ISSN: 1648-715X / eISSN: 1648-9179

VILNIUS TECH
Vilnius Gediminas Technical University

INTERNATIONAL JOURNAL OF STRATEGIC PROPERTY MANAGEMENT

2024
Volume 28
Issue 3
Pages 143–151
https://doi.org/10.3846/ijspm.2024.21456

REAL ESTATE BROKERAGE AND ENDOWMENT EFFECTS IN THE HOUSING MARKET: EVIDENCE FROM POLAND

Mateusz TOMAL *

Department of Real Estate and Investment Economics, Krakow University of Economics, Krakow, Poland

Article History:
- received 27 February 2024
- accepted 29 April 2024

Abstract. In the housing market, the prices sellers would be willing to accept to sell their properties exceed the prices buyers would be willing to pay for them. Behavioural economics postulates that this discrepancy is due to the endowment effect, which is a cognitive bias that causes the overvaluation of the goods we own. However, the existing literature lacks theoretical considerations and empirical evidence on the impact of the use of real estate agents by parties to transactions on the endowment effect in the housing market. Therefore, this study aims to assess the influence of real estate brokerage on the endowment effect using the example of the Polish residential market. To achieve the purpose of this study, a lab-in-the-field experiment was conducted with 248 respondents divided into sellers and buyers. The results indicate that the participation of real estate agents during transactions does not lead to the weakening or elimination of the endowment effect but, in some cases, to its intensification, which is due to the framing by buyers and sellers of the commission charged by agents as a loss requiring compensation. This research confirms the inefficiency of commission-based real estate brokerage services and points to possible corrective actions for legislators.

Keywords: endowment effect, real estate agent, real estate brokerage, housing market, behavioural economics, Poland.

*Corresponding author. E-mail: *tomalm@uek.krakow.pl*

1. Introduction

In the housing market, it is common to observe a mismatch between the prices at which sellers would be willing to accept selling (WTA) their properties and the prices at which buyers would be willing to pay for them (WTP). This situation deviates from standard economic theory, according to which parties to a transaction maximise their utility/profit as a result of their willingness to transact at the market price (Fallis, 1985). The WTA-WTP gap has been attributed to, among other things, the income effect (Willig, 1976) within neoclassical economics and transaction costs within new institutional economics (Brown, 2005). However, currently, the main explanation for the existence of the WTA-WTP gap is the endowment effect found within the behavioural economics stream. Thaler (1980) defined the endowment effect as a tendency that causes us to overvalue goods in our ownership. Behavioural economics indicates that this stems from the phenomenon of loss aversion specified in Kahneman and Tversky's (1979) prospect theory. Loss aversion assumes that each individual frames the decisions he/she makes as losses or gains according to a reference point. For sellers, this point is "owning" the good, and for buyers, it is not owning. According to prospect theory, losses weigh more than gains; therefore, a seller overcompensates for his/her loss, resulting in a higher WTA than the buyer's WTP.

Over the past few years, the endowment effect has been increasingly studied for housing goods. For example, Bao and Gong (2016) and Gong et al. (2019) identified a WTA-WTP gap in China's housing market. Bao (2020) found that the endowment effect occurs in the UK housing market, but only during price falls. A more recent study by Tomal (2024) discovered an endowment effect in Poland. However, none of the above studies considered the possibility of real estate agents' participation in housing transactions. Decisions in the housing market are complex and require expert information (Marsh & Gibb, 2011); therefore, some sellers and buyers employ real estate agents to assist during transactions. Bernheim and Meer (2013) indicate that real estate agents, as part of their services, advise on a fair buying or selling price of a property to increase the likelihood of a transaction. As a result, real estate agents potentially influence the formation of WTA and WTP values, and consequently, the endowment effect.

Taking the above research gap into account, this study, using Poland as an example, aims to assess the impact of real estate agents' participation during transactions on the occurrence of the endowment effect in the housing market. The Polish housing market was chosen as a case study

because, in general, real estate markets in Central and Eastern European countries are poorly studied in terms of the existence of behavioural biases. In addition, there is currently a significant shortage of dwellings in Poland and prices have been rising dynamically for several years, resulting in problems with their availability. Other studies have also indicated that the Polish housing market is in disequilibrium (Brzezicka et al., 2018). The research undertaken will allow for a better diagnosis of this condition, which will enable legislators to act optimally in implementing housing policies. As mentioned earlier, the measure of the endowment effect, i.e. the WTA-WTP gap, may arise from non-behavioural factors. Therefore, the experiment was designed in a manner that removes the impact of the income effect, substitution effect, asymmetric information, transaction costs, strategic motives, and transaction demand on the size of the WTA-WTP gap. Finally, this paper will answer the following research question: How does the participation of real estate agents in housing transactions affect the presence of the endowment effect in the residential market?

This study contributes to the literature in several ways. From an economic theory perspective, a conceptual model of the impact of real estate brokers on the intensity of the endowment effect is developed in three variants: 1) only the seller uses an agent, 2) only the buyer uses an agent, and 3) both the seller and buyer use independent agents. Empirically, this study estimates the change in the intensity of the endowment effect in the Polish housing market using a lab-in-the-field experiment following the participation of real estate agents during transactions.

