Time to build.

The effect of homeownership rates on development time of housing developments in the Netherlands

A quantitative analysis

Joris Buurman

Master's Thesis Spatial Planning

Radboud University

January 2024

Abstract:

The housing crisis in the Netherlands is characterized by an escalating demand for homes. This demand is set against a backdrop of considerable delays in housing development, a situation that is increasingly becoming a major concern. While there are many factors contributing to these delays, a significant portion of research in this field attributes these setbacks primarily to strict land-use regulations. One particular area of interest, which has not been extensively explored, is the potential impact of homeownership rates in the vicinity of proposed developments. There is a common perception among homeowners that new residential developments could negatively affect the value of their properties. This research delves into this aspect by using government data to conduct an exhaustive analysis of how homeownership rates in an area might influence the progress of housing developments. This investigation aims to provide a more nuanced understanding of the dynamics at play in housing development delays in the Netherlands. The following research question is composed for this purpose: “What is the effect of homeownership rates on development time of housing developments compared to the average/mean time in the Netherlands?” Multivariate analysis will be used to find a possible causal relationship between the variables. (198 words)

Keywords: Housing crisis, delay, development time, land-use regulations, homeownership rates, homevoters

Colophon

Title: Time to build

Subtitle: The effect of homeownership rates on development time of housing developments in the Netherlands

Student: J. (Joris) Buurman

Student number: s1045220

Faculty: Nijmegen School of Management

Master's programme: Spatial Planning

Specialisation: Planning, Land and Real Estate Development

Supervisor: Dhr. A. (Ary) Samsura

Date: 23-01-2024

Word count: 24.020

Radboud Universiteit

Preface

This thesis, which you are about to read, is the product of a ten-month period of research and analysis. It is the product of my commitment to exploring the complex relationship between homeownership rates and the duration of housing development processes in the Netherlands. This project was a significant part of my master's studies in Planning, Land and Real Estate Development at Radboud University.

Working on this thesis was a journey filled with learning and challenges. The subject of homeownership rates and their impact on housing development timelines was a new area for me, and delving into it required not only dedication but also a willingness to look into a new academic area. Fortunately, I was supported by incredible mentors and peers who made this journey more manageable. Even though I had to deal with a large setback in my personal life, I was met with understanding which I am extremely thankful for and is part of the reason as to why this thesis is now finished.

First of all, I want to portray gratitude to my thesis supervisor, Ary Samsura. His feedback and support from the start to the end of this project were invaluable. His expertise in the field not only guided this research in the right direction but also grew my understanding of the subject.

I would also like to give a special thanks to Huub Ploegmakers, who was invaluable in guiding me through the complexities of data handling and analysis in STATA. His patience and expertise were particularly crucial given my initial limited familiarity with the software. Furthermore, I am thankful to Stijn Willemsen, a colleague and fellow student. Stijn was working on a related topic, and our shared experiences and discussions were very beneficial. Collaborating on the data analysis and exchanging ideas helped me with numerous difficulties in processing the complex data.

I would also like to express my appreciation to the provinces of Noord-Holland, Zuid-Holland, and Limburg. Their help in providing the data sets played a crucial role in the success of this research.

This thesis was a highly educative project for me personally and the result can be seen as a sign of my academic growth. It is my hope that the insights from this research will contribute to the understanding of housing development processes and are useful in addressing the challenges faced in the Dutch housing market.

I hope you will enjoy reading this master’s thesis.

Summary

This master's thesis presents a comprehensive analysis of the Dutch housing market, a sector grappling with escalating prices and a significant shortage of affordable housing. The densely populated landscape of the Netherlands, combined with restricted development space and stringent real estate regulations, has led to an urgent need for approximately 1.2 million new homes over the next 15 years. This pressing requirement is particularly acute in provinces such as Noord-Holland, Zuid-Holland, and Limburg. Amidst skepticism, the Dutch government has proposed the construction of 100,000 houses annually, a plan that has been questioned in terms of feasibility, considering the high housing costs fueled by a strong economy, low interest rates, and restrictive zoning laws, alongside the significant role of institutional investors who view real estate chiefly as a financial asset.

Central to the thesis is an investigation into how homeownership rates affect the duration of residential developments, positing the hypothesis that higher homeownership rates result in longer development periods. Therefor the following main research quesion will be answered in this thesis:

"What is the effect of homeownership rates on development time of housing developments in the Netherlands?"

The theoretical framework of the thesis integrates two influential theories: Molotch's Growth Machine Theory, which suggests that urban development is predominantly driven by economically motivated influential actors, and Fischel's Homevoter Hypothesis, which argues that homeowners significantly influence local policies to safeguard property values, leading to more restrictive development regulations. The research also considers institutional perspectives, particularly New Institutionalism, to underscore the role of institutions like local governments in shaping housing supply and demand. The conceptual framework of the study identifies homeownership rates as the independent variable influencing housing development times, the dependent variable, while incorporating ten (groups of) control variables to ensure a comprehensive analysis.

This quantitative analysis utilizes secondary data from provincial housing development databases and homeownership information from the Dutch Central Bureau of Statistics. Employing statistical methods such as multiple regression and Cox regression models, the study examines the relationship between homeownership rates and development times, factoring in demographic and socioeconomic variables.

The results of the thesis delve into the impact of homeownership rates on various stages of housing development in the Netherlands. The study, which examines the permitting phase, the period between permit issuance and construction commencement, and the actual construction phase, finds that homeownership rates have a minimal and statistically insignificant effect on development times. Instead, the scale of projects and regional characteristics are identified as significant factors, suggesting that larger projects and regional policies are more influential than homeownership rates in determining development durations. Furthermore, the research uncovers notable regional disparities in development efficiency, with Zuid-Holland exhibiting the fastest development times and Limburg the slowest. This implies that regional administrative practices and policies are crucial in shaping the housing development process. The thesis concludes that focusing on planning capacities and regional frameworks is more essential than homeownership rates in enhancing housing development efficiency in the Netherlands. It emphasizes the diminishing significance of homeownership rates through the stages of housing development, underscoring the need to concentrate on other factors to improve the housing market.

Table of contents

List of figures and tables

1. Introduction

1.1. Contextual background

The Dutch housing market is currently facing an enormous challenge. With housing prices rising through the roof for the past years, there is a great need for affordable housing. This demand cannot be met without sufficient housing supply. The Dutch government is faced with an issue where they need a consistent supply of houses in an already tight market. On top of this, the Netherlands is one of the most densely populated countries of the world (Mulder, et al., 2020) (Smit & Heederik, 2017). The fact that the Netherlands is of relatively small size does not help with finding suitable building ground. Real estate development in the Netherlands is a highly regulated and bureaucratic field, in particular in Dutch cities, with Amsterdam as prime example (Hochstenbach & Ronald, 2020). Governments and developers always need to consider detailed laws and regulations that are in place and new laws that are being implemented. The new Spatial Planning Act for example is expected to change the name of the game and have a major impact on the plan procedure. Besides this, challenges such as the nitrogen emission crisis make housing developments more and more difficult. The Netherlands is looking for ways to deal with this growing demand for affordable housing and how to accelerate the planning process.

According to Groenemeijer and Gopal (2022) the housing shortage totals 315.000 houses. The estimate for the number of necessary houses to be built in the next 15 years amounts to more than 1,2 million, according to quantitative research by Groenemeijer and Gopal (2022). This needs to be realised to catch up with the housing shortage, fulfil the household growth and replace old houses. The expected population development data is based on municipal specific trends in birth, death, domestic and foreign migration and formation of households (Groenemeijer & Gopal, 2022). For this research it is relevant to mention that the housing shortage greatly varies between regions (Groenemeijer, 2021). In some areas there barely is a housing shortage like Middelburg where there is a shortage of only 0.1%. The average of the province of Zeeland is even rounded up to 0%. While in other areas like the Amsterdam agglomeration the housing shortage is almost 7% (Groenemeijer & Van der Lelij, 2020). This master's thesis will not look into the Netherlands as a whole but focus on three provinces: Noord-Holland, Zuid-Holland and Limburg. It is part of a larger research instigated by the Dutch national government.

The central government acknowledges this housing shortage and plans to combat it by increasing the number of new houses being built per year. In the national housing agenda, the then minister of internal affairs already speaks about the challenges related to the housing market. Ollongren (2018) mentions the need for more and faster residential development, making better use of the current supply and affordability of housing. A plan was made for the annual realisation of 75.000 new dwellings (Ollongren, 2018). This goes to show however, how much the challenge of residential development was underestimated back then. Current plans aim for more than 100.000 houses being built each year from 2020 until 2030, adding up to 1 million new houses. Opinions are divided about whether this is feasible. According to plans presented by the national government, made in agreement with all provinces, it is possible. Research by research journalists and the Association of Netherlands Municipalities (Vereniging van Nederlandse Gemeenten, VNG) declares the plans too ambitious and not feasible. They do not believe all of the current plans will be realised in the set time frame and claim

750.000 new dwellings is the maximum achievable (Doodeman, Du Saar, & Tokmetzis, 2022) (Binnenlands Bestuur, 2022).

