

DOES IT PAY TO ESCAPE HERDING BEHAVIOUR IN THE HOUSING MARKET?

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ARTICLE INFO	ABSTRACT
Keywords: behavioural economics, house purchase decisions, alternatives, rental market	This article discusses whether it is reasonable for a house buyer to escape herding behavior in the housing market, that is buying when prices rise. We add to the behavioral economics literature, which usually describes in detail why house buyers are irrational but gives usually little recommendations what should be done to make them behave more rationally. We focus our analysis on Poland, a post-socialistic country with a still inadequate housing stock. We compare the costs and gains of buyers that take out a mortgage versus those who rent housing in Warsaw, Poland. The calculation for the period 2010-2022 shows that buying is profitable in the long-term, despite the fact that it is often irrational in the short term. We conclude that only an improvement in the rental market, which absorbs a lot of demand, can make those who need housing become patient and take more rational purchase decisions.
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1. Introduction

Many studies have shown that buyers in the housing market behave in an irrational way (Mayer & Sinai, 2009; Madsen, 2012; Brzezicka et al., 2018). The most important unexpected behavior on the housing market, which is difficult to explain from a classical economic theory viewpoint, is herding behavior (Hott, 2012) and buying housing when its price is on the rise (Brzezicka et al., 2018). Such behavior can lead to price bubbles (see Brzezicka (2021) for a detailed literature review on housing bubbles), and those in turn result in significant banking and economic crises (Herring & Wachter, 1999). Herding also amplifies the negative effect of the remaining biases that have been studied in the literature. When people must make quick decisions, they tend to make far more mistakes than they would if they had time to collect more information, and to study and analyze it more carefully.

It is important to explain that herding can be divided into rational and irrational herding. One of the referees pointed out this fact, because in the initial version of the paper, herding was treated as purely irrational. According to Devenow and Welch (1996) rational herding means that people behave in the same way because they expect some gains. For example, they expect that, due to externalities, the payoff increases,

or that they "hide in the herd" or "ride the herd" (see Devenow & Welch, 1996, p. 605). People hide to avoid being evaluated or they try to be considered as highly valuable. In this article we focus on irrational herding, which is explained by Ngene and Gupta (2023) as a situation in which investors that are uncertain about the future value of an asset prefer to imitate the decisions of others and do not make use of their own beliefs and information.

There is vast literature which explains why herding emerges in the housing market, but little can be found on ideas how to stop or decrease herding. We, therefore, investigate whether it pays for the house buyer to behave rationally and postpone the purchase decisions until price stabilize or even decline. The empirical analysis is done for the housing market of Warsaw, the capital city of Poland, which is the largest post-socialist economy in the EU. All the post-socialist economies that joined the European Union have made fast economic progress, have got closer to EU per capita GDP levels, but at the same time, even in 2023, continue to have an inadequate housing stock (Eurostat, 2023).

In this paper we focus mainly on consumer demand for housing, but keep in mind that housing is also a durable investment good. People have basically only

two options to satisfy their housing needs. They are either owners or renters of housing. Henderson and Ioannides (1983) point out four groups of housing tenure: pure renters, renters who rent from someone and, at the same time, are landlords of another house, pure owners and owners of multiple houses which they rent to others. In this article we focus on people who want to buy housing, who can also rent housing if they consider it as a good option. For a rental market to function we need people who invest in housing and decide to rent it at a given rent rate.

There are some important factors in the Polish housing market which impact purchase decisions (see Augustyniak et al. (2021)). First and foremost, the rental market is still underdeveloped and risky for the landlord. In consequence, during 2007 – 2021, the rental costs were as high as the monthly payment of a mortgage or even higher, by up to 30%, in the 7 biggest cities in Poland (see NBP, 2022b). Secondly, until recently, only variable interest rate mortgages were offered by banks, so buyers face interest rate risk; that is if interest rates rise, their mortgage rate goes up. Finally, in Poland, mortgages are always calculated as fixed installment mortgages. This means that the installment is fixed over the whole duration of the mortgage, unless the interest rate changes over time. Banca di Italia supplies a tool which helps to understand what this means for a mortgage taker. Under very low interest rates (for example in the euro area), the installment consists of a small part to cover the interest, while the majority is used to pay back the principal. When analyzing house purchase decisions, one must split the payment into the user cost (interest) and the payment of the principal, which is like the accumulation of capital. But in the case of Poland, where the mortgage interest rates used to be around 6-7%, at least in the first 7 years of the mortgage (which usually has a maturity of 25 years) the installment does not cover much more than the interest payment. In such a market, the cost of a mortgage can be compared with the cost of renting a flat, at least over the first few years after the purchase was made. We ignore the costs of utilities, because they are equal for owners and renters in Poland.

We aim to add a little bit to the ongoing discussion in the literature and follow Ruonavaara (2018, p. 190), who concludes the recent discussion about the direction in which housing theory and research should go by stating that “theorizing about housing and from housing are ways to move forward”.

