university of groningen / faculty of spatial sciences

The Influence of Issued Building Permits on Housing Price

An analysis of the possibility of a relationship between issued building permits and housing price within Dutch municipalities.

BACHELOR THESIS

HUMAN GEOGRAPHY AND PLANNING

Colophon

Title	The Influence of Issued Building Permits on Housing Price
Subtitle	An analysis of the possibility of a relationship between issued building permits and housing price in Dutch municipalities.
Date	January 26, 2024
Version	Final Version of Bachelor Thesis
Author	M.P. (Marc Pascal) van der Kooi
Student number	s4161041
E-mail	m.p.van.der.kooi@student.rug.nl
Supervisor	Dr. X. Liu
E-mail	xiaolong.liu@rug.nl
Bachelor	BSc Human Geography and Planning
Faculty	Faculty of Spatial Sciences

Abstract

This bachelor's thesis investigates the factors that influence the housing price in the Netherlands, with the main focus being on the possibility of a relationship between the amount of issued building permits in a set period and the housing price two years later. Housing prices have been rising from 2013 onwards, while the amount of issued building permits fluctuates and seems to stagnate in most recent years. Other variables of importance used in this analysis are: income, unemployment rates and population size. This study makes use of data for these variables for the years 2012 until 2016. It investigates this relationship by analyzing data provided by the CBS. The findings shed light on several key factors of importance to the housing prices. No consistent relationship is found between the amount of issued building permits and the housing price in the Dutch municipalities for the researched years. However, in a third of the regression results there appears to be a significant relationship present. Furthermore, income appears to have a significant influence on the housing prices, population size does not, and unemployment rates in some cases. Overall, this thesis and its findings contribute to a deeper understanding of the factors influencing housing prices in the Dutch municipalities, and can play a role in further exploration of this relationship and in decision-making processes, as it has impact on policy- makers and advisors and on society.

Keywords: housing price, building permits, private real estate, housing crisis, the Netherlands

Contents

1. Introduction

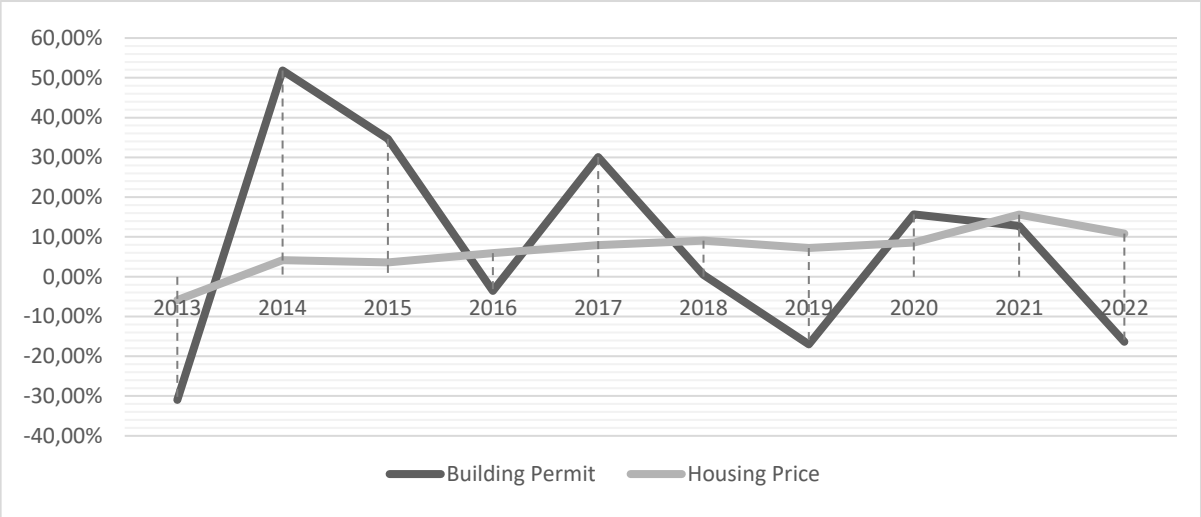
1.1 Background

In recent years, it became clear that the Dutch housing market is being faced with a severe housing shortage. News reports underline the urgency and social importance of the situation. Youngsters keep living with their parents for more years than before, due to the housing market being overloaded. 'There is almost nothing available. And when there is, it is often unaffordable. Young home seekers notice it every day: there is a major shortage of houses in the Netherlands' (NOS, 2021).