The COVID-19 pandemic has further exacerbated the housing crisis in the Netherlands, as many people are now working remotely and looking for larger homes with outdoor space. This has led to increased demand for homes outside of the major cities, which were already experiencing a shortage of affordable housing. However, these shifts in demand are mostly inconsequential for the housing market as a whole (Stec Groep, 2021). Alternatively, opinions on whether the COVID-19 pandemic had an influence on the Dutch housing market differ. Some are convinced that COVID-19 had an influence on the housing market (Tweede Kamer, 2021). Others say it had only a limited influence, which is difficult to separate from other effects on the housing market (Stec Groep, 2021). On the other hand, quantitative research shows no visible effects of price increase on owner-occupied homes and increase in the number of housing transactions which can be directly related to the COVID-19 pandemic in the year 2020 (Centraal Bureau voor de Statistiek, 2022). Seeing that the pandemic influenced everyone, the economy and peoples buying habits, it can be assumed that it also had an influence on delay in developments.

It is apparent that the Netherlands is in a dire need of housing. Many people cannot afford to buy a house anymore and have to join waiting lists that take years before they are eligible for a rental house (Kraniotis, 2021). The high housing prices in the Netherlands are partly driven by the country's growing population, as well as its strong economy and low interest rates. Additionally, the lack of available land for new developments, as well as strict zoning laws and building regulations, have made it difficult to build new homes quickly and affordably. Another aspect that seems to worsen the issue is that institutional investors see real estate as just another asset, without paying attention to the larger problems at hand (Van Loon & Aalbers, 2017). Local regulation is in multiple ways pivotal for the realisation of development plans. Regulatory measures are a critical component of a housing development and heavily influence the amount of delay of a residential development project. Whether a development has to deal with less restrictive regulation or more restrictive regulation influences many aspects, such as house prices, house supply and the possible prohibition of a project. Alternatively, delay is also a common cause and consequence of regulation (Gyourko, Saiz, & Summers, 2008).

Regulation is vital for the duration of development time of housing developments in the Netherlands. Land-use regulations are quite broad and consist of many different aspects. Some of those aspects that potentially influence delay in housing developments consist of mortgage interest tax deductions, capital gains exemptions, housing subsidies and rental market regulations (Rosen, 1985). These aspects all play a role in the time it takes for a development plan to go from an initiative to a completed residential development. When a developer wants to start a housing development, often times he must first request a zoning plan change at the municipality for example. This is a time costly procedure, because of the many aspects that come into play, such as involvement of stakeholders and possible appeals (so called consultation procedure). However, the current housing crisis in the Netherlands demands affordable housing to be built in a high tempo. More time spent on regulations means it will take longer for the necessary amount of housing to be available for the inhabitants.

All in all, the current housing crisis asks for a large number of houses to be built in the near future. For this to be possible many residential development plans need to be designed and realised. Only if enough new houses are being placed on the market in a consistent manner the house prices can

decrease. The development of real estate is for the most part dependent on the governments and developers involved. To make this realisation run smoothly the municipality should not only be familiar with the plan procedure in the development process, but also be experts in the operationalisation phase. This research intends to investigate the impact of homeownership rates in a certain area on delay in residential developments in that area and how the development time can possibly be improved.

The target audience of this master thesis, similar to most master theses, is the thesis supervisor. This is the person where the thesis is directed to regarding the expected level of knowledge on this subject. However, the broader target audience of this thesis are all the people active or involved in the housing market. This can be other researchers, who can cite this thesis or use it for further research. It can also be policy makers, regulators and developers who are involved in creating changes in development time of housing developments. These last parties have the possibility to use the results of this research to make changes in practice and improve development time of housing developments in the Netherlands. Something which is very necessary at the moment. This is also part of the reason why research in this area is important for swift progress in development. The importance of this research will become even more clear in this introductory chapter, especially in the scientific and societal relevance.

1.2. Research problem

The evolution of land use regulation in the Netherlands, rooted in the Housing Act (Woningwet) of 1901, reflects a shift from improving poor living conditions to complex spatial planning. The Act initially mandated municipalities to develop zoning plans and establish housing corporations for social rental housing. Post-WWII, the government heavily subsidized social housing and controlled rents to alleviate shortages and manage wage pressure, leading to a comprehensive planning strategy. The Spatial Planning Act (Wet op de Ruimtelijke Ordening) of 1965 further formalized this approach, introducing a top-down process where national guidelines are refined and implemented at provincial and municipal levels. These municipal zoning plans, which are updated every decade and legally binding, determine land functions, making residential land supply a governmental affair. However, this system often delays responsiveness to market signals due to lengthy legal procedures. Dutch spatial planning has historically balanced housing supply with environmental conservation, as seen in policies like the 'Green Heart' preservation and the 'growth centre policy' to manage population growth in specific towns. The 1980s marked a pivotal shift as the government reduced housing subsidies and liberalized housing corporations, transferring housing supply responsibilities to local governments and market parties. This change led to a decline in social housing construction and stagnation in the owner-occupier sector, despite high house prices (Vermeulen & Rouwendaal, 2007). In recent decades, low construction rates have been attributed to a governmental focus on environmental conservation (Priemus, 1998), limiting land availability and complicating residential construction. Even in areas designated for housing, many targets were unmet or delayed (Jokovi, Boon, & Filius, 2006).

The previous paragraph explained in short the history of how Dutch land-use regulations have become a very restrictive field. Overall, Dutch government interventions in land and housing markets have prioritized planning and negotiation over market forces. The regulation of land use, crucial for housing production, has been constrained, taxed, or conditionally granted based on specific housing types. This approach has limited the industry's responsiveness to market demands, with policy makers often less attuned to price-driven demand than market parties (Vermeulen & Rouwendaal, 2007). Focusing on

demographic projections and stated preferences, this strategy may neglect shifts in demand from factors like rising incomes or falling interest rates, leading to a continued housing shortage.

Building on the studies by Been, Madar, & McDonnell (2014) and Gyourko & Molloy (2015), which suggest a potential association between more restrictive land-use regulations and homeownership rates, it's important to consider the context in which these studies were conducted – the United States. These findings, though insightful, were derived almost a decade ago in an American setting, which raises questions about their applicability to the Dutch context. The housing market, planning system, and degree of urbanization in the Netherlands differ significantly from those in the U.S (Haffner & Boumeester, 2015) (Glaeser & Gyourko, 2003). For instance, the Dutch housing market is characterized by a higher density of urban development and a different regulatory framework, which could influence the dynamics between homeownership rates and land-use regulations differently than in the U.S (Needham, 2016). This distinction underscores the need for a localized study to understand the interplay of these factors within the Netherlands.

If the relationship observed in the U.S. studies holds true for the Netherlands – that is, if higher homeownership rates are indeed associated with more restrictive land-use regulations – it could imply that these regulations may contribute to longer development times for housing projects. The logic follows that if more restrictive regulations, influenced by homeownership rates, slow down the development process, then understanding this relationship becomes crucial for addressing housing supply issues. However, currently, there is a notable gap in research regarding this specific relationship in the Dutch context. No substantial evidence has been presented that directly links homeownership rates with the development time of housing projects in the Netherlands. This lack of data not only highlights a significant research gap but also emphasizes the need for a focused investigation into how homeownership rates might influence housing development timelines in the Dutch setting. Such research could provide valuable insights for policymakers and developers in their efforts to tackle the housing crisis more effectively.

Recent years have seen an increased relevance of citizen participation in spatial planning, which aims to harmonize societal and living space needs through structured rules and processes. However, achieving successful spatial planning projects requires some degree of cooperation from citizens. A key issue is the reluctance of many homeowners to support housing developments in their neighborhoods, a phenomenon known as NIMBY ("Not In My Backyard"). This is closely related to the homevoter hypothesis by Fischel (2001). Fischel claims that homeowners want to limit development in their local area and have more power and incentive to do so than people who do not own their home. The main drive of homeowners is maintaining their property value. They have a financial motive to maintain their property to get a good exchange value for when they want to sell their house, unlike renters who will not be able to sell their home (Rohe & Stewart, 1996). Renters are not as involved with local housing developments and participate less on social and political levels (Rohe & Stegman, 1994). This lack of involvement isn't always a matter of choice; it often stems from an unequal political footing compared to homeowners. For instance, homeowners are more likely to vote and exert political pressure through associations, influencing local government decisions in their favor. However, research in Austria shows that some renters want to be more involved, especially in decision-making processes. They are a group who need to overcome injustices and have varying needs and capabilities (Seebauer, 2021). It even goes further than that, while civic participation leas to positive changes in quality of life for both renters and homeowners, only homeowners experience economic benefits

(Manturuk, Lindblad, & Quercia, 2012). Research has shown that renters may even experience negative economic changes, because rents are more likely to increase in areas with more active citizen participation (DiPasquale & Glaeser, 1999). This shows that renters often do not have a fair chance when it comes to political involvement compared to homeowners.

In the Dutch context, the traditional NIMBY stance is being reevaluated amid the current housing crisis. One research on the Dutch housing market does point out that its research population bases their repulsion of local developments on rational thoughts and explicitly dissociates itself with the NIMBY movement. Their arguments on not wanting housing developments in their neighbourhood are based on the opinion that the development locations were not well chosen and that they are not necessarily against densification in their neighbourhood (Herdt & Jonkman, 2022). This research aims to explore the extent of homeowner opposition to local housing developments in the Netherlands and whether this opposition is truly based on Nimbyism or other factors. The study will investigate the role of homeownership rates in this dynamic, considering the lack of substantial research on homeowners' influence in Dutch housing developments. In this thesis, homeownership rates are used as an indicator based on the homevoter hypothesis. At the same time, homeowners are the unit of analysis of this research.