Vast literature which explains why irrational

behavior occurs in the housing market has emerged. For example, Gibb (2009), Watkins and McMaster (2011) and Dunning (2017) have addressed the behavioral approach to housing decisions and confronted those ideas with the classical economics approach. The conclusion from the behavioral economics literature is that people behave irrationally when buying a house. If people were perfectly rational, that is, if they waited until they had obtained all the information needed and had found the optimal house or flat, we would not observe the well-known boom and bust cycles. However, there is little discussion in the literature on whether those who behave as rationally as possible gain economically, both in the short and long term, in comparison to those who behaved irrationally. For further discussion, we consider one year as the short term and several years as the long term. Especially during a price boom, it would be rational to wait until the market slows down, or until one finds an optimal flat. But, if we look at the long term perspective, that is several years from the moment the buyer behaved rationally and postponed the purchase decision, it might be that this person is not better off than those who herd in the housing market.

To explain this phenomenon, we present a detailed calculation of gains and losses of people that buy a house versus those who decide to rent housing and postpone the purchase decision. This approach is like the analysis by Augustyniak et al. (2022) on the gains and losses of people who took domestic or foreign currency mortgages in Poland. This analysis allows to empirically verify the following research hypothesis:

Under growing house prices, a potential buyer has little incentive to avoid herding behavior. The three main arguments to support the thesis are:

- 1) There is no short selling on the housing market; people can either buy a house or postpone the decision. Those who expect price falls cannot take a short position like in the stock market, i.e. sell a virtual house today and buy it back at a lower price tomorrow.
- 2) If someone decides to postpone their purchase decision, they have to live somewhere else. If this person wants to live on their own and does not have a home already, their only option is to rent or to stay with their parents. In Poland, renting is financially more costly than paying back a mortgage. Even if it is of a similar cost, the tenant does not accumulate capital, while the house buyer does.
- 3) House prices tend to grow over time, sometimes

they even accelerate. Short price bust episodes are known, but no one knows when a bust will occur. Moreover, significant price busts are associated with severe problems of the economy and the financial system, so they do not necessarily improve the affordability of housing for the average person. Given those facts, postponing the purchase decision hardly helps to buy housing in the future, since it is likely to be even more costly. At the same time, the person who bought housing earlier becomes wealthier as house prices increase.

The paper is structured in the following way. In section 2, we present a review of the behavioral economics literature. In section 3, the research methodology is presented, especially the accounting framework, which allows to compare the financial gains and losses the house buyer incurs when compared to a house renter. Section 4 presents the economic outcome of the accounting model and shows how the gains and losses change over time and how they evolve for various years of house buyers. In section 5, we discuss the results and give some policy advice.

2. Literature review

House purchase decisions are important and complicated, also from the classical economics point of view. When a household buys a house, it mainly wants to find a place to live in, though it also considers housing to be a very important asset. Because housing is a consumer and an investment good at the same time, we observe that the buyer has to make an important decision whether to buy or to rent a flat (see Henderson & Ioannides, 1983; Ioannides & Rosenthal, 1994; Augustyniak et al., 2013; Rubaszek & Czerniak, 2017). As a pure consumer, the buyer should choose housing which allows to optimize the utility that one can obtain from the use of housing and consumption

of other goods. Therefore, a small cheap flat should be sufficient, and the remaining savings or earnings should be used for the consumption of other goods. At the same time, the investor part of the house purchaser looks into the future. The investor gains when house prices rise and the investor is aware of the fact that rents can rise too, so the optimal choice is to buy the biggest flat or house one can afford.

It is important to point out that the decision to rent or to buy a flat is usually triggered by multiple factors. A person is affected by the surrounding economy, and a new job offer, for example, can make this person move to another location. The new job can make a better house affordable, too. Contrary, after an economic shock or the dissolution of a marriage, people need to search for a smaller flat. Also household growth and downsizing change the needs and the preferences of the potential buyers or renters. Most importantly, those changes usually appear randomly and, in some situations, many trigger factors emerge simultaneously.

We need to put house purchase decisions in an appropriate theoretical framework. For that reason, we apply the decision diagram that Maclennan (1982) developed, to analyze the stay or move decision. It explains how somebody who already has a house decides whether to sell it and move to another one. The Maclennan (1982) diagram was augmented by Bao and Saunders (2023), who attached behavioral economics explanations to each step. Figure 1 shows the diagram, in which the decision-making process on whether to stay in the old flat or to move to a new one is initiated by a trigger factor. The potential buyer needs to find a house, its financing and also faces his own expectations. On these grounds, the buyer confronts his needs and expectations with the price offer and decides whether to stay or to move.

