowledge, 5 high level)?
- 4) Would you say that the US Real estate market is better regulated than the Croatian real estate market?
 - a) Yes
 - b) No
- 5) You have gained 50 kn but you have to choose one of the two options below
 - a) Keep 30 kn
 - b) Gamble with 50% probability to win or lose whole 50 kn
- 6) In 2008 you have bought an apartment in the outskirts of the city. It is a 60 m² apartment for which you have paid 1900€ per m². Today you have to sell it. What is the price you would ask for a m²?
- 7) You have gained 0,5 million kn by playing a lottery and you have decided to invest in the stock market. Most of the money you decided to invest into a company which was recommended to you by a close family member towards which you hold a great deal of trust and who has previous trading experience. For a respective company it was expected that it would be taken over by another German company due to which the stock prices were thought to grow in the future. However, half year after the

investment goes bust and the stock price goes down for 15% comparing to the buying value. Would you sell the stock or not?

a) Yes

b) No

- 8) Four years ago you have inherited an apartment of an estimated value of 600.000 kn. It is an apartment outside the city center. However considering the negative trends on the real estate market today the apartment is worth 80.000kn less and the prices are expected to fall even further. Considering the falling value would you consider selling this apartment?

a) Yes

b) No

- 9) You want to buy an apartment. Optimally you would buy a 60m² apartment for up to 78.000€. However, the real estate agent offers you a place which he thinks you might like. It is a 70m² apartment with a terrace and a private garage (garage is worth 10.000€). Without a garage the apartment is worth 94.500€, and with a garage 98.000€ (discount you would get for a garage is 6.500€). What would you do?

a) Keep on looking

b) Buy an apartment without a garage

c) Buy an apartment with a garage

- 10) want to buy an apartment. Optimally you would buy a 60m² apartment for up to 78.000€. However, the real estate agent offers you a place which he thinks you might like. It is a 70m² apartment with a terrace and a private garage (garage is worth 10.000€). Without a garage the apartment is worth 94.500€, and with a garage 98.000€ (discount you would get for a garage is 6.500€). What would you do?

a) Keep on looking

c) Buy an apartment with a garage

- 11) In an XXXX form please write what is the current time (eg. 1305 means it is 13h and 5min)

- 12) What would you say what was an average price of a m² for an apartment in Zagreb in December, 2015?

13) You have won 10 million kn by playing a lottery, where would you invest this money?

- a) Shares
- b) Real-estate

14) Have you or any of your close family members participate in an HT IPO in 2007?

- a) Yes
- b) No

15) You have been considering investing some of your savings on the stock market.

Before you have not had any experience investing due to lack of knowledge. While talking to your colleagues you have seen that most of them have invested their money in the stocks of an XY company. How would this notion affect your decision whether to invest as well or not?

- a) Positively
- b) Negatively
- c) It would have no affect

16) If you compare years 2008 and 2015 (mark the answer which best fits your opinion):

- a) Property prices in Croatia have dropped for more than 10%
- b) Property prices in Croatia have dropped for less than 10%
- c) Property prices in Croatia have increased for more than 10%
- d) Property prices in Croatia have increased for less than 10%
- e) Property prices in Croatia are more or less the same in 2015 as they were in 2008

17) If you compare years 2008 and 2015 (mark the answer which best fits your opinion):

- a. Property prices in Croatia have dropped for more than 10%
- b. Property prices in Croatia have dropped for less than 10%
- c. Property prices in Croatia have increased for more than 10%
- d. Property prices in Croatia have increased for less than 10%
- e. Property prices in Croatia are more or less the same in 2015 as they were in 2012

18) Do you believe that people that buy a property today will earn more on this property if they sell it in the future?

- a) Yes
- b) No

19) With numbers 1 to 4 please rank your preferences when it comes to the investment or saving options (1 shows your most favorite option and 4 your least favorite).

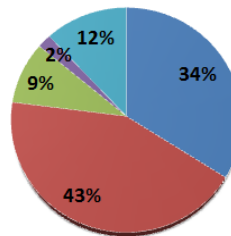
- a) Bank deposit
- b) Shares
- c) Real estate
- d) Bonds

20) The image below shows the investment portfolio of the pension funds in the EU.

Pension funds are one of the most strictly regulated financial institutions in Europe. By putting numbers 1 to 5 rank what do you think how do pension funds invest into the assets (put number 1 for the asset which you think are most represented in their portfolio and 5 for the least represented assets).

EU Pension funds investments

- a) Bank deposit
- b) Shares
- c) Real-estate
- d) Bonds
- e) Other



21) You have been given 50 kn but you have to choose among two options:

- a) Loose 20 kn straight away or
- b) Gamble with 50% probability you will keep or loose all 50 kn

22) I fin 2007 someone had told you the crisis was coming would you have believed it?

- a) Yes
- b) No

23) From 1 to 5 how would you rate your knowledge on concepts of behavioral economics? (1 shows low level of knowledge, 5 high level).

24) Which age group you belong to?

- a) 1) ≤ 25
- b) 26-40
- c) 41-50
- d) >50

25) Which part of Croatia you live in?

- a) North and central Croatia
- b) East Croatia (Slavonia)

- c) South Croatia (Dalmatia)
- d) Istria

26) Which income group you belong to?

- a) < 5.000 kn
- b) 5000 – 15000
- c) >15000

27) Please state your gender?

- a) F
- b) M

28) Please state your level of education.