2. Theoretical framework and hypotheses development

The endowment effect in the housing market means that the difference between the WTA value of sellers and the WTP value of buyers is positive (Bao, 2020), that is WTA > WTP. Therefore, to answer the research question, it is crucial to assess how the use of real estate agents by transaction parties affects the formation of WTA and WTP values. This consideration assumes a situation in which the buyer and seller have their own real estate agents (Anglin & Arnott, 1991).

In the context of buyers, Zumpano et al. (1996) point out that when they use the services of a real estate agent, they purchase a de facto bundled good consisting of residential property as well as the services of a broker. The use of a broker by buyers causes them to spend less time searching for a suitable residential property; that is, their opportunity cost of time is lower. In addition, the use of a real estate broker by buyers increases the supply of properties for sale available to them, while at the same time, they receive a better description of these properties in terms of physical features as well as the neighbourhood in which they are located. Furthermore, the real estate agency advises buyers on the appropriate bid price, points out sources of financing, and assists with the legal completion of the transaction. According to Zumpano et al. (1996), this creates added value for home buyers, which, in theory, should increase their WTP value compared with buyers who do not use real estate agents. Therefore, it can be tentatively assumed that WTP* > WTP where the value of WTP* refers to buyers assisted by a real estate agent.

In the context of sellers, Benjamin et al. (2000) indicate that the decision to employ a real estate agent is due to the high transaction costs of the housing market in terms of sellers' time. The employment of an agent by sellers also enables them to reach more potential buyers owing to brokers' use of computer networks, such as the Multiple Listing Service (Shy, 2012). Agents also provide sellers with expert information on the state of the local property market and, in a large number of cases, seek to rationalise their offer prices, which are usually too high and result in a significantly reduced likelihood of a transaction (Bernheim & Meer, 2013). The second factor affecting the possibility that sellers using real estate agents may reduce the value of WTA is the principal-agent problem, that is, the agent may have a strong inclination to sell the property quickly even at a significantly lowered price to obtain a commission (Levitt & Syverson, 2008). An empirical study in the USA by Bernheim and Meer (2013) confirmed that when an owner uses a broker, the sales price of a house decreases by several per cent. Conversely, Miller et al. (2021) find that owners selling on their own obtain lower prices for their properties compared to transactions with agents. Therefore, the impact of the principal-agent problem on the WTA value is ambiguous. Based on the above rationale, it can be tentatively assumed that WTA* < WTA where the value of WTA* refers to sellers with the assistance of a real estate agent. In summary, it appears that the employment of a real estate agent by any party in the transaction should reduce the magnitude of the endowment effect because the WTA-WTP gap decreases when only one party uses a real estate agent and when both parties choose to do so.

However, in addition to the advantages of using real estate agents, there are also disadvantages to such an arrangement. The most important of these is the charged brokerage commission, which amounts to a fixed percentage of the sales price. Assuming that buyers and sellers are reference-dependent, their reference point is the lack of a need to pay a commission if an agent is not used. Therefore, if a party to the transaction decides to employ an agent, it will be forced to pay him/her a commission, which it may frame as a loss to be compensated for, resulting in an undervaluation of the buyer's WTP or an increase in the seller's WTA. The collection of commissions by the agent may be accompanied by particularly negative emotions among sellers. In particular, Salant (1991) points out that the agent's involvement on the seller's side increases the offer price to cover at least part of the commission. Furthermore, Yinger (1981) emphasises that a rise in commission discourages sellers from

using the services of an agent. Kokot and Orzechowska (2015) analysing clients of real estate agencies in Poland noted that more sellers were dissatisfied with the high commission than buyers. Shu and Peck (2011) emphasise that the stronger the negative emotion, the greater the intensity of loss aversion. Consequently, sellers compensate for the loss resulting from the commission charged to a much greater extent than buyers.

In summary, the value of the WTP of buyers using agents is, on the one hand, increased owing to the added value of the agents' services and, on the other hand, decreased because of the need to compensate for the commission charged by the agents. Therefore, it can be assumed that both values are similar with respect to each other, that is WTP* ≈ WTP. For sellers using agents, their WTA values are usually reduced because of expert consultation with the agent. On the other hand, the loss from the necessity to pay the agent's commission leads to a significant increase in the value of the WTA, in view of the strong negative emotions of sellers related to it. Finally, it can be assumed that WTA* > WTA. The above also implies that WTA* – WTA >|WTP* – WTP| . On this basis, the WTA-WTP gaps that occur when real estate agents are involved in transactions can be conceptualised (Table 1). By adopting that the endowment effect is present in the housing market, that is WTA – WTP > 0, then real estate agents participation in housing market transactions does not lead to the elimination of this effect regardless of whether the agent is used only by the buyer, only by the seller or both parties have own agents. Further, the endowment effect should be stronger when the seller uses an agent and the buyer does not. The above considerations can be divided into the following research hypotheses.