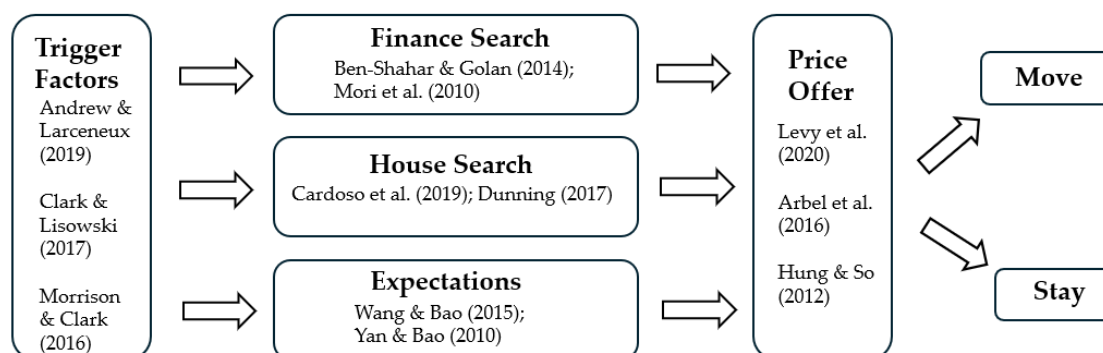


Fig. 1. Scheme of behavioral studies of house purchase decisions. Source: Bao and Saunders (2023, p. 1193), who augmented the Maclennan (1982) diagram.

We briefly explain the behavioral aspects at each stage of the purchase decision that were presented in the augmented Bao and Sounders (2023) diagram. Andrew and Larceneux (2019) performed a quantitative study that allowed to capture the emotions of buyers. They found that, besides the importance of feeling happy about the apartment as such, the proper interaction with the housing developer is also important. Clark and Lisowski (2017) put the move or stay decision into prospect theory and state that more risk averse people tend to stay in one place longer. People tend to consider the status quo with its all-positive aspects to formulate a use value of their house. If it is higher than the exchange value, they do not want to move. Clark and Lisowski (2017) test their model empirically and state that it has the power to predict migrations. In a similar fashion, Morrison and Clark (2016) use prospect theory to explain why people stay longer and longer in one place.

The decision maker is faced with a market price. Hung and So (2012) explain why house prices are rigid downwards, i.e. why they increase quickly, but decline only very slowly. House owners consider housing as both a consumer good and investment good, and therefore are willing to pay more for it than a pure consumer would be willing to. If they can sell the house at a higher price - they gain, but when house prices decline, they keep it, are happy that they live in a nice house, and wait until prices rise again to sell the house with a profit. Hung and So (2012) find, through empirical studies, that what buyers are willing to pay more for the house than is justified by its quality and economic conditions can be considered a call premium. Arbel et al. (2016) found evidence for the fact that people use past price information as a reference point for their decision when public housing is privatized. Levy et al. (2020) performed an experiment and found out that framing has a direct impact on house price expectations in the future. People were divided into four groups, one half got positive information and the other half negative information about the market, and half of each half got more insight about the market itself. It is important that the framing effect is asymmetric, which means that negative news generate price drop expectations which exceed the expected price increases, which a positive information set generates. However, the asymmetry is smaller when market participants are better informed. Waszczuk (2024) has found evidence of framing and anchoring among house buyers in Poland.

Important economic decisions, especially those

concerning purchases of housing, should depend on pure facts and their analysis, but people are not always able to capture all the facts, to put them in a proper perspective and to make a perfect decision. Most people do not behave like the so-called homo oeconomicus (see Leibenstein, 1976) and are not able to master this task. Brzezicka and Wiśniewski (2014) state that, instead of focusing on the homo oeconomicus model, which is rather an exception, when analyzing the behavior of people, we should enter an interdisciplinary field and apply economics, behavioral economics, economic psychology and behavioral finance.

Loss aversion and prospect theory, investigated by Tversky and Kahneman (1974), have a direct impact on the behavior of buyers. The prospect theory basically says that people start in an individual point and, from that point of view, evaluate potential changes. The focal point is that people are uncertain about the final outcome, so there is a risk that the change will bring a loss instead of a gain. People are loss-averse, which means that they are worried by potential losses more than they are happy about potential gains. In consequence, they make a forecast about the future outcome, which impacts on how much utility they expect to have from a given risky decision. In many cases, they will be worried so much, that they never risk a change, or they expect a huge improvement to convince them to make the change. Importantly, different people have different levels of loss aversion, so they will act differently, which results in multiple equilibria in the market. Further, Tversky and Kahneman (1974) also found that people have problems properly valuing things that are traded very rarely. People use anchoring, i.e. they use a value reported by others, as a starting point for their own valuation of such a good, which means that they can be easily manipulated. The impact of prospect theory on the decision-making process was discussed in even more depth by Kahneman and Tversky (1979). Gibb (2009) mentions two other factors that additionally impede decisions, namely time-inconsistent preferences and the endowment effect. Time-inconsistent preferences make people prefer what they get now over what they get even in the nearest future and are more patient when asked about postponing a purchase in the distant future. The endowment effect makes owners value their house more than it is factually worth. Lastly, mental accounting, which was studied by Thaler (1999), makes people value the same amount of money differently under different circumstances or when spent on

different things, and leads them to making irrational decisions.