1.3. Research aim and research questions

This research among others aims to shine light on the time it takes for a residential development plan to be realised. By doing a quantitative analysis on a dataset containing municipalities in Noord-Holland, Zuid-Holland and Limburg it should become clear what the average development time is in the residential development plans in these regions. Part of the relevance of this goal is the need for an overview of development plans. Ultimately, the goal of this thesis is to use a unique dataset to provide insights that can inform policies and strategies aimed at the approval time in the plan procedure and improving the efficiency of the development process in the Netherlands. How homeownership rates and development time are defined in this research will become clearer further on in this research.

The main research question that is meant to fulfil the research aim is constructed as follows:

- What is the effect of homeownership rates on development time of housing developments in the Netherlands?

The sub questions that are meant to help answer the main research question are formulated as follows:

- What is the effect of homeownership rates on approval time in the permitting phase of housing developments in the Netherlands?
- What is the effect of homeownership rates on the time between permitting and commencement of construction in housing developments in the Netherlands?
- What is the effect of homeownership rates on development time in the construction phase of housing developments in the Netherlands?

This main question of this master's thesis explores how homeownership rates affect the time it takes for housing projects to be realised in the Netherlands. To answer this main question, the development process is broken down into three different stages: the permitting phase, the period between

permitting and construction and the construction phase. This helps to create an understanding of the complex relationships between homeownership rates and development timelines. This investigation is not just about understanding housing development; it's also a valuable addition to urban planning and housing policy.

The first sub-question looks at how homeownership rates impact approval time during the initial permitting phase of housing projects. This phase is like the first gate in a housing project. It's where project proposals are carefully reviewed, and regulatory requirements are figured out. The time spent in this phase directly affects how quickly homes reach the market, influencing the overall supply. Studying the influence of homeownership rates here is crucial for spotting potential issues that could cause delays or fast-track approvals. Additionally, exploring this phase helps identify regulatory practices that might need refining, benefiting both policymakers and developers.

Next, the second sub-question explores how homeownership rates affect the time period after obtaining permits, but before the actual construction begins. This time is often overlooked in the housing development process. It's the phase between getting the green light and actually beginning construction. Developers use this time to finalize plans, secure financing, and make preparations for the physical construction of the project. Understanding how homeownership rates connect with development timelines here gives insights into balancing regulations with market forces. A longer period can have financial consequences for developers and may lead to unmet housing demands, making this investigation crucial.

Lastly, the third sub-question looks into how homeownership rates affect the time during the construction phase. This is the heart of the housing development process. When construction starts, time becomes crucial for both the developer's finances and housing availability. Delays at this stage can impact construction costs, housing supply, and eventually, housing prices and affordability. Understanding the relationship between homeownership rates and development time here provides valuable insights for everyone involved, from builders and financiers to government agencies and housing policymakers.

In summary, these sub-questions together create a complete picture of how homeownership rates influence housing development timelines in the Netherlands. By examining each phase, this research aims to offer practical insights for urban planners, policymakers, and developers. The goal is to inform housing strategies that better match market demands and regulatory requirements. The findings from these sub-questions have the potential to improve housing accessibility, affordability, and sustainability in the Dutch housing market, addressing critical issues locally and globally.

1.4. Hypothesis

The hypothesis is the result from the research question and will be tested in this research. It is also based on existing theories, through which the hypothesis can be based on scientific evidence. The hypothesis of this research is that a higher rate of homeownership in an area surrounding a development will lead to a longer development time of housing developments. If this hypothesis is correct, it would mean that an area with a lower rate of homeownership would in general see a shorter development time for housing developments compared to an area with a higher rate of homeownership. In regard to this hypothesis the following null hypothesis and alternative hypothesis can be written:

H_0: The homeownership rate in an area surrounding a housing development has no significant effect on the development time.

H_1: The homeownership rate in an area surrounding a housing development has a positive effect on the development time.

Using statistical analysis, the hypothesis can be tested, and the results will make clear whether the null hypothesis will be rejected or failed to reject. The independent and dependent variables will be outlined in the conceptual framework. Control variables will need to be added to account for outside factors and research bias. This is important for minimizing the chances of false conclusions and to be able to carefully say whether the alternative hypothesis can be supported or not.

1.5. Relevance

There is a great number of scientific studies available touching on the Dutch housing market. For this master's thesis to be considered relevant it must add objective knowledge to the scientific world and add to lack in other research, while at the same time bringing valuable knowledge to gain insight on societal problems. This chapter will discuss the scientific and societal relevance of this research paper.

1.5.1. Scientific relevance

As mentioned before, housing developments in the Netherlands have been researched extensively already. However, many of those studies focus on qualitative research and do an in-depth analysis on a small number of case studies (Bruning & Siersma, 1994). Alternatively, this study analyses a large number of municipalities in a quantitative way. On the basis of datasets acquired from provinces, important information in relation to development time of residential developments can be analysed. Compared to other quantitative studies investigating aspects of the Dutch housing market, this study focuses on three different phases within development time. Some prior studies have also looked at development time, but the real distinction made by this research can be found in the aspect of homeownership. The quantitative research of the effect of homeownership rates on development time in the Dutch housing market context makes this study unique.

None the less this analysis of development time for house types in Dutch residential development plans is partially built on multiple other scientific research. Not only other literary pieces lay the foundation for this research, but also the datasets provided by my supervisor are vital for the results that should make this quantitative thesis scientifically relevant. This study will add recent years to these datasets to make them more currently relevant. An important part of the analysis of the provincial datasets is to gain an overview of the available data. According to Doodeman, Du Saar and Tokmetzis (2022) the national government asks the provinces to clarify the plan capacity twice a year to get an overview of the total amount of residential building plans. However, every province counts these plans differently leading to data that does not match. Simultaneously, some definitions are vague which makes it unclear how many concrete building plans there are. The unclear definitions of 'hard' and 'soft' plans, which is also not the same for every municipality, adds to this problem (Doodeman, Du Saar, & Tokmetzis, 2022). This research paper will work towards finding a solution for this problem by creating an overview of residential development data of certain provinces.

The work by Been et al. (2014) provides a foundational understanding of how homeownership influences urban land-use regulations, particularly in the United States. Their findings suggest that

homeowners, or 'homevoters,' tend to advocate for more restrictive land-use regulations to protect and enhance their property values. This dynamic is pivotal in shaping housing supply and urban development (Been, Madar, & McDonnell, 2014). Applying this concept to the Dutch context, especially in densely populated urban areas, offers a unique opportunity to explore whether similar patterns exist in the Netherlands. The Netherlands presents a distinct setting with its high population density, unique spatial planning challenges, and different housing market dynamics compared to the U.S. Understanding if and how Dutch homeowners influence land-use regulations and consequently the development time of housing projects is of significant scientific relevance. It could provide insights into the broader implications of homeownership on urban development and housing policies.

This investigation is scientifically relevant as it bridges a critical research gap. While the 'homevoter hypothesis' is well-explored in the context of the U.S., its applicability in the Dutch context remains under-researched. By examining this relationship within the Netherlands, the thesis contributes to a more comprehensive understanding of global urban development trends. It also offers valuable insights for policymakers and urban planners in the Netherlands, assisting in the formulation of housing policies that balance the interests of homeowners with the pressing need for efficient housing development. This alignment of local housing policies with homeowner interests could be instrumental in addressing the housing crisis, particularly in urban centres.

Although this thesis research has a specific focus on the Dutch context, it is interesting to draw knowledge from comparable research done in England (McAllister, Street, & Wyatt, 2016). The research combines quantitative research to analyse a national database of unimplemented planning permissions with qualitative research to do an in-depth analysis of 18 case studies. McAllister, Street and Wyatt (2016) analyse different aspects that come into play considering why planning permissions may not be implemented. Based on the case studies a suggestion is made of which interlinked issues need to be solved for it to be possible to implement these planning permissions. Alternatively, the quantitative analysis of the national database explains which type of development is mostly likely to be a stalled site and in which type of area they are most often located. Their research indicates that there is a relatively large gap between granted planning permissions and how many of them are actually realised, the so called “implementation gap” (McAllister, Street, & Wyatt, 2016). The research by McAllister et al. (2016) doesn’t pay attention to differences in house types, however. Contrary to the focus of my research the authors have no consideration for the influence of homeownership rates in an area on the implementation of planning permissions.

Besides quantitative research in the English context in respect to development time, there is also relevant scientific research that dives deeper into the process from irrevocable plan until building permit. This group of researchers analyse the planning process and residential development process in the four biggest Dutch provinces with regard to the number of municipalities. They find an irregular progress of planned housing from the first phase of planning until completion (Ploegmakers, Van der Krabben, & Rouwendaal, 2022). It looks at different phases of the planning process and based on data finds the influence of certain variables, such as multiple impediments, disposable income, number of residents and construction costs. The research explains in which phases there is delay and why and explores the significance of their influence on the planning process. A focus is put on five moments in the planning process with four accompanying decision moments. The first of these four decision moments that were examined is from a location without real initiative to potential development site. The second phase looks at the period from first initiative to irrevocable plan and the third phase

considers the process from irrevocable plan to granted permits. The last phase that was examined is from building permits to completed homes. The main focus of the analysis lays on the amount of time it takes for an increase in plan capacity in a certain phase to cause a proportionate capacity increase in the next phase (Ploegmakers, Van der Krabben, & Rouwendaal, 2022). Although the influence of certain variables on plan phases and development time is relevant for my research it doesn't take into consideration the aspect of homeownership rates.