Approximately 900 thousand inhabitants of the Netherlands are affected by this shortage. They want to move, but cannot, because they are unable to find suitable housing. This amount has more than doubled compared to the 'only' 400 thousand people who experienced this problem in the year 2015 (Centraal Bureau voor de Statistiek, 2022). According to the most recent data from Volkshuisvesting Nederland (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2023), it has become clear that the Netherlands is faced with a housing shortage of a staggering 390 thousand dwellings.

Furthermore, it is notable that the upward trend in the number of building permits issued for new-build homes has stagnated over the past few years (Centraal Bureau voor de Statistiek, 2023a). Table 1 shows this trend, it depicts the percentage difference of increase or decrease in the amount of issued building permits and the level of housing prices. The mean housing prices have increased from € 213.353 in 2013 to € 428.591 in 2022. From table 1 it becomes clear that these prices have been rising for the past ten years, without periods were they stop growing (Centraal Bureau voor de Statistiek, 2023b). The stagnation in the growth of the mean number of issued building permits is also visible in this table. This could potentially mark a pivotal moment in the evolution of the Dutch housing market. Respectively, in 2014 41.300 building permits were issued per municipality, 70.000 in 2018, and 63.400 in 2022.

Table 1. Difference in amount of issued building permits and housing prices in the Netherlands, 2013 – 2022, in percentages.



The housing market is a fundamental component within any economy, and it plays a critical role in shaping the landscape of urban development. Insights from Case and Shiller (2003) shed light on the intricate relationship between housing prices and the broader economy. Their study focusses on the United States, but their findings are likely to be applicable to the Dutch context. They emphasize a pivotal role that housing prices have in influencing household wealth and consumer spending. When prices for housing rise, a wealth effect is observed, which subsequently causes increased consumer spending and therefor contributing to economic growth. If this effect is flipped, a decline in housing prices can possibly be the cause of economic constrictions. Additionally, they state that the stability of the financial system is linked to the housing market. Potential bubbles and fluctuations in the housing market can be hazardous to financial institutions, which can in a reaction impact the overall financial stability.

The rising housing prices have been fuelling concerns about the functioning of the Dutch housing market and the role that governmental policies have in it (Korevaar, 2022). Examining the relationship between factors which can potentially be influential to housing prices and the housing prices holds significant academic significance. Other studies show that a lot of research has been conducted into the dynamics of housing prices, and the factors driving these housing prices (Abelson et al., 2005; Bourassa and Hendershott, 1995; Reichert, 1990; Sayin et al., 2022; Zhang and Yang, 2023; Zhang et al., 2012). This research is particularly important for policy makers to understand the factors that influence housing prices, due to the crisis on the housing market. Given this crisis, it becomes crucial to investigate the different drivers of housing prices. This study focusses on one of these potential factors. To be precise, this research contributes to a comprehensive understanding of the diverse factors which are influential to the housing price, with the amount of issued building permits as the main focus. In light of the

insights given by existing literature it becomes clear that this research addresses a critical research gap, by exploring the connections between the amount of building permits issued in Dutch municipalities and the housing price in those municipalities. Several studies have researched the relationship between building permits and the housing price, but only in a U.S. context (Bahmani-Oskooee, 2021; Pollakowski, 1995; Zhang and Yang, 2023). The factors that will come forth of this research can in possibility contribute to the theoretical understanding, but additionally to practical applications. These can help with informing the Dutch policy and decision-making processes, in the face of the current housing challenges in the Netherlands.

1.2 Research problem

The aim of this research is to determine whether or not there is a causal relationship between the issuance of building permits and the housing prices in municipalities in the Netherlands. To be able to research this possible causal relationship a central research question will be answered:

'Does an increase in issued building permits lead to lower housing prices in Dutch municipalities?'

This research question can be answered by making use of a statistical analysis. Furthermore, theoretical backing will be provided by reviewing previous studies which have a focus on building permits and housing prices.

1.3 Structure of thesis

To guide the reader through this research, this research will follow a structured approach. The remainder of this thesis will be structured as follows. Chapter 2 covers the theoretical framework, which provides an overview of previous studies regarding relatable topics. It becomes clear what factors influence the housing prices in general. Furthermore, it gives explanations about the influence of building permits on the housing prices in different situations. Chapter 3 covers the methodology. This chapter provides information about the statistical methods used in the analysis accompanying the theoretical research part. The statistical analysis is needed to provide an answer to the main research question. Chapter 4 discussed the data sources, variables, data cleaning techniques and descriptive statistics. In

chapter 5 the results are presented. The findings will be interpreted while comparing them with the findings from existing literature. Chapter 6 encompasses the conclusions. This is a summary of the key findings from this study, which restates the significance of the research and will offer recommendations for future research or policy considerations.