Housing purchase decisions are decisions which are taken under uncertainty, and which have a heavy weight. Marsh and Gibb (2011) therefore argue that the classical standard economic theory of decision-making under uncertainty cannot be applied in this case. They quote Maclennan (1982), who points out seven features of the housing market which make the decision process very complex. Those are 1) people trade very seldom on the housing market and therefore have imperfect information, 2) the market changes quickly, so old information becomes obsolete, 3) imperfect information makes the buyer initiate a costly search process, 4) housing is a complex good, which increases the usual consumer problems, 5) available housing is dispersed around the city, thus a comparison of the housing on offer is difficult, 6) house purchasers enter a kind of bidding, 7) there is a slow turnover in the market, while demand changes rather quickly, so therefore a disequilibrium in submarkets can be observed. We would like to add to this list the fact that, despite the Internet, multiple professional platforms and specialized applications, the above-mentioned problems still exist. Moreover, each housing unit has distinctive features, and a broad stream of literature has emerged that proposes to apply a hedonic regression to capture and price those distinctive features (see Rosen, 1974 and Diewert, 2003), which further complicate the decision-making process. Marsh and Gibb (2011) explain the complexity of decision-making in the housing market and present a detailed literature review about different approaches that can help to understand why people take given decisions. We see that the buyer is faced with many information problems, which means that if the buyer has found a house that makes them happy, they can stop behaving rationally and pay nearly any price, just to get it.

The choices of the buyers are also affected by decisions of policymakers, who sometimes face a paradox of incentives. Tamvada and Chowdhury (2023) give the example that, in the UK, the government introduced programs that should help people to buy houses, such as the Help to Buy scheme and stamp duty waivers for buyers, but in the end these programs lead to price increases. Instead of simplifying and promoting housing supply, the government has increased the demand for housing.

We focus on explaining house purchase decisions, but need to consider the alternative, i.e. renting a flat. The decision to buy or to rent is not only affected by

personal factors, but also by taxes and subsidies, which can decrease or increase the monthly user costs and therefore make one of the two options more attractive (see Henderson & Ioannides, 1983; Poterba, 1992; Ioannides & Rosenthal, 1994). Housing is very expensive, and most people buy it with a mortgage which is paid back monthly, i.e. the mortgage transfers a huge one-time cost into relatively small costs that need to be covered over decades. In the long term, the buyer will pay back the mortgage and own the house or flat forever, while the renter will still need to rent it in the future. In the long-term analysis, one should make a more advanced calculation, which includes the fact that house prices tend to rise, which means that the owner will most likely become wealthier over time. Only the payment of the interest is considered a cost, while the payment of the mortgage principal can be seen as a form of reversed saving. Chen et al. 2022 present a recent detailed analysis of the user costs in Shanghai and relate it to the price to rent levels.

We focus on Poland where, as explained in the introduction, most people buy housing with a mortgage with flexible interest rates and fixed installments. Given the housing shortage, most people buy housing to satisfy their basic housing needs, and thus consider mainly the current situation. With fixed installments, usually a 30-year mortgage contract, and rather high interest rates (around 6-7%), the payment of the interest makes up the lion's share of the monthly costs over the first 7 years. Only after the 7th year does the share of the payment of the principal increase, and close to the maturity of the mortgage, the buyer pays only the principal and nearly no interest, as the principal approaches zero. In Poland, there are no fiscal tools that allow the renter to obtain a lower cost than the owner must bear, therefore we can directly compare the mortgage cost with the rental cost.

People in Poland have preferred ownership over renting for a long time (see Rubaszek & Czerniak, 2017), but recently the private rental market is evolving and, due to the growing mobility of people in Poland, renting should become a more often chosen tenure form.

3. Results methodology

To analyze the gains and losses of house buyers with a mortgage against renters, we apply a modified version of the accounting framework that was used by Augustyniak et al. (2022) to analyze the gains and losses of people who took a mortgage that was denominated in a foreign currency (mainly in Swiss

francs) versus those who took one in the local currency. Our analysis focuses on the housing market in Warsaw, which is the capital city of Poland. We first give a brief introduction to the housing market in Poland and explain our accounting framework.

The housing market started to function as a free market, with mortgages and private developers on a significant scale shortly after Poland entered the EU in 2004 (see Łaszek et al., 2018). There was a strong housing boom during the 2005 - 2007 period, which was fuelled by seemingly cheap mortgages that were denominated in foreign currencies (see Augustyniak et al. (2022) for more details). However, the outbreak of the global financial crisis reached Poland in 2008, and the housing frenzy ended. As the Polish currency depreciated by 50%, the foreign currency mortgage became very expensive and difficult to pay back. Due to the increased economic risk and uncertainty in 2009, the housing market slowed down and nominal prices declined a little bit. Banks started to issue new mortgages on a larger scale starting in 2010. We decided to cover in the empirical analysis the time span from 2010 onwards, because from that moment, only mortgages in the local currency were granted and the housing market functioned in an orderly way.