However, research has been done in the opposite direction: the influence of regulation on homeownership rates. Andrews and Sánchez examine the role of public policy in the increase of homeownership rates in a selection of countries that are part of the Organization for Economic Co-operation and Development (OECD). According to their results, public policy has a potential role in explaining changes in homeownership rates through measures such as mortgage interest tax deductions, capital gains exemptions, housing subsidies and rental market regulations (Andrews & Sánchez, 2011). Riley (2012), on the other hand, researches the influence of land-use regulations on house prices of urban homeowners in the United States. She finds that low-income homeowners encounter significantly larger decreases in property value when in an area with more restrictive regulation compared to an area with less restrictive regulation (Riley, 2012). Although this shows that homeownership and regulation are closely related, it doesn't mention the impact of homeownership on delay in regulation. Gyourko and Molloy (2015) investigate the influence of regulation on the housing supply. They also mention how regulation can influence the location, type and quality of housing. More restrictive regulation may limit the supply of affordable multi-family homes in favour of more expensive single-family homes for example (Gyourko & Molloy, Regulation and housing supply, 2015). However, it is hard to find any research that looks into the influence of homeownership rates on delay in housing development. This research aims to add to the available scientific research by investigating the role that homeowners in a certain area play on the development time of a housing development.

1.5.2. Societal relevance

The current housing crisis in the Netherlands affects many people. There is a housing shortage of around 315.000 houses (Groenemeijer & Gopal, Rapportage Primos Prognose 2022 beschikbaar, 2022). The housing shortage is directly related to house prices and affordability for the Dutch population. Buying or renting a house, apartment or room is near to impossible for a growing amount of people (Kraniotis, 2021). Besides this many people have a lower disposable income, which also has a negative effect on the Dutch economy. The Dutch central government aims for the realisation of a high number of houses in the coming years, which some people consider overly ambitious. For this to be achievable many aspects in planning need to work out properly. Every aspect that can be improved within Dutch plan procedures will benefit the real estate market. This research addresses the importance of looking into the bigger picture instead of focusing on one case. More insight into the effect of homeownership rates on development time in the Netherlands has a greater benefit for future development projects. Ultimately, this research aims to have a positive impact on those plan processes and aiding Dutch development projects with the newly gained quantitative knowledge.

2. Theoretical framework

This chapter delves deeper into the relevant theories that accompany this research to gain a better understanding of its content and its additional aspects. This theoretical framework is meant to explain the concepts and constructs that help answer the main research question: What is the effect of homeownership rates on development time of housing developments in the Netherlands? This theoretical framework will link theories about market players influencing the planning and development process in housing to decision-making motivations within the planning process, studying how different parties' interests might explain delays in Dutch housing developments. The theories that are featured in this chapter will be analysed with the research objective and the Dutch context consistently in mind. Similar to how this research plans to use data analysis, Glaeser and Ward (2009) use a regression analysis to estimate the relationship between land-use regulations, measured by zoning laws, housing prices and construction. Their research focuses on the political economy of land-use regulations and suggests that regulations may be driven by a desire to protect property values or to limit competition. It provides empirical evidence to support the idea that land-use regulations can have significant effects on the housing market. Furthermore, it highlights the importance of considering the political and economic factors that shape these regulations (Glaeser & Ward, 2009). At the end of this chapter a conceptual framework will embody the roles that the most important theories play in the assumptions and variables of this study.

Central to this thesis, which explores the impact of homeownership rates on the development time of housing projects in the Netherlands, is the assumption that homeowners are key actors in urban development. This assumption is grounded in two influential theories. Firstly, the Growth Machine Theory by Molotch (1976), which describes how a coalition of land-based interest groups, including homeowners, significantly influences urban growth patterns. Secondly, Fischel's homevoter hypothesis (2001) states that homeowners, motivated by the value of their properties, are crucial in shaping land-use regulations. This hypothesis is supported by studies conducted by Been, Madar, & McDonnell (2014) and Gyourko & Molloy (2015) in the United States context, where homeownership is closely linked to more restrictive land-use regulations. However, the applicability of these findings to other countries like the Netherlands remains an open question. The Netherlands' unique institutional settings, encompassing different regulatory frameworks, urban planning traditions, and housing market dynamics, might lead to different interactions between homeownership rates and development times. Therefore, while the theoretical foundation underscores the potential influence of homeowners, the empirical exploration in the Dutch context is essential to understand these dynamics fully and to see if the relationships observed in the U.S. hold true in a different institutional environment.

2.1.The growth machine theory

The growth machine theory was first proposed by Molotch (1976) and considers the political economy of place. The theory suggests that urban development is primarily driven by a coalition of powerful actors, or the "growth machine," including developers, landowners, and local politicians who benefit from the expansion of the local economy through increased development. The Growth Machine Theory has since been widely discussed and built upon by scholars in urban studies and political

economy. One of those studies is Gyourko and Molloy's (2015) analysis, which supports Molotch's growth machine theory. They find that local governments, developers, and other powerful actors have an important role in shaping local land-use regulations. They argue that these actors often have a major interest in limiting housing supply to maintain higher prices, which can lead to restrictive land-use regulations. This is consistent with the growth machine theory, which emphasizes the role of powerful actors in shaping urban development (Gyourko & Molloy, Regulation and housing supply, 2015). To better understand the growth machine theory and its position in the theoretical framework several key elements need to be discussed.

The growth machine, as mentioned by Molotch (1976), is a group of actors, including developers, landowners, real estate brokers, and politicians. They work together to promote economic growth through the expansion of urban development. The main motivation of the growth machine is profit and economic gain. It often operates in a way that prioritizes the interests of the powerful actors over those of other urban residents. In line with the growth machine theory, theoretical and empirical research finds that areas with higher levels of income inequality tend to have more restrictive regulations (Hilber & Robert-Nicoud, 2013). It is clear that this is related to political economy and equal treatment of residents. Molotch (1976) talks about this political economy of place, which refers to the complex combination of economic and political forces that shape urban development. Molotch (1976) argues that the growth machine is a product of this political economy, and that urban development cannot be understood without considering the political and economic interests at play. He specifies that urban development is the result of power and conflict, instead of a neutral or inevitable process. The growth machine is able to use its influence through a variety of means, including political donations, lobbying, and media campaigns. Other groups such as tenants, small business owners, and community activists, may lack the resources and influence to challenge the growth machine (Molotch, 1976).

In his research, Glaeser (2011) examines the economic and social benefits of urbanization and the factors that shape urban development. He argues that cities are the engines of economic growth and innovation, and that the concentration of people and ideas in urban areas leads to higher productivity and creativity. He also emphasizes the importance of local politics in shaping urban development and talks about the key players and interest groups that drive urban policy. Glaeser's analysis supports the growth machine theory by Molotch by highlighting the ways in which local politics can create a good environment for businesses and residents. These ways are connected to the importance of understanding the political economy of place. He lays emphasis on this by bringing up the key factors that shape the urban landscape, such as land-use regulations, transportation policies, and local government institutions (Glaeser E. , 2011).

2.2.The homevoter hypothesis

Zoning policy is influenced by many different factors and actors. However, many researchers agree that the influence of single-family homeowners is the most influential factor when it comes to zoning policy. Fischel's homevoter hypothesis gives the most in-depth analysis supporting this statement (Been, Madar, & McDonnell, 2014). Fischel's homevoters hypothesis is a theory in political science that argues that homeowners have a disproportionate influence on local government policies. It is therefore related to the growth machine theory by Molotch (1976). According to the homevoter hypothesis, homeowners are often wealthier, better educated and more likely to be involved in local

politics and to vote in local elections. Because they own their home, they have a stronger interest in maintaining property values and limiting development in their neighbourhoods compared to renters. As a result, local politicians are more likely to cater to the interests of homeowners than to other groups, such as renters or business owners (Fischel, 2001).

According to Fischel's homevoters hypothesis (2001) homeownership is a key factor in determining the political power of a group. Homeowners have a stronger incentive to participate in local politics and to vote in local elections because they have a larger stake in the community. They are also more likely to organize themselves into homeowner associations or other groups that can exert political pressure on local officials. Their main motive is their benefit in maintaining property values in their neighbourhoods. This means they are likely to support policies that limit development and protect property values, such as zoning restrictions, building height limitations, and historic preservation regulations (Fischel, 2001) (Hilber & Robert-Nicoud, 2013). Furthermore, homeowners are generally considered to have a higher social status (Rakoff, 1977). This boosts their self-esteem, sense of ontological security and overall satisfaction and wealth. Homeowners do more to uphold the quality of their residence, compared to landlords (Butler, 1985). Homeowners have a greater stake in society, which is all in line with Fischel's homevoter hypothesis (Perin, 2014). As a result, they participate more on a social level and in turn vote more than the average citizen (Rohe & Stegman, The impact of home ownership on the social and political involvement of low-income people, 1994).

Research by Gyourko and Molloy (2015) supports Fischel's homevoter hypothesis with empirical evidence. They used empirical data to examine the relationship between local land-use regulations and housing supply. They find that more restrictive land-use regulations are associated with lower levels of housing supply, which is consistent with Fischel's homevoter hypothesis that homeowners want low levels of housing supply, because it keeps property values intact (Gyourko & Molloy, Regulation and housing supply, 2015). Additionally, homeowners are more likely to support the provision of public goods that directly benefit their neighbourhoods, such as parks, sidewalks, and streetlights. However, they may be less willing to support public goods that do not directly benefit them, such as public transportation or affordable housing (Fischel, 2001). Other empirical research also shows that the methods of homeowners, such as using their influence in local politics, work. This can be seen in the findings that areas with higher home values tend to have more restrictive land-use regulations (Hilber & Robert-Nicoud, 2013). Another empirical case study research finds that homeowners have been successful in using political power to shape land-use regulations in ways that benefit themselves, such as limiting the supply of housing and increasing property values (Glaeser E. , 2005).