Through this structure, the research aims to provide a comprehensive inquiry of the relationship between the amount of issued building permits in Dutch municipalities and the housing prices connected to these municipalities in the Netherlands. It hopes to contribute to both the theoretical understanding and give practical applications to the Dutch housing market.

2. Theoretical framework

2.1 Key factors affecting housing prices

The main research question of this study focuses on the relationship between building permits and housing prices. Therefor it is of large importance to gain a deeper understanding on the concept of housing prices. To be able to understand further research, it is important to specifically study the key factors influencing housing prices very carefully. Several key factors that exert influence on the housing prices can be derived from existing literature. For example, Case and Shiller (2003) have explored the housing market bubbles. Their research also sheds light on the factors that have an influence on the housing prices. Factors which are of influence they mention are income growth, employment growth, interest rates and construction costs. In their research, when the household income grows, this tends to have a positive effect on the housing prices. This is also visible in a case-study on China conducted by Zhang et al. in 2012, where they state that a rapid household income growth pushes up housing prices to a large extent. Furthermore, a case-study on the city of Izmir in Turkey indicates that an increase of income reveals the willingness to pay more for housing, which can drive up housing prices as well (Sayin et al. 2022). This is further substantiated by the finding of Reichert (1990) that, within the U.S. housing markets different wind directions, several factors appear to have influence on the housing prices. One of the most stable factors of these is the permanent income. In addition, this seems to be the case in the United Kingdom as well, as Stern (1992) states that the disposable income is the most important variable affecting the housing market of the U.K.

Additionally, employment growth can lead to higher housing prices, as high employment rates can contribute to increased consumer confidence and therefor higher demand for housing, driving up the price (Case and Shiller, 2003). Reichert (1990) supports the claim that employment rates have an influence on housing prices, by demonstrating this with a study on the U.S. housing price determinants. This claim is further backed up by Abelson et al. (2005). Their research found that unemployment rates are negatively related to the housing prices in Australia. The higher the unemployment rate, the lower the housing price, and vice versa. Subsequently, interest rates have a significant impact on the housing prices as well. Low interest rates tend to stimulate demand for housing, which increases the price. On the other hand, when interest rates increase, the demand for housing might drop, which contributes to price declines. At last, Case and Shiller (2003) mention the construction costs as an influential factor for the fluctuation in housing prices. When construction costs are high, this is passed on to the consumer. This can be seen by the rising of housing prices, in these situations. Vice versa, when construction costs drop considerably, housing prices tend to follow this pattern.

Furthermore, the housing market is a game of supply and demand. The demand side is partially determined by the population size. The larger the population, the larger the demand for housing. When demand and supply do not match, this will affect the housing prices (Gyourko & Saiz, 2006). Within the U.S. context, Reichert (1990) indicates that, among employment rates and income, the population size has one of the largest effects on the housing price. Population growth can directly impact the demand for housing, especially when the population growth is in the home buying age-group. Therefor, housing prices should be affected directly by the population growth (Reichert, 1990). The claim on population growth affecting the housing prices is supported by Bourassa and Hendershott (1995). House prices in the capital city of Australia are, among other factors, driven by the growth in population.

2.2 Building permits

A factor closely related to the supply of housing is the amount of issued building permits. The supply of new housing is determined for a considerable amount by the amount of issued building permits in a certain area. A low amount of newly built houses delivered relates to a positive alteration of housing prices (Van Dalen, 2016; Buitelaar, 2019). Therefore, data on building permits can be used as one of the sources for measuring house prices (Pollakowski,

1995). In the context of the possible relationship between the amount of issued building permits and the housing prices, the case study of Zhang and Yang (2023) on the United States discusses the possibility of this relationship. Their study found a nation-wide causality relationship between building permits and the housing value index. However, this relationship seemed to act in both directions, and changed when using different time-periods. Their observations highlight that the housing value responds negatively to an increase in building permits within a relatively short period of time of four to seven months, but responds positively within the period of ten till twelve months. Thus, in the short term when more building permits are issued, the housing value decrease, but in the longer term, this relation is flipped and more building permits issued lead to a higher housing price. Possibly this can be explained by the fact that when more and more building permits are issued, and therefore more and more houses are built, the housing market turns wide. In other words, the supply outgrows the demand. Moreover, in previous years a very similar study has been performed by Bahmani-Oskooee et al. (2021). They study the relationship between the number of issued building permits and the housing prices in the U.S. Their analysis encompasses all U.S. states, and makes the distinction between a 'supply hypothesis', where an increase of issued building permits leads to a decrease in housing prices and a 'demand hypothesis' where this effect is vice versa. They find that for most states the 'demand hypothesis' can be accepted, however, for other states this is the 'supply hypothesis'. Overall, they suggest there is a relationship between the amount of issued building permits and the housing price, but it is context- and location- dependent whether or not this relationship is positive or negative.