The construction of a mortgage contract is very important, because it determines the cost the buyer must bear every month. In Poland, for most of the covered time, only variable interest mortgages could be taken. The interest is calculated as the 3-month interbank rate (WIBOR3M) plus a mark-up that is fixed at the beginning of the mortgage contract. The mortgage is usually taken for 25 years, the loan to value ratio is 80%, and it is paid back in fixed installments. As explained in the literature review, for a rather long-lasting mortgage with quite high interest rates, the monthly installments consist mainly of the interest rate payment over the first seven years.

We assume that the size of the purchased housing is 50 sqm. In the first step, we calculate the annual mortgage payment. This depends on the initial house price, the initial mark-up of the bank and varies over time due to changes in the interbank rate. We compare the mortgage payments to the rent that should be paid per year if this person does not buy a house but decides to rent it. The analysis is performed on a yearly basis. We have to admit that this choice is artificial, but it is the easiest way to show the most important facts. People can buy housing on any working day of the year, which would require us to make around 200 calculations for each year considered. We have

quarterly data on house prices, but only annual data on wages at the city level. As Andre et al. (2017) point out, house prices show long growth phases which are followed by also relatively long phases of price decline. In this sense the exact day does not change much in our reasoning. We are also aware of the fact that people decide to buy or rent a house due to various reasons, but when we look at the whole population, we can aggregate individual choice and analyze the average. In the case of Poland, we had a long period of price increases due to continuous demand that exceeded the supply. Our calculations are made on an annual basis. Mortgages are paid back on a monthly basis and the mortgage rate in Poland is set every three months, as it is tied to the WIBOR3M. We tested the Augustyniak et al. (2022) model also on quarterly data, but did not find significant differences in the conclusions.

The house price data comes from the NBP (2022a) database, while the mortgage interest rates are taken from NBP (2022b, p. 15) and the bank margins on the interest rate, also from NBP (2022b, p. 15). Rents were obtained from various reports of the NBP (2022b, p. 15). Data on wages and CPI originates from Statistics Poland (2023).

We present the calculations for the 2010 mortgage year in Table 1. The first column contains the year for which we do the calculation. We start in 2010 and assume that one buys the flat on the first day of the year and compares the rental or mortgage payments over the whole year and also the price that is recorded on the first day of the next year. The second column shows how long the mortgage will last. The third column shows the total annual mortgage installment, whereas the two next split it into the interest payment and the principal payment. Here we see that during the first few years the interest rate payment generates the majority of costs. The sixth column shows the amount of outstanding mortgage at the end of the year. Column 7 presents the actual mortgage interest rate of the given mortgage cohort (it consists of the fixed mark-up and the market interest rate that changes over time) and finally, Column 8 shows the mortgage multiplier. The last value is calculated based on the mortgage rate and the mortgage duration. When we multiply it with the outstanding mortgage, we obtain the annual mortgage installment. When we subtract the interest payment from the installment, we obtain the principal payment. The general rule is that the mortgage multiplier decreases with the length of the mortgage. The longer it lasts, the smaller the shares of the outstanding principal that need to be paid back

each year are. And when interest rates are extremely low, such as close to zero as was observed in the euro zone, the lion's share of the monthly payment goes directly to the payment of the principal. Contrary, under very high interest rates, the share of the interest

payment can exceed the principal payment by a lot. We see in the example in Table 1 that the share of the principal payment increases over time, but once the interest rates rise sharply in 2022, it decreases again.

Table 1

Calculation of the mortgage instalment for the 2010 mortgage cohort							
year	duration of the mortgage	mortgage installment	interest_payment	principal_payment	outstanding mortgage	interest rate	mortgage_multiplier
2010	25	26 990	21 762	5 227	325 297	6.6%	8.2%
2011	24	28 469	23 364	5 105	320 192	7.2%	8.8%
2012	23	29 395	24 199	5 197	314 995	7.6%	9.2%
2013	22	25 117	17 902	7 215	307 780	5.7%	8.0%
2014	21	24 041	15 894	8 147	299 633	5.2%	7.8%
2015	20	22 541	13 164	9 377	290 256	4.4%	7.5%
2016	19	22 477	12 627	9 849	280 407	4.4%	7.7%
2017	18	22 541	12 276	10 265	270 142	4.4%	8.0%
2018	17	22 527	11 776	10 751	259 391	4.4%	8.3%
2019	16	22 556	11 324	11 232	248 159	4.4%	8.7%
2020	15	21 006	8 204	12 802	235 357	3.3%	8.5%
2021	14	20 821	7 430	13 391	221 966	3.2%	8.8%
2022	13	26 714	16 549	10 165	211 801	7.5%	12.0%

Source: own calculations on NBP (2022a,b) data.

To do our comparison, we need to compare the costs of renting, the costs of the mortgage and potential gains or losses due to price movements. First, this comparison is done for the short term, that is, we compare the costs each year. Because we assume that the purchase decision is delayed until the next year, this person needs to save enough money for the down payment. The down payment is a percentage of the value of the house, usually amounting to at least 20%. The amount of money needed for the down payment rises when house prices rise, and falls when house prices fall. When the potential buyer has accumulated the money for the down payment, and house prices fall in the next year in which he wants to buy the house, he needs to take a lower mortgage. But if the person waited and house prices increased over this year, he will need to save more money for the down payment. In the

second step, we perform this analysis over the long term, that is, we cover several years. In this case, we accumulate the gains or losses over the years.