Hypothesis 1. The use of real estate agents by buyers and/or sellers does not eliminate the endowment effect in the housing market.

Hypothesis 2. The use of real estate agents by sellers increases the intensity of the endowment effect in the housing market.

Table 1. The WTA-WTP gaps in theory when real estate agents are involved during housing market transactions (source: own study)

Category	Seller without a real estate agent	Seller with a real estate agent
Buyer without a real estate agent	WTA – WTP > 0	WTA* – WTP > 0
Buyer with a real estate agent	WTA – WTP* > 0	WTA* – WTP* > 0

3. Methodology

3.1. Data

Data on WTA and WTP values are directly unobservable in the property market and need to be artificially induced. For this purpose, a lab-in-the-field experiment, widely used in endowment effect research, was employed. The experiment used a contingent valuation method with an open-ended question to elicit WTA and WTP values. The experiment was conducted with a group of residential property owners in Poland in January 2024. Respondents who were already housing owners were expected to provide significantly more reliable answers than those who had never been active in the residential market. To recruit respondents for the study, an online panel data platform (OPDP) from Prolific (https://www.prolific.com/) was used, which allows for better-quality responses compared to other OPDPs (Douglas et al., 2023). A total of 256 respondents were recruited using quota sampling and divided into sellers and buyers. Data from five respondents acting as sellers were removed due to unreliable responses and three responses from buyers. The number of respondents was determined by comparable studies and financial constraints. For example, Bao (2020) used 319 respondents, including 155 acting as sellers and 164 as buyers, to identify the endowment effect.

The experimental questionnaire was divided into two parts. First, respondents were asked about their basic characteristics, such as gender, age, income, education, employment, place of residence, preferences on housing tenure, and standard of the present dwelling. These variables serve as control variables in the model to estimate the endowment effect size. Ultimately, there were 35% women and 65% men among the respondents. The average age of the interviewee was 32 years and the average monthly income was PLN 6,490. The full data for this analysis are available at the link https://doi.org/10.58116/UEK/BUTOIU.

Building on Bao and Gong (2016) and Bao (2020), the second part of the questionnaire asked respondents about the minimum price they would be willing to accept to sell the dwelling (sellers) or the maximum price they would be willing to pay for it (buyers). Before the questions were asked, respondents were described the hypothetical dwelling that would be involved in the transaction and advised not to consider financial constraints or transaction costs associated with the transaction. The dwelling was given the typical parameters for a residential property. It was also emphasised that there was no opportunity to change the answers to the questions asked. Finally, it was indicated to respondents that they were interested in the transaction but were not compelled to do so. This eliminated the impact of the income effect, substitution effect, asymmetric information, transaction costs, strategic motives, and transaction demand on the size of the WTA-WTP gap. The sellers were also informed that they currently lived with the subject property. By contrast, buyers were instructed that they were buying property for residential purposes. This created the conditions found in the secondary sales housing market, where the endowment effect according to Tomal's (2024) study is the strongest in Poland.

Participants in the experiment were shown the price range for which similar dwellings were sold as well as the percentage change in the price level over the last four years, in order to take into account the possible impact

Table 2. Questionnaire design (source: own study)

Label	Market trend	Price information
Without a real estate agent	Up	a. Similar properties sold between 700,000 and 800,000 PLN b. Sales prices of similar properties up 20% in 4 years c. Think about the development of sales property prices over the year
	Down	a. Similar properties sold between 600,000 and 700,000 PLN b. Sales prices of similar properties down 20% in 4 years c. Think about the development of sales property prices over the year
With a real estate agent	Up	a. Similar properties sold between 700,000 and 800,000 PLN b. Sales prices of similar properties up 20% in 4 years c. Think about the development of sales property prices over the year d. For buyer: The real estate agent recommends as a WTP value of 750,000 (market price). The buyer must pay the agent a 3% commission of the sales price d. For seller: The real estate agent recommends as a WTA value of 750,000 (market price). The buyer must pay the agent a 3% commission of the sales price
	Down	a. Similar properties sold between 600,000 and 700,000 PLN b. Sales prices of similar properties down 20% in 4 years c. Think about the development of sales property prices over the year d. For buyer: The real estate agent recommends as a WTP value of 650,000 (market price). The buyer must pay the agent a 3% commission of the sales price d. For seller: The real estate agent recommends as a WTA value of 650,000 (market price). The seller must pay the agent a 3% commission of the sales price

Notes: For the upward trend, the hypothetical flat was located in the centre of a city with 200,000 people. It was on the 2nd floor, and the standard was good. The standard of the building was also good, but the building did not have an elevator. For the decreasing trend, the flat was located in the centre of a city with 20,000 people, with other parameters unchanged. One PLN is equal to 4.3463 Euro on 15.02.2024.

of the business cycle on the intensity of the endowment effect. Respondents were also asked to answer a question on the value of the WTA or WTP after reflecting on the expected future development of the property market, allowing the study to capture the reference point related to price expectations. Finally, the question about the value of the WTA or WTP was repeated after the respondent was informed that he/she had decided to hire a real estate agent to assist in the transaction. It was assumed that the broker acts rationally and recommends the transaction according to standard economic theory, that is, at the market price of the property, and indicates that he/she charges a commission equal to 3% of the final sales price. Table 2 lists the information provided to the participants during the experiment.