Additionally, Asabere and Huffman (2001) researched the relationship between the amount of issued building permits and the residential land sales prices in a set of municipalities in a suburban county of Philadelphia, U.S. This is not one on one comparable with the housing prices, but they have some relationship. Their study finds that a one percent increase in the amount of issued building permits leads to 1,14 percent increase in sales price per acre. Thus, a positive relationship between the amount of issued building permits and land prices is present. However, the same relationship has been researched in France (Ay et al., 2018), and the results are different. This study concludes that a one percent increase in the number of issued building permits relates to a 0,3 percent decrease in land prices. This result is at odds with the results of Asabere and Huffman (2001).

2.3 Hypothesis and conceptual model

Since the outcome of this research is derived from a statistical analysis, a null-hypothesis will be formulated: *'There is no linear relationship between the amount of issued building permits and the housing prices in Dutch municipalities, during the 2012-2016 period.'* This hypothesis assumes that, after controlling for other independent variables, the amount of issued building permits has no significant impact on the housing prices in Dutch municipalities in the time-period of 2012 till 2016. However, one may expect that the outcome of this statistical analysis will conclude that this null-hypothesis cannot be accepted. One may not expect that there is no relationship between the amount of issued building permits and the housing prices in Dutch municipalities for the 2012 – 2016 time period. This is an educated guess, based on the theory provided in the existing literature. Especially, the articles by Zhang and Yang (2023) and Bahmani-Oskooee et al. (2021) are decisive in this expectation, as the outcome of Zhang et al. (2023) is that for some months there is a positive relationship, and for some other months there is a negative relationship between the amount of issued building permits and the housing value index within the time period of their research. Bahmani-Oskooee et al. (2021) find a relationship between the two variables as well, which is also present in U.S. states, both negatively and positively, depending on the context. Figure 1 displays a conceptual model regarding this research.

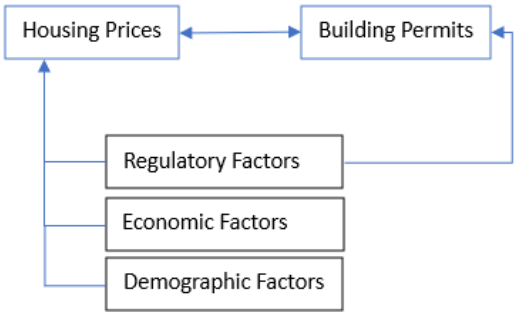


Figure 1. Conceptual model.

3. Methodology

3.1 Statistical model

The central research question guiding this study is: 'Does an increase in issued building permits lead to lower housing prices in Dutch municipalities?'. Given the nature of the research question, a quantitative research design is adopted to analyse numerical data and establish whether or not there is a statistical relationship between two variables. Previous studies have done so before.

Two main variables can be extracted from the research question itself, namely 'the number of issued building permits' and 'the housing price'. The first variable being independent, and the second variable being dependent. Several other factors were suggested to have an influence on housing price. The ones which appeared most in previous studies are income, unemployment levels and population size (Abelson et al., 2005; Bourassa and Hendershott, 1995; Reichert, 1990; Sayin et al., 2022; Zhang and Yang, 2023; Zhang et al., 2012). These factors will be added to the analysis as independent 'control'-variables.

This study will make use of the following multiple linear regression:

$$LnY=\beta 0+\beta 1\text{Ln}(X1)+\beta 2\text{Ln}(X2)+\beta 3\text{Ln}(X3)+\beta 4\text{Ln}(X4)+\varepsilon$$

Here, LnY represents the logarithm of the housing price, Ln(X1) represents the logarithm of the amount of issued building permits, Ln(X2) represents logarithm of the income, Ln(X3) represents the logarithm of the amount of people unemployed, Ln(X4) represents the logarithm of the population size. Furthermore, β0 is the intercept, and β1, β2, β3, and β4 are the coefficients associated with each independent variable. At last, ε represents the error term.

4. Data

4.1 Data & variables definition

The study encompasses data of Dutch municipalities within the time span of 2012 till 2016. The data used in this study is secondary data, publicly accessible at the Centraal Bureau voor de Statistiek or 'Statistics Netherlands' (CBS). The CBS provides exact or similar data on variables for all four independent and one dependent variables used in this study per municipality, per year.