Fischel (2001) mentions that when it comes to cost aspects, homeowners generally also have a differing opinion from renters and business owners. They are more likely to support fiscal conservatism in local government, as they are concerned with property taxes and other costs associated with homeownership. They may oppose tax increases or new government programs that could raise their costs. Renters and business owners usually have different interests than homeowners, as they are not as directly tied to the community. Renters may be more concerned with affordable housing and access to public transportation. While business owners may be more concerned with economic development and business-friendly policies. This shows that people owning or renting a house in an area have different stakes and possibly conflicting interests. Fischel's hypothesis (2001) suggests that

homeowners have a disproportionate amount of political power in local government. This can lead to policies that favour homeowners over other groups, potentially leading to unfair outcomes.

Fischel's homevoters hypothesis provides part of this theoretical framework for understanding the role of homeownership in local politics. It suggests that homeowners have a strong incentive to participate in local politics and to support policies that protect property values and limit development. This can result in policies that favour homeowners over other groups, potentially leading to unfair and unwanted outcomes. This research will investigate the effect that the influence of those homeowners on policies has on delay of development time of housing developments in the Netherlands.

The article "Urban Land-Use Regulation: Are Homevoters Overtaking the Growth Machine?" (Been, Madar, & McDonnell, 2014) relates to Fischel's Homevoter Hypothesis in that it expands upon the idea that homeowners have a disproportionate influence on local land-use regulation. The article examines the changing dynamics of land-use regulation in urban areas. They argue that traditional "growth machine" interests, such as developers and business owners, are being replaced by "homevoter" interests, or the concerns of homeowners. The authors suggest that this shift is due to several factors, including rising homeownership rates and the increasing political influence of homeowners. The article also highlights the potential negative consequences of this shift, such as a decrease in affordable housing and limited economic growth in certain case studies. The authors argue that policymakers need to address these issues by implementing policies that balance the interests of different groups and ensure equitable outcomes (Been, Madar, & McDonnell, 2014).

The research can be seen as a test on Fischel's homevoter hypothesis. Been et al. (2014) test the hypothesis that homeowners have a growing influence on urban land-use regulation using empirical methods. The authors use data from the American Housing Survey (AHS) and the American Community Survey (ACS) to examine changes in homeownership rates and the political behaviour of homeowners over time. They also use data from local land-use regulations to analyse the impact of homeowners on policies related to zoning, development, and affordable housing. One of the empirical methods used by the authors is a regression analysis to test the relationship between changes in homeownership rates and changes in land-use regulation (Been, Madar, & McDonnell, 2014).

They find that increases in homeownership rates are associated with more restrictive land-use regulations, suggesting that homeowners are indeed having a growing influence on these policies. The question being raised in my research is to what extent that influence of homeowners on land-use regulation is apparent and whether homeownership rates have a negative or positive influence on delay. The authors also use case studies of several cities to examine the role of homeowners in local land-use regulation. For example, they examine the impact of homeowner associations in San Francisco, which have been successful in limiting new development and preserving neighbourhood character. Been et al. (2014) use a combination of quantitative and qualitative methods to provide empirical evidence of the growing influence of homeowners on urban land-use regulation. Their findings support the homevoter hypothesis, suggesting that homeowners have a significant impact on local policies related to land-use, and that this impact may be growing over time (Been, Madar, & McDonnell, 2014).

Gyourko and Molloy's (2015) analysis also provides empirical evidence to support both Fischel's homevoter hypothesis and Molotch's growth machine theory. It highlights the importance of understanding the complex relationship between local regulations, powerful actors, and the supply of

housing. Furthermore, Gyourko and Molloy's analysis suggests that the relationship between land-use regulations and housing supply is complex and varies across different types of regulation. For example, they find that minimum lot sizes and maximum building heights are particularly effective at limiting housing supply, while other types of regulation, such as requirements for off-street parking or environmental impact studies, have a more limited impact. This suggests that the impact of land-use regulations on housing supply is influenced by a range of factors, including the interests of different groups and the specific design of the regulations (Gyourko & Molloy, Regulation and housing supply, 2015).

Research by Hilber and Robert-Nicoud (2013) reflects on the concerns raised by both Fischel (2001) and Molotch (1976) regarding the potential trade-offs between land-use regulations and housing affordability. They argue that while restrictive regulations may protect home values and improve the quality of life for some homeowners, they can also limit the supply of housing and drive-up prices, making it harder for lower-income households to find affordable housing. Besides the reflection on the potential negative consequences of land-use regulations, the analysis by Hilber and Robert-Nicoud shows theoretical and empirical support for both theories. Comparable to other theories that were discussed in this theoretical framework, they highlight the importance of understanding the complex relationships between homeowners, interest groups, and the political economy of place in shaping land-use regulations (Hilber & Robert-Nicoud, 2013).

2.3.Institutions

Another method of looking at homeownership and delay regarding the topic of housing development is through institutional perspectives. Institutional factors play an important role in shaping Dutch housing developments. A common denominator in the aforementioned theories is the role of powerful actors in urban developments. These theories show that not every societal group has the same influence on land readjustments. To better understand the role of institutions in urban development it is important to look at several key elements of institutions and the accompanying theory of institutionalism. By examining the institutional factors that influence housing supply and demand, researchers and policymakers can develop more effective strategies for promoting sustainable and equitable urban development.

One major powerful actor in urban development is the local government, which holds a lot of power as an institution. Institutions, such as the local government and housing associations, play a key role in determining the supply and demand of housing, as well as shaping the physical and social characteristics of neighbourhoods (Van Kempen & Wassenberg, 2019). Local governments control how many houses are being built and where in their municipality. Besides this they also control what types of houses are being built, such as rental, social rental or owner-occupied housing (Michielsen, Groot, & Veenstra, 2019). The location of different types of houses within a development area is influenced by developers, as they have the authority to determine where in their development area rental houses and owner-occupied houses will be constructed. Through the power that local governments -and to a lesser extent developers- hold, they indirectly influence where homeowners are going to live. One could conclude that this means that local governments unconsciously introduce the homevoter hypothesis.

Molotch (1976) notes that institutions, such as local governments and zoning boards, play a crucial role in shaping urban development. These institutions are often captured by the growth machine, leading to policies and regulations that favour the interests of developers and other powerful actors. Sorensen (2017) adds to this that institutions form the base for all urban developments. They have the most influence on whether an urban development project becomes a success or not. For institutions the decision-making process and motivation for choices is a complex part of the plan procedures. Additionally, institutions do not only look at the sum of interests but choose to inhibit some actions while facilitating others. These multifaceted institutions play an important role in shaping all minor and major developments of a city. Because of that complexity, institutional theories often contradict each other, which makes the whole process even more complex (Sorensen, 2017).

New Institutionalism, a theoretical approach in social science that emphasizes the role of institutions in shaping social, economic, and political outcomes, can be relevant in understanding the relationship between homeownership rates and delays in housing developments. This approach posits that institutions - including laws, regulations, norms, and conventions - significantly influence individual and collective behaviour. In the context of homeownership and housing development, New Institutionalism suggests that the institutional framework surrounding property ownership, land-use regulations, and housing policies plays a crucial role in determining how quickly housing developments proceed. New institutionalism has been divided into three main branches: sociological institutionalism, historical institutionalism and rational choice institutionalism. It is an approach to the study of institutions that focuses on the many different effects of formal and informal rules, shared understandings and standard operating practices on the behaviour of individuals and groups (Sorensen, 2017).

One particularly interesting branch of new institutionalism for this research is historical institutionalism. The reason for this is that its definition of institutions most closely resembles that of the likes of government institutions, which is relevant when analysing residential development projects and land-use regulation. Historical institutionalism highlights the importance of decision making and the big influence of timing and sequencing of developments on the outcome. This is associated with path dependency (Sorensen, 2017). When government institutions have opted for a certain way of doing developments it is very difficult to change this procedure. The many times the Spatial Planning Act has been postponed are a great example of the difficulties associated with changing to a completely new system. Studies into where planning processes can be improved might be more necessary and beneficial than many people think. The interdependence of institutions can be an obstacle for improvement, but the institutions can also reinforce each other. Additionally, institutions do not only look at the sum of interests but choose to inhibit some actions while facilitating others. This can be seen in the planning process, where the interests of some parties need to make way for a bigger public interest. Historical institutionalism helps explain the diverse planning systems and how they evolved. It can be used for comparative analysis of different planning systems (Sorensen, 2017). This can help planning systems to evolve, adapt and eventually improve. This theory can be used for this research to understand plan policies, find its delays and find ways to improve them for the future.

2.4. Conceptual framework

In this paragraph the theoretical framework is used to compose and interpret the conceptual framework. This conceptual framework portrays the expected relationship between the variables considered in this study. As one can already deduce from reading the hypothesis section, the

independent variable of this research is “homeownership rates”, while the dependent variable of this research is “development time”. There is only one independent variable investigated, however there are many more control variables which are included to secure the validity of the results. Out of the many control variables that are taken into account for the data analysis, twenty-two have been selected and are included in the model. These are formed by combining different specific control variables that fit together, creating the following variable groups: plan capacity, gender, inhabitant, corop code, house, zoning, price index, transactions, selling price and building costs index. The data is corrected for control variables in the data analysis because this ensures that there are no other factors influencing the expected causal relationship in this study. More on these control variables and why specifically these have been chosen will be explained in the methodology section.