3.2. Econometric procedure

Econometric modelling was used to measure the endowment effect. The dependent variable denotes the percentage deviation of the WTA and WTP values of sellers and buyers, respectively, from the property's market price, which allows the endowment effect to be estimated in a relative manner. The model takes the following form.

$$\begin{aligned} y_i = {} & \beta_0 + \beta_1 ups_i + \beta_2 upsr_i + \beta_3 upb_i + \beta_4 upbr_i + \\ & \beta_5 downs_i + \beta_6 downsr_i + \beta_7 downbr_i + \delta_1 gen_i + \\ & \delta_2 age_i + \delta_3 inc_i + \delta_4 edu_i + \delta_5 emp_i + \delta_6 loc_i + \\ & \delta_7 nor_i + \delta_8 std_i + \varepsilon_i, \end{aligned} \tag{1}$$

where: y_i is a percentage deviation of WTA or WTP from the property market price, which is PLN 750,000 in the up market and PLN 650,000 in the down market; β_0 is the model constant; $\beta_1,\ldots,\beta_7$ and $\delta_1,\ldots,\delta_8$ are the parameters of the model; ε_i is the error term; ups_i ($downs_i$) takes the value 1 if the respondent acted as a seller without a real estate agent during up (down) market; $upsr_i$ ($downsr_i$) takes the value 1 if the respondent acted as a seller with a real estate agent during up (down) market; upb_i takes the value 1 if the respondent acted as a buyer without a real estate agent during up market; $upbr_i$ ($downbr_i$) takes the value 1 if the respondent acted as a buyer with a real estate agent during up (down) market; gen_i takes the value 1 if female or 0 if male; age_i is the respondent's age; inc_i is the respondent's gross monthly income; edu_i takes the value 1 if the respondent has a higher education or 0 otherwise; emp_i takes the value 1 if the respondent is employed and 0 otherwise; loc_i takes the value of 1 if the respondent lives in an urban area and 0 otherwise; nor_i takes the value of 1 if the respondent agrees with the social norm that ownership is the "right" form of housing tenure; std_i takes the value of 1 if the respondent assesses the condition of their dwelling to be at least good.

In the model, buyers acting without a real estate agent during the down market were set as the reference group because the mean value of the dependent variable for this group was the lowest across all the groups analysed, which allows an easy calculation of the endowment effect size based on the model parameter estimates. In particular, for example, the difference between the parameters $\beta_1 - \beta_3$ represents the intensity of the endowment effect expressed as a percentage of the market price of the property during the up market in a situation where both the seller and the buyer chose not to use estate agents during the transaction. Using model (1), Hypotheses 1 and 2 can be verified, as shown in Table 3.

Table 3. Econometric procedure for hypotheses testing (source: own study)

Hypothesis 1		Seller without a real estate agent	Seller with a real estate agent
Buyer without a real estate agent	Up market	NA (β_1 vs. β_3)	$\beta_2 > \beta_3$
	Down market	NA (β_5 vs. 0)	$\beta_6 > 0$
Buyer with a real estate agent	Up market	$\beta_1 > \beta_4$	$\beta_2 > \beta_4$
	Down market	$\beta_5 > \beta_7$	$\beta_6 > \beta_7$
Hypothesis 2			
Seller and buyer without a real estate agent vs. Seller without a real estate agent and buyer with a real estate agent		NA ($\beta_1 - \beta_3 + \beta_5$ vs. $\beta_1 - \beta_4 + \beta_5 - \beta_7$)	
Seller and buyer without a real estate agent vs. Seller with a real estate agent and buyer without a real estate agent		$\beta_1 - \beta_3 + \beta_5 < \beta_2 - \beta_3 + \beta_6$	
Seller and buyer without a real estate agent vs. Seller and buyer with a real estate agent		$\beta_1 - \beta_3 + \beta_5 < \beta_2 - \beta_4 + \beta_6 - \beta_7$	

Notes: NA indicates that an examination of the relationship between the model coefficients indicated in brackets is not necessary to verify the hypotheses.

4. Results and discussion

Table 4 shows the average WTA and WTP values as well as their average deviations from the adopted benchmarks. In the absence of real estate agents' participation during the transaction, the average WTA value of sellers is slightly higher than the market price of the property (in the up market), confirming that they are overcompensating for the loss of ownership. In contrast, in the down market, the average WTA value is less than the benchmark, which may indicate that sellers are taking into account the possibility of a significant decline in the value of their property and may therefore be framing the failure to transact as a foregone gain. When sellers include a real estate agent in the transaction, the average WTA values in both the up and down markets increase which is in line with the theoretical assumptions presented in Section 2. During the up market, the average deviation of the WTA value from the market price increased by 1.77 percentage points, while during the down market, it increased by 4.56. As a result, sellers in a rising market compensate only part of the commission, while in a falling market, they cover it in full with the excess, indicating that the commission is a particularly painful loss for sellers during this period. There is a generally pessimistic mood in the real estate market during a downturn, which can exacerbate sellers' negative feelings about charging commissions. Likewise, when prices increase, optimistic market sentiment can mitigate negative perceptions of commissions and consequently weaken the phenomenon of loss aversion.