We also explain the year-to-year analysis, which is presented for the 2010 mortgage year in Table 2. The first column describes the year that we analyze, Column 2 shows the rent per sqm and per month and Column 3 the market price per sqm of flat. With the help of this data and the methods described above we calculate the annual mortgage installment (Column 4), and we present in Column 5 the annual rent a borrower would need to pay. Finally, Column 6 shows the potential gain or loss that the owner faces due to changes of the market price. Equipped with this tool we move on and perform the analysis of gains and losses.

Table 2

Comparison of the gains and losses a buyer incurs in a given year						
data	rent per sqm per month	price per sqm	mortgage installment	annual rent expenses	change in value y-o-y	gain / loss
2010	33.1	8 263	26 990	19 840	- 24 766	- 31 915
2011	34.2	7 768	28 469	20 497	- 30 161	- 38 134
2012	30.4	7 165	29 395	18 243	- 7 340	- 18 492
2013	32.0	7 018	25 117	19 229	15 383	9 494
2014	34.9	7 325	24 041	20 933	4 540	1 432
2015	36.2	7 416	22 541	21 702	4 613	3 774
2016	38.5	7 508	22 477	23 106	13 580	14 209
2017	40.9	7 780	22 541	24 538	30 796	32 793

2018	41.2	8 396	22 527	24 731	43 266	45 470
2019	47.2	9 261	22 556	28 328	46 079	51 851
2020	46.0	10 183	21 006	27 626	47 518	54 138
2021	47.8	11 133	20 821	28 670	39 759	47 608
2022	57.1	11 928	26 714	34 248	29 428	36 962

Source: own calculations on NBP (2022a,b) data.

4. Analysis of the economic performance of buyers vs. renters

We analyze the gains or losses of a buyer in relation to a renter to understand what motivates house buyers to behave irrationally and buy housing even when the market is booming.

We first show house prices, rents and wages in Warsaw, Poland (Figure 2). The capital city of Poland has a fast-evolving housing market, but despite growing prices, demand is rising, so prices rise even more. One important demand driver is continuously growing wages.

After the 2005 – 2006 housing boom, real house prices declined from 2007 on, reaching a plateau in

2013, started to rise again, and have accelerated since 2016. At that time interest rates in PLN were lowered a lot and also the private rental market started to emerge. The buyers of rental housing competed with those buying for own purposes. Rents moved in a similar fashion as house prices, but we should mention that a reasonably large rental market started to function from around 2016. The price-to-income and price-to-rent data are shown in Figure 3. We see that both indices declined over time, which means that rents and wages grow faster than the house prices for most of the time. It should be mentioned that preliminary data for 2022 is marked with an asterisk, because it is based on the available data for the first half of the year.

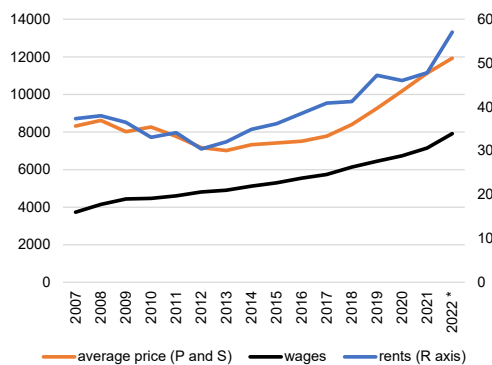


Fig. 2. House prices in the primary (denoted P) and secondary market (denoted S, per sq. m, L axis) and rents (per month per sq.m., R axis) in Warsaw. Source: calculations on NBP (2022a,b) and Statistics Poland (2022) data.

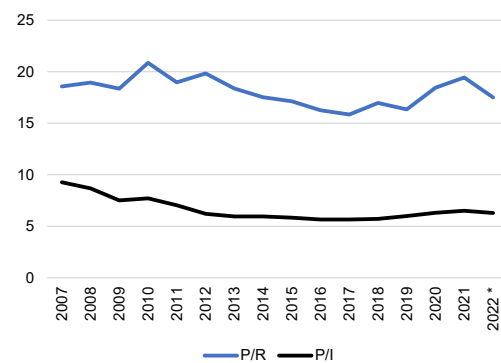


Fig. 3. P/I and R/I ratio in Warsaw. Source: calculations based on NBP (2022a) and Statistics Poland (2022) data.