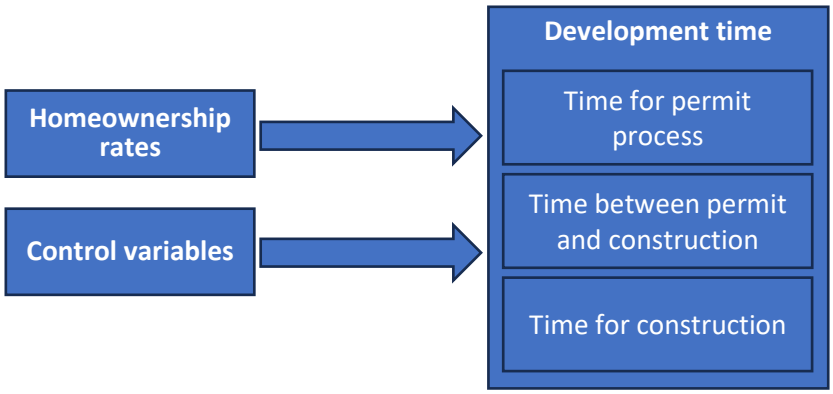

Figure 1: Conceptual framework.

The conceptual framework depicted above outlines a structured approach to analyse how homeownership rates affect the time taken for housing development, considering that development time is the dependent variable. Homeownership rates are the independent variable, hypothesized to influence the various components of development time: the time required to process permits, the interval between securing permits and the onset of construction, and the time taken to complete construction. To ensure the robustness of the analysis, twenty-two control variables are introduced to account for other factors that might affect the development time, thereby isolating the effect of homeownership rates. These control variables include economic indicators, demographic characteristics, local regulations, and other relevant factors as depicted in operationalisation table below. The framework, thus, sets the stage for a comprehensive investigation into the dynamics of housing development, with a particular focus on understanding how the propensity of individuals to own homes can impact the efficiency and speed of housing development projects.

The above conceptual framework is based on the theories presented in the prior theoretical framework. The variables that are researched are expected to impact the dependent variable, which can be described as the development time of housing development plans from plan initiative until completion of the plan. Homeownership rates is the independent variable of this research, and this is based on the homevoter hypothesis by Fischel (2001). In this research the influence of the independent variable, homeownership rates, is the influence by the share of local homeowners surrounding new housing developments. The growth machine theory by Molotch (1976) explains how certain political actors are powerful and drive most urban development alone. Other research expands upon these theories by showing that homeowners have been gaining proportionately more political power (Been, Madar, & McDonnell, 2014). Been et al. (2014) lays the basis to why some of these variables are

important to include as control variables. More on this will be explained in the methodology. Other research empirically tests these theories and focuses on the role of institutions, land-use regulations and the consequences of regulation among others (Gyourko & Molloy, 2015) (Hilber & Robert-Nicoud, 2013) (Glaeser E. , 2011) (Sorensen, 2017). This conceptual model assumes that because of the growing influence of homeowners and their interest in stopping other housing developments the average development time in areas with high homeownership rates is longer compared to areas with low homeownership rates. The ten groups of control variables -totalling twenty-two separate variables- all correlate with homeownership rates and have a causal relationship with the development time of housing developments. As can be seen in the table below, most of the control variables relate to institutional settings.

Conceptual construct	Variable	Indicator
Development time	Time for the permit process	The time it takes in months for the development permits to be granted.
	Time between permit and construction	The time in months from initial permitting to the commencement of construction.
	Time for construction	The time in months to successfully complete the construction of the housing projects.
Homeownership rates	Owner-occupied homes (p_koopwon)	Percentage of owner-occupied homes in the vicinity (within a 1,000-meter radius) of proposed housing developments.
Control Variables	Plan capacity	Amount of houses in the housing development. Measured with the variable 'plan cap'.
	Gender	Gender of the homeowner. Measured with the variables 'man' and 'woman'.
	Inhabitant	Amount of inhabitants surrounding the housing development. Measured with the variable 'inwoner'.
	Corop code	Code given to a regional area including multiple municipalities. Measured with the variable 'coropcode'.
	House	Amount of houses surrounding the housing development. Measured with the variable 'woning'.
	Zoning	Zoning plan at the housing development. Measured with six variables starting with 'pct'.
	Price index	Price index of the houses surrounding the housing development. Measured with five variables starting with 'prijsindex'.
	Transactions	Amount of transactions of houses surrounding housing development. Measured with two variables starting with 'transacties'.
	Selling price	Selling price of houses surrounding housing development. Measured with two variables starting with 'verkoopprijs'.
	Building costs index	Building price index of houses surrounding housing development. Measured with the variable 'bouwkosten_index'.

Table 1: Operationalisation of the conceptual framework.

3. Methodology

3.1. Research philosophy

The purpose of this research philosophy is to outline the guiding principles and approach that will be used to conduct the research on the effect of homeownership rates on the development time of housing developments in the Netherlands. A researcher uses a certain philosophical approach to embody a system of beliefs or attitudes. Sainani (2014) explains the importance of mentioning the research model when doing multivariate statistical analysis, because this distinction affects the research goals and its entire model building and evaluation process. This research is explanatory of nature, meaning that it intends to find causal relationships or risk factors pertaining to a certain outcome (Sainani, 2014). Alternatively, this research tests whether its hypothesis is true and can therefore be considered confirmatory research. Another goal of confirmatory research is to minimise the chances of wrongfully rejecting the null hypothesis, or in other words: committing a type I error (Wagenmakers, Wetzels, Borsboom, Van der Maas, & Kievit, 2012).

One of the main aspects that needs to be discussed in the research philosophy is the relation to reality, the so-called ontology (Guba & Lincoln, 1994). This research is based on the assumption that there is a causal relationship between homeownership rates and development time of housing developments. In other words, it is believed that the level of homeownership rates has an impact on the length of time it takes for housing developments to be completed. The research also assumes that data can be objectively collected and analysed to answer the main research question. Another key aspect of the research philosophy is the epistemology, the relationship between the researcher and the research. This research will utilize a positivist approach, which emphasizes the use of empirical evidence to test hypotheses and draw conclusions. In a positivist epistemology the researcher and research should not influence each other, findings should be replicable and true (Guba & Lincoln, 1994). The study will rely on quantitative data analysis to provide an objective assessment of the relationship between homeownership rates and development time of housing developments. The research will also incorporate deductive reasoning, which involves testing a theory or hypothesis against empirical evidence to arrive at a conclusion. The last important aspect of the research philosophy is the methodology, how can the researcher acquire findings (Guba & Lincoln, 1994). The research methodology, including the research strategy, data collection and data analysis will be explained more upon in the rest of this chapter.

The research will be conducted in accordance with ethical principles. The research will not involve any direct contact with human subjects and will be kept confidential where necessary. The research will also strive to be transparent and open in its methods and will make its findings available to the public as far as the results are allowed to be shared. The data is not publicly available however, and not allowed to be made public without permission from that specific provincial authority.

The research approach relevant to this study is positivism. Positivism is a research approach that emphasizes the use of empirical evidence to test hypotheses and draw conclusions. One of its main goals is replicability, which is closely related to the truthfulness in research (Guba & Lincoln, 1994). Other guiding principles of positivism are generalisable inferences and controlled experimentation. It assumes that there is an objective reality that can be measured and observed, and that knowledge can be obtained through systematic observation and experimentation. Positivism is often associated with quantitative research methods, which involve the use of numerical data and statistical analysis to test hypotheses (Park, Konge, & Antino, 2020). Human assumption in observations, however, makes it that maintaining a rigorous positivist approach is difficult (Saunders, Lewis, & Thornhill, 2009).

The positivist approach of this research involves collecting and analysing quantitative data on homeownership rates and development time. It uses statistical analysis to test hypotheses and draw conclusions. For example, regression analysis is used to control for potential control variables, such as type of housing development, and determine whether there is a significant relationship between homeownership rates and development time.

3.2. Research strategy

The purpose of the research strategy is to fit the research philosophy to the research methods. The research design and research methods need to correlate to ensure the validity. This research analyses secondary material and involves statistical data. For research that is deductive and hypothesis-driven statistical data is generally very suitable (Van Thiel, 2014). This research will use quantitative research methods to analyse the effect of homeownership rates on development time of housing developments. The data will be analysed using statistical techniques such as multiple regression analysis to determine the relationship between homeownership rates and development time, while controlling for potential control variables. The data used will be collected from Dutch provincial databases of housing developments. The research design will focus on a comparative analysis of the development time of housing developments in the provinces of Noord-Holland, Zuid-Holland, and Limburg.

The databases are acquired from the provincial government and this research will add more recent years to these databases to complete them and make the research outcomes more currently relevant. The advantage of this quantitative research is that it can give significant results for a lot of cases, compared to qualitative analysis that can only explain one or a few case studies. This data analysis will be done to explain the causal relationship between homeownership rates and development time of housing developments in the Netherlands. More about the methods of data collection and data analysis in this research will become apparent in the next two sections.