For the dependent variable ‘housing price’, data on the average sales price is used. CBS represents this as the average value paid for existing homes purchased by a private individual. For the variable ‘building permits’, this is represented as the total number of new homes to be built for which a building permits has been granted. Furthermore, data on the average disposable income of private households, excluding student households, is used for the variable ‘income’. The disposable income consists of gross income minus paid income transfers, income insurance premiums, health insurance premiums and taxes on income and capital. The private household is specified as one or more people who live in a living space together and provide themselves with daily necessities. Additionally, for the variable ‘population size’, data is used which displays the number of inhabitants which are included in the population register of a Dutch municipality. The ‘unemployment’ variable consists of the number of people who receive benefits under the Unemployment Act.

The task of the issuance of building permits in the Netherlands is being carried out by the municipalities in which the requests are made. The rules for assessment for this are in the environmental code, which is a nationwide law, or in local rules of the environmental plan, environmental regulation, or water board regulation, in the certain municipality. The environmental code is about the physical environment, and the activities that have or may have consequences for the physical environment. The main factors associated with building permits are in this law affecting the physical environment include buildings, infrastructure, landscapes and nature, and the changing of parts of the physical environment or its use, the use of natural resources, and activities that cause emissions, nuisance or risks (Overheid.nl, 2024).

Another important aspect to notice is that over the years, the size, shape and names of some municipalities in the Netherlands have changed, mostly due to the merging of several smaller municipalities into one larger municipality. For such a reclassification there are two options. An already existing municipality becomes larger, by the addition of (part of) a discontinued municipality, but keeping its existing name, is one of the options. The other option is that several municipalities merge into one, or more, new municipalities, with a new name. This creates a situation in the dataset where for some municipalities, due to them being new, or discontinued, there is no data for one or more years available. To overcome this issue, all municipalities for which no data is available, or the presented value is zero for the amount of issued building permits, for all of the years in the time span of 2012 – 2016, are excluded from the analysis. The raw dataset from which the amount of building permits is obtained has data on this topic for the years 1995 until 2016. This is why this dataset consists of 727 municipality-names,

which is a lot more than the actual number of municipalities the Netherlands has. After omitting the 389 unusable municipality-names, which did not exist anymore, or did not produce data, the new dataset consists of 338 municipalities, for which all variables have values, which are not zero, for this time period.

Furthermore, the dataset uses a panel-data structure, since there is data for several years for the same variables. Additionally, a time lag is needed between the variable named building permits and the variable named housing price. This finds its cause in the fact that once a building permit is issued, a certain time period is needed for the construction of the object. The time lag within this research is set at two years.

4.2 Descriptive statistics

Due to the time lag of two years, and the dataset consisting of data on the time period 2012 – 2016, a multiple linear regression is run three times. One time using the variable 'building permits' for the year 2012, and all other variables for the year 2014. The second time 2013 – 2015 is used, and at last 2014 – 2016. With regards to table 2, which displays the descriptive statistics for all variables, in broad terms, it is possible to tell something about the changes and variability in the statistics over the years for these variables. Furthermore, the table only shows the years which are used in the statistical analysis per variable, this is due to the time lag of two years.

Table 2. Descriptive statistics for variables: 'building permits, housing price, income, unemployment, population size'.

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Building Permits					
2012	338	101,28	153,971	1	1272
2013	338	74,17	139,895	1	1557
2014	338	108,44	220,378	1	3056
Housing Price					
2014	338	223363,5	54225,90	119488	558336
2015	338	230906,8	57605,60	124837	597694
2016	338	243570,1	61265,64	127804	649703
Income					

2014	338	42366,27	5615,403	31300	72700
2015	338	41684,02	5228,123	31600	79300
2016	338	43398,82	5489,034	32500	79300
Unemployment					
2014	338	1037,43	1575,674	70	19790
2015	338	988,20	1485,468	80	18310
2016	338	913,31	1411,341	60	17810
Population Size					
2014	338	43225,86	62987,55	3578	810937
2015	338	43485,12	63789,20	3590	821752
2016	338	43707,41	64490,60	3611	833624

The analysis of these descriptive statistics provides valuable information into the dynamics of the Dutch municipalities over the given time period of three years for the variables ‘building permits’, ‘housing price’, ‘income’, ‘unemployment’ and ‘population size’. First of all, the number of building permits shows a fluctuation over the years 2012 until 2014. A decrease of more than 26 percent in building permits issued is visible when comparing 2013 to 2014. However, a year later this amount increases with approximately 46 percent. No real trend is visible for these years. On the other hand, housing prices do show a trend. These have been rising steadily from 2014 to 2016. One thing that stands out is the large difference between the minimum and maximum amount of housing prices per municipality and it is notable that this difference is growing over the years. Furthermore, there is no real trend visible in income over the period of 2014 till 2016, as the mean income in 2015 is lower than that of 2014 and 2016. The standard deviation indicates some variability here, but it is relatively stable over this period, indicating the variability does not change much over the years. Additionally, the unemployment figures show a continuous decrease in unemployment rates. The mean amount of unemployed individuals dropped from 1037,43 in 2014 to 913,31 in 2016. Population size, however, shows this trend oppositely. The mean population size of the Dutch municipalities increased from 43.225,86 in 2014 to 43.707,41 in 2016.