For buyers, deviations from adopted benchmarks are significantly higher than those for sellers in both down and up markets. This is particularly noticeable in the former situation, where the average buyers' WTP is significantly lower than the market price. As a result, a transaction at the market price is framed as a loss for buyers. In the case where buyers decide to hire a real estate agent, the average WTP values increase slightly upward, which is in line with the theoretical assumptions in Section 2. Namely, the average deviation from the market price during the up market falls by 0.6 percentage points and during the down market by 2.04.

Table 5 shows the estimation results of model (1). The model was subjected to basic diagnostic tests for collinearity, specification, and homoscedasticity of residuals. As a result of the failure of the latter condition, the model was estimated with heteroscedasticity-consistent standard errors. Given the relatively large sample size, the residuals of the model were not analysed for normality because, according to the central limit theorem, the OLS estimator is approximately normally distributed (Wooldridge, 2018). Among the control variables in the model, only two variables describing the gender and location of the

Table 4. Respondents' WTA or WTP values (source: own study)

Category	Mean values				Mean percentage deviation from the benchmark			
	WTA or WTP (without a real estate agent)		WTA or WTP (with a real estate agent)		WTA or WTP (without a real estate agent)		WTA or WTP (with a real estate agent)	
	Up market	Down market	Up market	Down market	Up market	Down market	Up market	Down market
Seller	764,713	631,721	777,940	661,407	1.96%	–2.81%	3.73%	1.75%
Buyer	678,611	547,373	683,111	560,627	–9.52%	–15.79%	–8.92%	–13.75%

Notes: The values shown are in the PLN. One PLN is equal to 4.3463 Euro on 15.02.2024. The benchmark was the property market price, which was PLN 750,000 in the up market and PLN 650,000 in the down market.

Table 5. Model parameter estimates (source: own study)

Variable	Coefficient	Robust standard error†	*t*-statistic	*P*-value	Variance inflation factor
Constant	–0.1073*	0.0269	–3.99	<0.0000	–
ups	0.1757*	0.0180	9.75	<0.0000	1.75
upsr	0.1934*	0.0163	11.89	<0.0000	1.75
upb	0.0627*	0.0213	2.95	0.0030	1.75
upbr	0.0687*	0.0188	3.66	<0.0000	1.75
downs	0.1280*	0.0172	7.46	<0.0000	1.75
downsr	0.1736*	0.0158	10.98	<0.0000	1.75
downbr	0.0204	0.0200	1.02	0.3090	1.75
gen	–0.0234*	0.0097	–2.41	0.0160	1.11
age	<0.0000	0.0005	0.01	0.9930	1.18
inc	<0.0000	<0.0000	–0.38	0.7020	1.38
edu	–0.0111	0.0093	–1.19	0.2350	1.16
emp	–0.0021	0.0143	–0.14	0.8850	1.44
loc	–0.0339*	0.0128	–2.65	0.0080	1.03
nor	0.0022	0.0091	0.24	0.8120	1.06
std	–0.0002	0.0106	–0.01	0.9880	1.08
R^2			0.2345		
N			992		
Link test for model specification‡			p = 0.27		
Ramsey RESET test for model specification‡			p = 0.19		

Notes: † Heteroskedasticity-consistent standard errors. ‡ H_0: Model is correctly specified. * Significant at least at 0.10.

respondents were found to be significant. Notably, women tend to report lower WTA/WTP values, consistent with Bao and Gong's (2016) research on the endowment effect in the housing market in China. Wieland et al. (2014) argue that women's lower valuations may be due to the fact that they are generally more risk-averse than men. The second significant control variable indicates that respondents located in rural areas had higher WTA/WTP values. The reason might be that in rural areas, the housing market is much less active, and people are generally more attached to their properties than in urban areas. Among the variables referring to the different respondent groups, only one relating to buyers during the down market using an estate agent was found to be insignificant at the 0.10 level. This situation was expected, as the reference group was buyers during the down market without the use of an agent, and as indicated in Table 4, the average deviation of WTP from market price among these groups is similar.