3.3. Data collection

The data collection will be done through secondary sources from the provincial databases of housing developments in the Netherlands. It concerns a large dataset, which is fitting to the positivist approach, where empirical findings based on large sample sizes are preferred (Park, Konge, & Antino, 2020). Because the dataset is extensive and contains all housing development plans in these provinces it is a representative sample for different regions, sizes and types of developments. There are a total of 1553 housing development plans in this dataset, spread over the three provinces. For clarity, it is important to note that this research contains population data for the three provinces that this research focuses on. The population data for these provinces is considered as sample data for the Netherlands as a whole. A big advantage of analysing secondary data is that large datasets can be acquired without the extensive research and time it takes to normally acquire these datasets. The results based on the large data set help create powerful and precise results that are also reliable. The data will include variables such as the date of submission of the housing development plan, the date of approval of the housing development plan, the date construction started, the date construction was completed, the location of the housing development, and the type of development. The provinces will supply the datasets to a

professor who is supervising this master's thesis. These datasets will be used specifically to address the research question at hand.

The sampling frame for this study will include all the housing developments plans that were submitted in the provinces Noord-Holland, Zuid-Holland, and Limburg from 2014 to 2022. The sampling method used will be purposive sampling, where housing development plans that meet the criteria of being submitted in the selected provinces and within the time frame will be included in the study. Because the data has been collected by these provinces over a longer time period there is an opportunity for longitudinal analysis. Through repeated measuring of data over a longer time period, it is possible to better analyse the factors in data that influence change (Fitzmaurice, Davidian, Verbeke, & Molenberghs, 2008). The changes in development plans can be analysed separately, such as phases from plan initiative to approved plan and from approved plan to irrevocable plan.

Data about homeownership rates can be obtained through Dutch statistical office Centraal Bureau voor de Statistiek (CBS). They publish statistical data about demographics, housing, energy, social security, density and proximity of facilities in the Netherlands. Within the data published about housing it is possible to get specifics about house types in an area, which gives the opportunity to get insights into the homeownership rates in that specific area. The data is divided up into areas of 100 by 100 meters and is available from the year 2000 until most recently the year 2021 (Centraal Bureau voor de Statistiek, N.D.).

3.3.1. Control variables

When doing statistical analyses, a researcher must be careful with defining causal relationships. One can easily find causal relationships between two variables without realising and taking into consideration there are multiple factors influencing the dependent and independent variable. Therefore, to establish a causal relationship the researcher must include potential control variables in the model (Frank, 2000). For a variable to be considered a control variable it must correlate with the independent variable and have a causal relation to the dependent variable. As mentioned before, adding relevant control variables that can be adjusted for in the results boosts the internal validity of a scientific research. Establishing whether a variable is a control variable or not is an important, but complex process which should be decided on before applying a statistical model. It is usually not possible to accurately correct for every single control variable, however for this research using the Cox proportional hazards model is the most suitable option to take multiple variables into account when investigating a possible causal relationship between homeownership rates and approval time (Pourhoseingholi, Baghestani, & Vahedi, 2012).

A multivariate model such as the Cox regression model can handle a large number of variables simultaneously and be used to eliminate effects of cofounding variables. Thereby it makes sure that the control variables cannot influence the model in such a way that the results do not reflect the actual relationship (Pourhoseingholi, Baghestani, & Vahedi, 2012). To reduce the impact of potential control variables they will be taken into account as control variables in the regression model. Control variables will be kept constant to ensure they do not interfere with the results. These are variables that impact the results but are not intended to be researched. The following potential control variables will be considered in this research: gender of residents, income of residents, age of residents, household size, degree of urbanity, project size, house price, proximity to services and ethnicity of residents. The next paragraph explains the reasoning behind this selection of variables. Keep in mind that the reasoning for the relevance of these variables means they are a risk of influencing the results and not because the effects of these variables will be researched in this thesis.

Fischel (2001) argues that the homevoter theory is best put into practice in smaller, suburban jurisdictions with high homeownership rates and less policies that can cause an issue in the political landscape. In the contrary, Fischel (2001) also argues that even in bigger cities with a more complex political structure homevoters can become a strong political unity through collaboration and neighbourhood voting. This is a reason to why degree of urbanity can be a potential control variable and should be taken into consideration when correcting for control variables. Furthermore, urban areas may have different approval processes compared to rural or suburban regions. Analysing how the degree of urbanity affects approval time can provide insights into the complexities of urban development and the potential need for smooth and easy processes in densely populated areas. Another potential control variable is the ethnicity of residents. Particular racial or ethnic groups are less wanted by other racial or ethnic groups, because they believe welcoming these specifics groups in larger quantities into their neighbourhood can negatively influence house prices or reduce quality of life (Been, Madar, & McDonnell, 2014).

Furthermore, Been (2014) explains why house prices and income are also variables that need to be included as control variables. House prices are central to this research. Increasing and decreasing house prices are a main indicator of supply and demand of houses in an area. House prices can potentially influence decisions made by policymakers due to different market conditions when house prices are high or low. Developers could also influence the government in a way that suits them so they can choose to sell quickly or wait to sell their future developments. For this reason they can also potentially influence approval time and should therefore be considered as a control variable. Housing prices are potentially the most important variable when looking at housing market changes. Housing markets have a regional role and should therefore be taken into account on a COROP level. Differences in developments in housing markets are an influential variable on housing developments project, which is why they are considered as a control variable. Been (2014) includes income in their research as well for its close link to homeownership rates among others. Income is related to the financial well-being of people and the socio-economic situation in an area. If an area is better off financially for example, this could mean a housing development is of a higher standard which could take more time to be approved. However it could also mean that more effort is put into a notice of objection to try and postpone a project. Therefor for obtaining useful results it is necessary to take income out of the equation by considering it as a control variable.

Many control variables in this research are related to characteristics of residents. Another one of these variables is the gender of renters and homeowners. It may seem as a non-essential research variable, however there is a reason for taking the gender of residents into account. The reason for considering it is the fact that it can potentially influence the results of the data analysis. This is possible because one gender could be more politically active which could cause delays in a development. Another example of possible delay related to differences in gender is possible government policies related to providing housing for single mothers. In this case more single mothers in an area could mean more time needs to be put into the planning and approval process. Hence gender should be considered a control variable. Similar to this, a certain age group could influence the outcomes of approval time for a housing development due to their level of involvement. There is a chance that either younger or older people are more involved in local politics. Involvement in local politics can lead to delay or on the contrary shorten the approval time.

3.4. Data analysis

Survival analysis, which can in principle be performed with the use of logistic regression analysis, will be used to analyse the data. Because survival analysis will be used as data analysis method it is possible to also take already finished developments or developments that were never finished into account. Survival analysis focuses on aspects regarding the timing and duration until the occurrence of an event, which is ideal for measuring the time it takes for a plan to be approved. Descriptive statistics, such as means and standard deviations, will also be calculated to describe the sample characteristics and distribution of the variables.

3.4.1. Methods for data analysis

In this section of the research, the selection of statistical methods is tailored to best address the nuances of analysing housing development timelines. We choose these methods for their distinct capabilities in handling different aspects of survival and event-time data.

The Kaplan-Meier method, while not used for multivariate analysis in this research due to its limitations in handling multiple covariates, is nevertheless critical for estimating survival functions when the data is censored. This method provides an initial understanding of the survival probability over time, which is essential when considering the proportion of projects completed at various intervals (Erik Bradley & Kohler, 2007).

The Cox proportional hazards model is chosen because of its robustness in multivariate analysis, allowing for the adjustment of multiple control variables simultaneously (Fox & Weisberg, 2002). This model is particularly useful for this research as it strengthens the internal validity by accounting for various potential confounders, providing a clear picture of the relationship between homeownership rates and development timing.

Logistic regression is employed to analyse the binary outcome of whether a project is completed within a specified time frame. This method is advantageous for its simplicity and the interpretability of odds ratios, making it a valuable tool for examining the association between homeownership rates and the likelihood of project completion when time-to-event data is not the primary focus (Osborne, 2008).

Now, let's dive into each method in detail:

- Kaplan-Meier Method:
  The Kaplan-Meier Method is a non-parametric technique for estimating the survival function from time-to-event data (Jager, Van Dijk, Zoccali, & Dekker, 2008). It's utilized to create a survival curve that represents the probability of a housing development project reaching completion at various time points, particularly useful for data with censored observations. Advantages are that it is effective for dealing with censored data and does not assume any specific statistical distribution for survival times. On the other hand, it does not allow for the adjustment of covariates; limited to univariate analysis, which restricts its use in multivariate contexts where multiple factors influence the event of interest.

- Cox Proportional Hazards Model:
  The Cox Proportional Hazards Model is a semi-parametric model that assesses the effect of several variables on the hazard or risk of an event occurring over time (Fox & Weisberg, 2002). It is applied to examine the complex interplay between homeownership rates and the timing of housing development, while controlling for a range of other variables. It is crucial for

identifying the magnitude and direction of the effects of these variables on the likelihood of project completion. The main advantages are that it accommodates a multivariate approach, allowing for the inclusion of various control variables; hazard ratios provide a clear measure of relative risk or benefit. A disadvantage is that it relies on the proportional hazards assumption, which, if not met, can invalidate the model. It may not be suitable for data where hazards are not proportional over time (Babińska, et al., 2015).

- Logistic Regression:
  Logistic Regression is a statistical method for modelling the probability of a binary (yes/no) outcome based on predictor variables. It is used to determine the odds of a housing development project being completed within a predetermined timeframe, given the homeownership rates and other control variables. An advantage is that it is widely used and easily implemented in most statistical software; results in odds ratios that are straightforward to interpret (Pourhoseingholi, Baghestani, & Vahedi, 2012). A disadvantage is that it does not account for the time until the event occurs; less informative for analyses where time-to-event is a critical factor.