In summary, for the years studied, it seems there is a negative trend for unemployment figures, there are positive trends for population size and housing prices, and no real trend visible for the amount of issued building permits and income.

5. Results

5.1 Linear regression

A multiple linear regression was run three times, using the natural logarithm of the variable values, as explained in the methodology section. In table 3 the results of these regressions are depicted. The conventional significance level of 0,05 is used in the analysis.

Table 3. Coefficients.

Variable	B	Std. Error	t	Sig.
Dependent variable: Housing Price 2014				
(Constant)	-5,821	0,601	-9,692	0,000
Building Permit 2012	0,014	0,005	2,765	0,006
Income 2014	1,690	0,061	27,891	0,000
Unemployment 2014	0,076	0,037	2,074	0,039
Population 2014	-0,041	0,038	-1,074	0,284
Variable	B	Std. Error	t	Sig.
Dependent variable: Housing Price 2015				
(Constant)	-6,981	0,654	-10,679	0,000
Building Permit 2013	0,004	0,005	0,734	0,463
Income 2015	1,784	0,065	27,258	0,000
Unemployment 2015	0,034	0,037	0,923	0,357
Population 2015	0,010	0,040	0,252	0,801
Variable	B	Std. Error	t	Sig.
Dependent variable: Housing Price 2016				
(Constant)	-7,279	0,624	-11,66	0,000
Building Permit 2014	0,002	0,006	0,275	0,784
Income 2016	1,828	0,061	29,904	0,000
Unemployment 2016	0,091	0,036	2,538	0,012
Population 2016	-0,042	0,038	-1,098	0,273

Table 3 indicates that for the multiple linear regression that was run with the dependent variable 'housing price 2014', several variables may have a significant impact on this dependent variable. For the control variables this is the case for 'income 2014' and 'unemployment 2014', as their probability values are respectively <0,000 and 0,039. The probability value associated with the population size of 2014 does not indicate a significant influence on the dependent variable. However, the amount of issued building permits in 2012 seems to have an influence, as the probability value associated with this variable is 0,006. Furthermore, the expected B is 0,014, which implies that for a one percent increase in the number of issued building permits the housing price increases with 0,014 percent, while keeping all other variables constant. The outcomes for the second multiple linear regression are somewhat different. This time 'housing price 2015' is the dependent variable. The only probability value which indicates a significant influence on the dependent variable is the one for 'income 2015', as this is again <0,000. The other control variables, 'unemployment 2015' and 'population 2015' do not show a significant impact, nor does the probability value associated with 'building permits 2013', as this is 0,463. For the last multiple linear regression, the dependent variable is 'housing price 2016'. The outcome of this regression shows again that income, in this analysis as 'income 2016', has a significant influence on the housing prices in 2016 (p-value: <0,000). From the results of the other control variables, it stands out that the population size does still not have a significant influence, as the probability value is 0,273. However, the unemployment rate of 2016 seems to have a significant impact on the housing prices in 2016, as the probability value displays 0,012. Additionally, the main variable of interest 'building permits 2014' does not appear to have a significant influence on the housing prices of 2016, with a probability value of 0,784.

In summary, it becomes clear that for all of the years, income is the only consistent significant predictor of housing prices in the Dutch municipalities. Another consistent result is that of the population size. This does appear to not be a significant predictor in neither of the years. Unemployment levels can be seen as significant predictors for two out of three years, and the amount of building permits only indicates to be a significant predictor for the housing prices in one year.