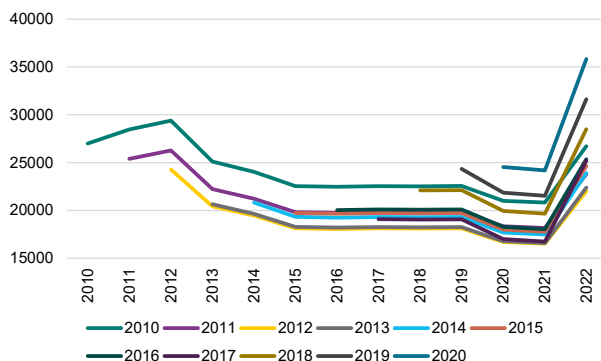


Fig. 4. Annual mortgage payments for different mortgage years. Source: own calculations on NBP (2022a,b) data.

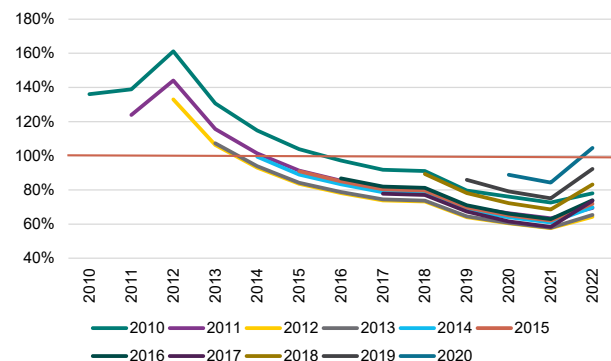


Fig. 5. Annual mortgage payments in relation to annual rents for different mortgage years. Source: own calculations on NBP. (2022a,b) data.

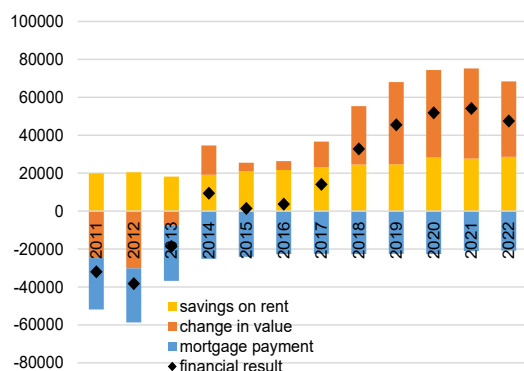


Fig. 6. Decomposition of the costs and gains of a mortgage purchase over renting. *Source:* own calculations on NBP (2022a,b) data.

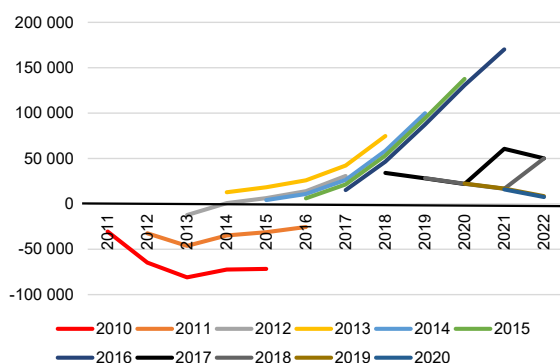


Fig. 8. Financial result of different mortgage years during the first 5 years. *Source:* own calculations on NBP (2022a, b) data.

We first show the annual mortgage payments calculated for purchases in different years in Figure 4. The annual mortgage payment for those who bought housing later declined, because for a long time prices were rather stable, but interest rates declined significantly. Only the recent sharp increase in interest rates made the payments increase. The levels depend not only on the initial prices, but also the mark ups in various years. To see the gains and losses of buyers versus renters, we compare the mortgage payments to the annual rents in Figure 5. In the years 2010-2013 it was cheaper to rent than to pay the mortgage rate, but this changed for the different mortgage years from around 2014 on. The sharp rise in interest rates in 2022 had a significant impact on the mortgage payments for all years but was most pronounced for those who took a mortgage at historically low rates in 2021.

In the next step we analyze all components that determine the final outcome for different mortgage years (Figure 6). The buyer has to bear the cost of the mortgage, but gains as they do not need to pay the rent. The value of the house fluctuates, so this component can be positive or negative. The same decomposition can be made for those who decide to postpone the purchase decision by one year (Figure 7).

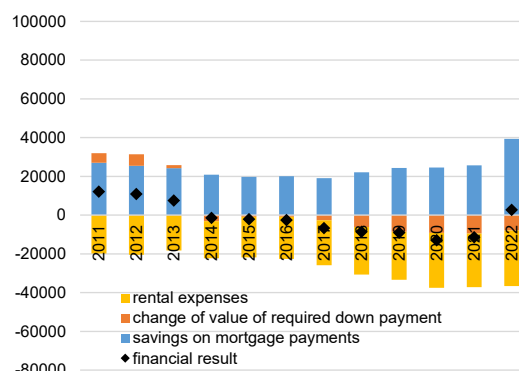


Fig. 7. Decomposition of the costs and gains of renting over a mortgage purchase. *Source:* own calculations on NBP (2022a,b) data.