Table 6 shows the magnitude of the endowment effect in the relative (as a percentage of the benchmarks) and absolute (amount) terms. The WTA-WTP gap is positive and statistically significant (Table 7) in each case, that is, during both the up and down markets, regardless of whether a real estate agent is involved in the transaction. Hence, H1 is verified positively. The endowment effect is similar for up and down markets. The lack of difference in the intensity of the endowment effect during the upward and downward trends in property prices is also confirmed statistically (Table A1), which is in line with Gong et al. (2019) and Tomal (2024). When both sellers and buyers do not use real estate agents, the endowment effect averages 12.05%, that is, PLN 83,972, which confirms the study of Tomal (2024), in which the endowment effect was 13.45% for the secondary residential sales market. The involvement of a real estate agent only on the buyer's side slightly reduces the endowment effect by increasing the WTP value but is not enough to conclude that it has a significant effect (Table 7). When a real estate agent is used on the seller's side, an increase in the intensity of the endowment effect can be observed, but it is statistically significant only when the buyer does not use a real estate agent simultaneously (Table 7). In the latter case, the endowment effect was as high as 15.21% (PLN 105,428). The endowment effect, when both buyers and sellers use the services of agents, turned out to be insignificantly different from transactions when the parties do not use such services because of the slightly increased WTP of buyers using agents. Therefore, the obtained results can only partially verify H2.

The findings of this study provide new evidence of the inefficiency of commission-based real estate brokerage services from a behavioural economics perspective. Previous scholarly work within the framework of new institutional economics (NIE) has highlighted that real estate brokerage services are characterised by excessive commissions (Zumpano & Hooks, 1988), which can lead to the creation of high transaction costs in the real estate

Table 6. Estimates of the WTA-WTP gap based on the model (source: own study)

Category		Seller without a real estate agent	Seller with a real estate agent
Buyer without a real estate agent	Up market	11.30% (PLN 84,759)	13.06% (PLN 97,986)
	Down market	12.80% (PLN 83,185)	17.36% (PLN 112,870)
	Mean	12.05% (PLN 83,972)	15.21% (PLN 105,428)
Buyer with a real estate agent	Up market	10.70% (PLN 80,259)	12.46% (PLN 93,486)
	Down market	10.76% (PLN 69,931)	15.33% (PLN 99,616)
	Mean	10.73% (PLN 75,095)	13.90% (PLN 96,551)

Table 7. Hypotheses verification results (source: own study)

Hypothesis 1		Seller without a real estate agent	Seller with a real estate agent
Buyer without a real estate agent	Up market	$\beta_1 = \beta_3$ ($p < 0.01$)* $\beta_1 > \beta_3$ ($p > 0.99$)*	$\beta_2 = \beta_3$ ($p < 0.01$) $\beta_2 > \beta_3$ ($p > 0.99$)
	Down market	$\beta_5 = 0$ ($p < 0.01$) $\beta_5 > 0$ ($p > 0.99$)	$\beta_6 = 0$ ($p < 0.01$) $\beta_6 > 0$ ($p > 0.99$)
Buyer with a real estate agent	Up market	$\beta_1 = \beta_4$ ($p < 0.01$) $\beta_1 > \beta_4$ ($p > 0.99$)	$\beta_2 = \beta_4$ ($p < 0.01$) $\beta_2 > \beta_4$ ($p > 0.99$)
	Down market	$\beta_5 = \beta_7$ ($p < 0.01$) $\beta_5 > \beta_7$ ($p > 0.99$)	$\beta_6 = \beta_7$ ($p < 0.01$) $\beta_6 > \beta_7$ ($p > 0.99$)
Hypothesis 2			
Seller and buyer without a real estate agent vs. Seller without a real estate agent and buyer with a real estate agent		$\beta_1 - \beta_3 + \beta_5 = \beta_1 - \beta_4 + \beta_5 - \beta_7$ ($p = 0.35$)*	
Seller and buyer without a real estate agent vs. Seller with a real estate agent and buyer without a real estate agent		$\beta_1 - \beta_3 + \beta_5 = \beta_2 - \beta_3 + \beta_6$ ($p < 0.01$) $\beta_1 - \beta_3 + \beta_5 < \beta_2 - \beta_3 + \beta_6$ ($p > 0.99$)	
Seller and buyer without a real estate agent vs. Seller and buyer with a real estate agent		$\beta_1 - \beta_3 + \beta_5 = \beta_2 - \beta_4 + \beta_6 - \beta_7$ ($p = 0.27$)	

Notes: * Not required for hypothesis verification. A heteroskedasticity-robust F test was used to verify the hypotheses. First, a two-sided test was applied; if the null hypothesis was rejected, the corresponding one-sided test was applied. The results are left untouched when adjusting the p-values owing to the multiple testing problem.

market, resulting in a discrepancy between the bid and offer prices of buyers and sellers, respectively (Crockett, 1982), and ultimately to decreased housing market liquidity, and allocative inefficiency (Barwick & Pathak, 2015). In contrast to the NIE approach that treats the collection of commission by a real estate agent from the parties to a transaction solely as a transaction cost, this study, adopting the behavioural strand, indicates that this situation can be framed by these parties as a loss requiring compensation. Stronger negative connotations, and consequently a more painful loss, in relation to commissions are noted among sellers than among buyers. It should be noted that the problem of overly high commissions is noticeable among potential clients of brokers and real estate agents themselves. For example, Ostrowska (2014), asking potential clients of real estate brokers in Poland, discovered that as many as 79.8% of respondents were reluctant to involve an agent during a transaction because the price for their services was too high. An almost identical percentage of indications for this effect was indicated in a study carried out by Gackowska (2023), where it was highlighted that agents also suggest that they may charge too high a price for their services.