5.2 Comparison with literature

To give some context, it is helpful to compare the results of this Dutch case linear regression analysis with the existing literature, which can be read in the theoretical framework. From this comparison, it stands out that there tends to be no linear relationship between the variable for amount of issued building permits and the housing price in the case of Dutch municipalities for approximately 66 percent of the cases. However, for one combination of years there appears to be a linear relationship, namely the amount of issued building permits in 2012 seems to have a positive relationship with the housing price in 2014, while all other year combinations do not show this relationship. This is not consistently in line with existing literature, since Zhang et al. (2023) observed a relationship between the amount of issued building permits and the housing price, but it acted both ways. Considering their findings, from which we can assume that in general there is no consistent positive or negative relationship, this is also the case within the Dutch context. The findings by Bahmani-Oskooee et al. (2021) suggested a different outcome as well, as their study finds positive and negative relationships between building permits and housing price, depending on the U.S. state. There appears to be no consistent linear relationship between the two variables for the given years in the Dutch municipalities, at least not for the years studied in this research. However, Pollakowski (1995) stated that data on building permits could be used as one of the sources of measuring house prices. This is at odds with the findings of this research, focusing on Dutch municipalities. This can possibly be the case because in principle there does not have to be a relationship between the amount of issued building permits, and the amount of actual new houses built. In other words, it is possible that there is no real connection between the number of issued building permits and the supply of houses, as the housing market is a game of supply and demand (Gyourko and Saiz, 2006).

Furthermore, in line with the results from the study performed by Case and Shiller (2003) it appears that the income does have a significant influence on the housing prices in Dutch municipalities. Rising incomes may contribute to an increased purchasing power, which potentially leads to higher housing prices (Reichert, 1990; Sayin et al., 2022; Stern, 1992; Zhang et al., 2012). On the other hand, Case and Shiller (2003), among many others, indicated that there is a relationship between employment rates and the housing price (Abelson et al., 2005; Case and Shiller, 2003; Reichert, 1990). From the results of this study however, this relationship does not entirely become clear, as this possible relationship is not visible in all three observations, but rather only in two of the three. This can potentially be explained by the fact that the mean amount of unemployed individuals per municipality is only a fraction of the mean population size of municipalities itself. However, this study does not show a significant

relationship between the population size and the housing price, while this relationship seemed to be present in the researches conducted by Gyourko and Saiz (2006), Bourassa and Hendershott (1995) and Reichert (1990). This is potentially the case because data is used on population size per year, and not population growth per year with respect to the year before.

6. Conclusions

The main purpose of this research is to investigate the impact of the amount of issued building permits on the housing prices in the Dutch municipalities. This is examined by looking at the building permits issued in Dutch municipalities in the years 2012, 2013 and 2014, and the housing prices in Dutch municipalities for the years 2014, 2015 and 2016. A dataset of 338 municipalities was studied in order to indicate whether or not this relationship would be present. The research findings shed light on several key aspects.

The results of this study indicate that there is no consistent relationship visible between the amount of issued building permits and the housing prices in Dutch municipalities for the years investigated. There is no consistency, since in one certain time period there seemed to be a relationship between the amount of issued building permits and the housing price, while in all other time periods this relationship is not visible. This is the case for the amount of building permits issued in 2012 and the housing prices in 2014. This conclusion is not one on one the same with previous studies, as Pollakowski (1995) presented a continuous relationship between building permits and housing prices, and in other studies this relationship was also present, but acted both negatively and positively (Bahmani-Oskooee et al., 2021; Zhang & Yang, 2023).

Furthermore, the study includes several other factors in the statistical analysis. As well as previous studies concluded, for this research it is possible to conclude that another variable turned out to have a significant effect on the housing prices. This is the income level of the Dutch municipalities (Case and Shiller, 2003; Reichert, 1990; Sayin et al., 2022; Stern, 1992; Zhang et al., 2012). Additionally, this study does not reveal a consistent relationship between the unemployment figures and the housing prices, as this relationship was only observed in two out of three time-periods studied. Other studies, however, suggested that the employment figures do have an impact on housing prices (Abelson et al., 2005; Case and Shiller, 2003; Reichert, 1990). In addition, this study suggests there is no linear relationship present between

the population size and the housing prices. This is at odds with studies performed by Gyourko and Saiz (2006), Bourassa and Hendershott (1995) and Reichert (1990) who suggest that there is a strong relationship between the two.

While this research presents valuable insights, there are several limitations that should be considered. Further research on the relationship between the amount of issued building permits and the housing prices is needed to clarify why the relationship is not consistent, why a certain time period does show a relationship between the two variables, and others do not. Additionally, a limitation of this study is that regional differences have not been researched. Future research could include an in-depth analysis, which can focus on these possible regional differences. The outcomes of such a study are possibly different when the specification for different regions is taken into account. This possibility is derived from the standard deviations of the multiple linear regressions visible in this study, which are overall quite large, indicating that there are regional differences present. Another limitation of this research is that the relationship between the amount of issued building permits and the amount of actual new houses built has not been studied. The amount of newly built houses might have a stronger influence on the housing market. For future research this is recommended to include. Finally, investigating more recent data would be beneficial for future research, as conditions and variable values can change over time.