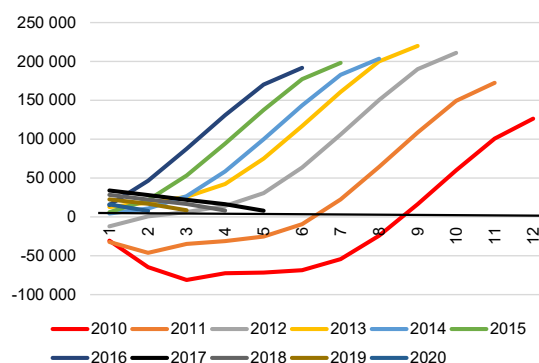


Fig. 9. Financial result of different mortgage years over time. *Source:* own calculations on NBP (2022a,b) data.

The renter has to pay the rent, but can save on the mortgage payment. This person postpones the purchase decision, so they have to accumulate a down payment for a future mortgage. This part changes alongside changes in house prices, but the down payment accounts for only 20% of the house value.

We now analyze the gains and losses of those who buy and those who postpone the purchase decision over the first five years after the purchase decision (Figure 8). To be able to add the values over the years and compare across the years, we deflated the results by the CPI. Indeed, those people who bought houses in 2010, 2011 and 2012 made losses in comparison to those who waited. Interestingly, those buyers cannot be called irrational because they bought at declining prices. Their losses resulted from the relatively high interest rates and the declining rents at that time. But when we look at the events in the long term (Figure 9), we observe that in most cases the buyers made profits. Only those who bought housing in the most recent years, at low interest rates and high prices, made the least profits. We should also remember that buyers will pay back the mortgage at some time in the future and will be owners forever, while renters will be just renters. Surely, buyers and renters can have different

preferences and a different financial situation, as investigated by Matel and Olszewski (2022, 2023) and Olszewski and Matel (2022). We should also be careful in making comparisons across time, because we analyze different time spans for different mortgage years. The results can change significantly if we observe those buyers over the whole duration of the mortgage.

5. Discussion

While most studies about behavioral biases in the housing market analyze how individuals make decisions, we focus on the economic performance of cohorts of two identical twins, who chose either to buy a house or to rent it. We find, at least for the Warsaw housing market for the analyzed period, that herding and buying housing when others buy housing and its price is on the rise seems to be profitable. This fact encourages people to buy housing whenever they have the financial possibility, rather than to rent it. The continuously rising house prices allow us to assess that herding behavior in a market with an insufficient supply of rental housing can be considered as rational. Despite this, such behavior can be risky for the whole market and the stability of the financial system.

We need to put our findings into the context of other recent studies about behavioral biases in the housing market in Poland. For that purpose we need to stress once again that, in Poland, the dominant share of people are house owners, among which most are not burdened by a mortgage. This differentiates the situation of a house buyer in Poland from one in a country with a significant share of renters. In a predominantly owner occupied housing market, the endowment effect has a significant role in the formation of price expectations by the sellers. Tomal (2024) provides evidence that house owners (sellers) in Poland are biased by the endowment effect, which means that owners have a higher price expectation than potential buyers. In general, this behavior can lead to price increases (buyers have to adjust their price upwards) or to a stabilization of house prices (owners are unwilling to lower prices, unless economic shocks force them to do so). Waszczuk (2024) shows evidence from individual surveys that people anchor their house price expectations on the basis of surrounding house price information. Both studies help to explain herding, because people who see prolonged price increases expect further price increases and follow the market. This conclusion can be strengthened by Kokot (2023) who estimates the house prices in Poland and finds that, besides the usual fundamental price factors,

behavioral elements have an important impact. We conclude that our considerations about herding and whether one can escape it can be seen as yet another approach which helps to understand the dynamics of house prices in Poland.

6. Conclusions

In the empirical part of the study we observed that, under the housing market conditions that prevailed in Poland in the last two decades, it was reasonable to follow the others, thus to enter the classical herding behavior. A person who made the correct economic accounting and decided to wait until house prices fell, generated losses in comparison to the impulsive and irrational buyer in the long term, and also, at times, in the short term. We have to ask ourselves what can be improved to help people to react more rationally. Two solutions can be applied. One is the creation of a properly working rental market that will be considered by the potential buyers as a true alternative. Such a market would take a lot of demand pressure away and would also make decision making more simple and less stressful. However, only a fully operating rental market, with reasonable rents, can make people indifferent, at least in the short term, to buying and renting. When prices rise, people will be still able to make a rational decision to rent and to wait for a better price. This will hinder the creation of housing runs, which lead to house price bubbles, which in turn can make even the most informed and rational person behave in an irrational way.

The second solution is to focus on those factors that determine how people behave and to improve them. 1) Better and faster access to reliable market information should help people to make better decisions. If buyers find many housing offers, they can choose the one which is best suited for their needs. Such buyers are also less faced with a "take it or leave it" situation, which means they have more time to think about the decision. 2) Better financial education will help people to understand that interest rates can change over the duration of the mortgage and that they should be more prudent when taking a mortgage. 3) Housing generates not only the mortgage costs but also costs of utilities, which grow over time. More information about this fact should make potential buyers to think carefully about the optimal size of the flat or house and whether they will be able to carry all the costs.

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