5. Conclusions

This study aimed to assess the impact of real estate agents' participation during transactions on the endowment effect in the housing market using Poland as an example. The realisation of the study objective and verification of the set research hypotheses make it possible to answer the research question posed at the beginning: How does the participation of real estate agents during housing transactions affect the presence of the endowment effect in the residential market? The results obtained indicate that regardless of whether a real estate agent only participates on one or both sides of the transaction, the endowment effect is not eliminated or even reduced because of the commission charged by agents, which is regarded especially by sellers as a very negative loss. The latter leads to a situation in which when the real estate agent is only used by the seller, the endowment effect is significantly increased compared with when both parties to the transaction try to complete it on their own.

The results of this study are relevant for policymakers. As in the previous literature, this research also points to the inefficiency of real estate brokerage services. The

government could try to encourage agents to follow a different policy in setting their remuneration, for example, as a fee rather than a percentage commission, in line with what Yinger (1981) proposes. Such a move should reduce the negative connotations potential clients have about the agent's charge and direct their gaze toward the added value that real estate brokers can create during a transaction. A second solution is to introduce a flexible commission that depends on the value of the house being sold. This is because agents' commissions tend to be the same across transactions, making buyers and sellers with higher incomes more likely to use their services. Therefore, linking the amount of the commission to the value of the house would probably be fair in the eyes of potential customers, and, at least in some of them, the negative connotation of charging a commission would be weakened. With the above measures, the endowment effect in the housing market could decrease, helping to reduce the friction between housing demand and supply.

The present study also has some limitations, which indicate directions for future research. First, it was assumed that real estate agents act rationally; that is, they recommend buying and selling prices equal to the market price of real estate, which is consistent with the standard economic theory. However, real estate professionals can also succumb to behavioural biases in their actions, as highlighted by Salzman and Zwinkels (2017), Kucharska-Stasiak (2014, 2018), and Jarecki (2020). In addition, real estate agents, due to the principal-agent problem, may act in their own interests by advising sellers to significantly reduce their price demands to quickly obtain commissions. Finally, Tomal (2024) pointed out that the strength of the endowment effect varies between housing market segments, which was not analysed in this study.

Disclosure statement

The authors declare no conflict of interests.

References

Anglin, P. M., & Arnott, R. (1991). Residential real estate brokerage as a principal-agent problem. *The Journal of Real Estate Finance and Economics*, *4*, 99–125. https://doi.org/10.1007/BF00173119

Bao, H. X. (2020). *Behavioural science and housing decision making*. Routledge. https://doi.org/10.1201/9780429027253

Bao, H. X., & Gong, C. M. (2016). Endowment effect and housing decisions. *International Journal of Strategic Property Management*, *20*(4), 341–353. https://doi.org/10.3846/1648715X.2016.1192069

Barwick, P. J., & Pathak, P. A. (2015). The costs of free entry: An empirical study of real estate agents in Greater Boston. *The RAND Journal of Economics*, *46*(1), 103–145. https://doi.org/10.1111/1756-2171.12082

Benjamin, J., Jud, G., & Sirmans, G. (2000). What do we know about real estate brokerage? *Journal of Real Estate Research*, *20*(1–2), 5–30. https://doi.org/10.1080/10835547.2000.12091034

Bernheim, B. D., & Meer, J. (2013). Do real estate brokers add value when listing services are unbundled? *Economic Inquiry*, *51*(2), 1166–1182. https://doi.org/10.1111/j.1465-7295.2012.00473.x

Brown, T. C. (2005). Loss aversion without the endowment effect, and other explanations for the WTA–WTP disparity. *Journal of Economic Behavior & Organization*, *57*(3), 367–379. https://doi.org/10.1016/j.jebo.2003.10.010

Brzezicka, J., Wisniewski, R., & Figurska, M. (2018). Disequilibrium in the real estate market: Evidence from Poland. *Land Use Policy*, *78*, 515–531. https://doi.org/10.1016/j.landusepol.2018.06.013

Crockett, J. H. (1982). Competition and efficiency in transacting: The case of residential real estate brokerage. *Real Estate Economics*, *10*(2), 209–227. https://doi.org/10.1111/1540-6229.00264

Douglas, B. D., Ewell, P. J., & Brauer, M. (2023). Data quality in online human-subjects research: Comparisons between MTurk, Prolific, CloudResearch, Qualtrics, and SONA. *Plos One*, *18*(3), Article e0279720. https://doi.org/10.1371/journal.pone.0279720

Fallis, G. (1985). *Housing economics*. Toronto.

Gackowska, M. (2023). Istota działalności pośrednika na rynku nieruchomości. *Zeszyty Studenckie Wydziału Ekonomicznego Uniwersytetu Gdańskiego Nasze Studia*, *13*, 161–171.