In conclusion, this thesis successfully investigated the impact of the amount of issued building permits on the housing prices in Dutch municipalities. Hereby, this thesis contributes to a deeper understanding of the factors influencing housing prices, from a Dutch perspective.

References

Abelson, P., Joyeux, R., Milunovich, G. and Chung, D. (2005). Explaining house prices in Australia: 1970-2003. *The Economic Record,* 81(1), 96-103.

Ay, J., Cavailhès, J., Hilal, M. and Le Gallo, J. (2018). Does issuing building permits reduce the cost of land? An estimation based on the demand for building land in France. *Economie et Statistique*, 500-502, 45-67.

Asabere, P. and Huffmann, F. (2001). Building Permit Policy and Land Price Distortions: Empirical Evidence. *Journal of Housing Economics*, 10, 59-68.

Bahmani-Oskooee, M., Ghodsi, H., Hadzic, M. (2021). On the Link between Housing Prices and House Permits: Asymmetric Evidence from 51 States of the United States of America. *International Real Estate Review*, 24(3), 323-361.

Bourassa, S.C. and Hendershott, P.H. (1995). Australian capital city real house prices, 1979-1993. *The Australian Economic Review*, 28(3), 16-26.

Buitelaar, E (2019). Versnelling van de woningbouw: van korte- naar langetermijnperspectief. *Real Estate Research Quarterly*.

Case, K.E. and Shiller, R.J. (2003). Is there a bubble in the housing market*?*. *Brookings Papers on Economic Activity*, 2003(2), 299–362.

Centraal Bureau voor de Statistiek. (2022). Meer mensen willen verhuizen maar kunnen geen woning vinden. *Centraal Bureau voor de Statistiek*. Available at: https://www.cbs.nl/nl-nl/nieuws/2022/47/meer-mensen-willen-verhuizen-maar-kunnen-geen-woning-vinden

Centraal Bureau voor de Statistiek. (2023a). Minder vergunde nieuwbouwwoningen in 2022. *Centraal Bureau voor de Statistiek*. Available at: https://www.cbs.nl/nl-nl/nieuws/2023/07/minder-vergunde-nieuwbouwwoningen-in-2022

Centraal Bureau voor de Statistiek. (2023b). Dataset 'Bestaande koopwoningen; gemiddelde verkoopprijzen, regio'. *Centraal Bureau voor de Statistiek.* Available at: https://opendata.cbs.nl/statline/#/CBS/nl/dataset/83625NED/table?ts=1702560446052

Gyourko, J. and Saiz, A. (2006). Construction costs and the supply of housing structure*. *Journal of Regional Science*, 46(4), 661–680.

Korevaar, M. (2022). Historisch gegroeide discrepanties brengen woningmarkt uit balans. *ESB*, 107(4809S), 24-29.

Ministerie van Binnenlandse Zaken en Koninkrijksrelaties. (2023). Het statistisch woningtekort nader uitgelegd. *Volkshuisvesting Nederland.* Available at: https://www.volkshuisvestingnederland.nl/onderwerpen/berekening-woningbouwopgave

NOS. (2021). Jongeren over woningcrisis: 'Zo veel geld héb ik gewoon niet'. *NOS*. Available at: https://nos.nl/op3/collectie/13877/artikel/2397348-jongeren-over-woningcrisis-zo-veel-geld-heb-ik-gewoon-niet

Overheid. (2024). Omgevingswet. *Wettenbank Overheid.nl* Available at: https://wetten.overheid.nl/BWBR0037885/2024-01-01/0

Pollakowski, H. O. (1995). Data Sources for Measuring House Price Changes. *Journal of Housing Research*, 6(3), 377–387.

Reichert, A. (1990). The Impact on Interest Rates, Income, and Employment upon Regional Housing Prices. *Journal of Real Estate Finance and Economics*, 3, 373-391

Sayin, Z., Elburz, Z. and Duran, H. (2022). Analyzing housing price determinants in Izmir using spatial models. *Habitat International*, 130(102712), 1-10

Stern, D. (1992). Explaining UK house price inflation 1971-89. *Applied Economics*, 24(12), 1327-1333.

Van Dalen, P. (2016). Woningmarkt stevent af op hoog aantal verkopen en flinke prijsstijgingen. *Rabo Research | Economisch Onderzoek.*

Zhang, X., and Yang, E. (2023). Observation of relationship between housing value and the number of building permits in the United States using time series method. *International Journal of Housing Markets and Analysis*.

Zhang, Y., Hua, X. and Zhao, L. (2012). Exploring determinants of housing prices: A case study of Chinese experience in 1999–2010. *Economic Modelling*, 29(6), 2349-2361