Gong, C. M., Lizieri, C., & Bao, H. X. (2019). "Smarter information, smarter consumers"? Insights into the housing market. *Journal of Business Research*, *97*, 51–64. https://doi.org/10.1016/j.jbusres.2018.12.036

Jarecki, P. (2020). *Wybrane behawioralne aspekty wyceny nieruchomości*. Wydawnictwo Uniwersytetu Łódzkiego. https://doi.org/10.18778/8220-042-3

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, *47*(2), 263–292. https://doi.org/10.2307/1914185

Kokot, S., & Orzechowska, K. (2015). Oczekiwania klientów biur pośrednictwa w obrocie nieruchomościami. *Świat Nieruchomości*, *1*, 13–22.

Kucharska-Stasiak, E. (2014). Behawioralne aspekty w wycenie nieruchomości. *Zarządzanie i Finanse*, *2*(4), 247–261.

Kucharska-Stasiak, E. (2018). Dysfunkcje na rynku nieruchomości w warunkach kryzysu gospodarczego. *Bank i Kredyt*, *49*(5), 493–514.

Levitt, S. D., & Syverson, C. (2008). Market distortions when agents are better informed: The value of information in real estate transactions. *The Review of Economics and Statistics*, *90*(4), 599–611. https://doi.org/10.1162/rest.90.4.599

Marsh, A., & Gibb, K. (2011). Uncertainty, expectations and behavioural aspects of housing market choices. *Housing, Theory and Society*, *28*(3), 215–235. https://doi.org/10.1080/14036096.2011.599182

Miller, N., Sanchez, A., Sklarz, M., & Vamosiu, A. (2021). Saving real estate commissions at any price: Does having a real estate agent influence the sales price of a home? *Journal of Housing Research*, *30*(2), 175–206. https://doi.org/10.1080/10527001.2021.1984756

Ostrowska, I. (2014). Analiza zalet i wad korzystania z usług pośrednictwa w obrocie nieruchomościami na podstawie opinii konsumentów. *Marketing i Zarządzanie*, *34*, 161–171.

Salant, S. W. (1991). For sale by owner: When to use a broker and how to price the house. *The Journal of Real Estate Finance and Economics*, *4*, 157–173. https://doi.org/10.1007/BF00173122

Salzman, D., & Zwinkels, R. C. (2017). Behavioral real estate. *Journal of Real Estate Literature*, *25*(1), 77–106. https://doi.org/10.1080/10835547.2017.12090455

Shu, S. B., & Peck, J. (2011). Psychological ownership and affective reaction: Emotional attachment process variables and the endowment effect. *Journal of Consumer Psychology*, *21*(4), 439–452. https://doi.org/10.1016/j.jcps.2011.01.002

Shy, O. (2012). Real estate brokers and commission: Theory and calibrations. *The Journal of Real Estate Finance and Economics*, *45*(4), 982–1004. https://doi.org/10.1007/s11146-010-9296-6

Thaler, R. (1980). Toward a positive theory of consumer choice. *Journal of Economic Behavior & Organization*, *1*(1), 39–60. https://doi.org/10.1016/0167-2681(80)90051-7

Tomal, M. (2024). *The endowment effect and housing markets: Theory and evidence from Poland*. Routledge.

Wieland, A., Sundali, J., Kemmelmeier, M., & Sarin, R. (2014). Gender differences in the endowment effect: Women pay less, but won't accept less. *Judgment and Decision Making*, *9*(6), 558–571. https://doi.org/10.1017/S1930297500006422

Willig, R. D. (1976). Consumer's surplus without apology. *The American Economic Review*, *66*(4), 589–597.

Wooldridge, J. M. (2018). *Introductory econometrics: A modern approach*. Cengage.

Yinger, J. (1981). A search model of real estate broker behavior. *The American Economic Review*, *71*(4), 591–605.

Zumpano, L. V., & Hooks, D. L. (1988). The real estate brokerage market: A critical reevaluation. *Real Estate Economics*, *16*(1), 1–16. https://doi.org/10.1111/1540-6229.00440

Zumpano, L. V., Elder, H. W., & Baryla, E. A. (1996). Buying a house and the decision to use a real estate broker. *The Journal of Real Estate Finance and Economics*, *13*, 169–181. https://doi.org/10.1007/BF00154054

Appendix

Table A1. Testing the difference in the strength of the endowment effect between the up and down markets (source: own study)

Category		Seller without a real estate agent	Seller with a real estate agent
Buyer without a real estate agent	Up market vs. down market	$\beta_1 - \beta_3 = \beta_5$ ($p = 0.75$)	$\beta_2 - \beta_3 = \beta_6$ ($p = 0.28$)
Buyer with a real estate agent	Up market vs. down market	$\beta_1 - \beta_4 = \beta_5 - \beta_7$ ($p = 0.98$)	$\beta_2 - \beta_4 = \beta_6 - \beta_7$ ($p = 0.36$)

Notes: P-values were adjusted for the multiple testing problem.