The structured use of these methods enables a layered approach to the research question. Kaplan-Meier sets the stage with survival probabilities, Cox models bring in the depth of multivariate relationships and temporal dynamics, and logistic regression adds the dimension of binary classification in a controlled setting. Combining these analytical methods allows for a comprehensive exploration of the factors impacting the timeline of housing development projects.

3.4.2. Process of data analysis

The data acquired from the Dutch Central Bureau of Statistics (CBS) is available in ZIP-files in a Geopackage format. This creates the opportunity to transfer this data to the Geographical Information System ArcGIS. Following this, it is possible to compare this data to the provincial datasets by putting multiple layers of data over each other (Centraal Bureau voor de Statistiek, N.D.). To initiate this creation of a new dataset in ArcGIS Pro the datasets have to be imported. The CBS dataset is imported into ArcGIS Pro alongside additional datasets, including original land-use data of Dutch soil and a provincial dataset containing all housing developments in Noord-Holland, Zuid-Holland and Limburg.

A critical step in the creation of a new dataset involves the creation of a buffer zone around each planned housing development area. In this study, a 1000-meter buffer is generated, which serves to spatially delineate the immediate vicinity of the development sites. This buffer size is chosen to effectively encompass the surrounding area, thereby facilitating a focused analysis on the local impacts and characteristics relevant to the housing developments. It creates a meaningful and representative dataset outlining the surrounding area. The second step in mapping the data is to use the intersect tool. The intersect tool is employed within the buffer zones to ensure that only data within these specified areas are included in the analysis, effectively excluding all other irrelevant spatial data. This step is vital for refining the dataset to include only pertinent spatial information. These steps need to be taken separately for Noord-Holland, Zuid-Holland and Limburg. However, by building a model these tools can be ran effortlessly for different datasets and using different variables by only changing the input.

Utilizing the erase tool, data pertaining to the CBS within the plan areas are removed. This is a crucial step as the focus of the research is on the impact of the existing local population on housing

developments, rather than on potential future residents of the new developments. The intersect tool is again applied, this time to the land-use base layer. Only the land-use for the plan areas need to be considered, therefore an intersect is run to exclusively select this land-use data. This step is instrumental in understanding the land-use dynamics relevant to the housing developments. The study involves combining datasets related to different provinces, plan areas, land-use, and CBS characteristics into a unified dataset. The merge tool in ArcGIS Pro facilitates this integration. The resulting comprehensive dataset, encompassing all necessary variables, is then exported to Excel for further statistical analysis. The final step involves conducting regression analysis using the software Stata. This analysis aims to elucidate the relationship between the surrounding local population dynamics and housing development patterns.

After the creation of a new unique dataset this data can be carefully analysed to gain an understanding of the effects homeowners have on delay in housing developments. Stata, a statistical software for data science, will be used to perform a cox regression analysis. As mentioned before, the cox proportional hazards model is the most suitable for this research purpose, because of its ability to do a multivariate analysis. One of the essential factors of regression analysis in this research is that it encompasses the possibility of including the different control variables relevant for this study.

The methodology involves preparing the dataset for analysis using Stata's “stset” command. This command allows defining of the survival-time data structure, identifying the variables representing the time to the event and the event indicator. In the context of this research, the event is the completion of a housing development project. The stset command is crucial for ensuring that the Cox model accurately interprets the time-to-event data. Once the dataset is structured appropriately, the Cox proportional hazards model is implemented using the “stcox” command in Stata. This command allows for the estimation of the hazard ratio for homeownership rates while controlling for other variables. The Cox model's ability to handle multiple variables simultaneously is essential for this research, as it provides insights into how homeownership rates impact development times, independent of other factors.

In the analysis, homeownership rates are the primary independent variable of interest. The Cox model estimates the hazard ratio for this variable, reflecting the effect of changes in homeownership rates on the likelihood of housing development completion over time. A hazard ratio greater than one would indicate that higher homeownership rates are associated with longer development times, whereas a hazard ratio less than one would suggest the opposite. A range of control variables, such as plan capacity, gender, inhabitant, corop code, house, zoning, price index, transactions, selling price and building costs index, are included in the model. These variables are added to the Cox model using the stcox command, where each control variable is accounted for in the multivariate framework. This allows for a more nuanced understanding of the development timeline, ensuring that the observed effects of homeownership rates are not confounded by these other factors. The control variables are selected based on their potential impact on housing development times and their independence from homeownership rates. For example, the inclusion of variables like plan capacity and building costs helps to adjust for the scale and economic factors of the development projects, while demographic and regional variables (such as gender and corop code) account for socio-economic and geographic diversities.

The output from the stcox command in Stata provides the hazard ratios and their corresponding p-values for homeownership rates and each control variable. These results are interpreted to understand the magnitude and significance of the impact of homeownership rates on housing

development times. The p-values help determine whether the observed effects are statistically significant or likely due to chance.

3.5. Reliability

Ensuring the reliability of research is essential to produce valid and trustworthy results. Reliability refers to the consistency and stability of the research findings, which can be affected by various factors such as measurement error, sampling bias, or data manipulation (Roberts & Priest, 2006).

This research uses a positivist approach, of which one of the main goals is replicability. Replicability means that a research process can be repeated in detail, where the same methods will be used but with new data, and the results will be the same. It is also important for a researcher to stay clear of assumptions and bias in the research to ensure it is replicable. When research has a good replicability, this significantly enhances the reliability (Asendorpf, et al., 2013). To make this research more reliable the methodology section will be made as transparent as possible. Transparency will be provided by giving a detailed explanation of the undertaken steps in this research making the results more reliable. This is in part why the methodology section with the data collection, data analysis, reliability and validity among others, is so important for a trustworthy scientific study. Another way of ensuring the reliability of this research is through the use of clear and unambiguous language (Asendorpf, et al., 2013). This research is written in a way that is supposed to be understandable for non-experts and not leave too much room for interpretation, so the results are still replicable.

3.6. Validity

Similar to reliability, validity is also a concept that measures the quality of research. Contrary to reliability, validity focuses on the accuracy of a method. For the validity it is also important to be clear in writing and describing what the method is meant to measure. The method can be considered valid when it accurately measures what it claims to measure with results corresponding to real world values. When doing experimental research, a distinction can be made between two types of validity: internal validity and external validity (Roberts & Priest, 2006).

3.6.1. Internal validity

As the name suggests, internal validity is related to aspects within the study. It refers to the level of certainty that the causal relationship that is being researched is trustworthy and independent of other variables. The causal relationship in this study is that between the independent variable homeownership rates and the dependent variable approval time of housing developments. To establish a causal relationship between homeownership rates and approval time, it is essential to control for potential extraneous variables that may influence the dependent variable (Slack & Draugalis Jr., 2001). For example, the research will control for variables such as location, size, and type of housing development, as these may affect approval time and also be related to homeownership rates. This will be supported by established and widely used measures to ensure validity. For the internal validity and establishing a causal relationship it is also important to pay attention to a clear research design. Similar to reliability, for internal validity the variables, data collection and analysis must be defined in detail (Slack & Draugalis Jr., 2001).

3.6.2. External validity

External validity refers to the degree to which you can generalise the results to a broader context, for example other populations or settings (Lakschmi & Mohideen, 2013). The study will use a

representative sample of housing developments from different regions, sizes, and types to ensure that the findings are generalizable to the population of housing developments in the Netherlands. This is possible, because the datasets will be provided directly by the provinces including information about all developments in their respective province. Data from three provinces -Noord-Holland, Zuid-Holland and Limburg- will be analysed, this is more generalisable for the whole of the Netherlands compared to analysis of data of just one province. The study will use multiple regression models to control for potential control variables that may affect the relationship between homeownership rates and approval time. This will increase the chances of the findings being applicable to different populations and settings (Lakschmi & Mohideen, 2013). By using these strategies, the research will be better able to generalize the findings to other contexts, and provide valuable insights for policymakers, housing developers, and communities in and possibly beyond the Netherlands.

3.7. Limitations

One of the limitations of this data analysis is the availability of data on housing development plans. Although the national database of housing developments provides a large share of data, it is possible that not all housing developments are registered in the database. Another limitation is that the study will only focus on three provinces, which may not be representative of the entire country. Alternatively, an aspect that could be seen as a limitation is that the data analysed is provided and owned by provinces and therefore confidential. It cannot be made public without permission from the provinces, which means not just any person can reproduce the results. Furthermore, the data analysis will not take into account important factors such as the complexity of the development plan, the size of the development, and the involvement of stakeholders.

4. Results

In addressing the critical question of how homeownership rates impact the development time during the permitting phase, time between permit and commencement development and actual construction phases of housing developments in the Netherlands, this analysis delves into the complexity of various factors that might influence this dynamic. The core of this investigation is centred around a comprehensive evaluation of data obtained from a Cox Survival Regression analysis. This statistical method is particularly useful for handling time-to-event data, making it an ideal tool for examining the time-dependent nature of permit approval processes in housing development scenarios. The primary focus is on the variable "p_koopwon," representing the percentage of owner-occupied homes within a 1000-meter radius of proposed housing developments. This variable stands as a proxy for homeownership rates in the vicinity of these developments. The reasoning behind investigating this particular aspect is rooted in understanding whether communities with higher percentages of owner-occupied homes experience different permit approval, development start and construction times compared to areas with lower homeownership rates. This inquiry is crucial, as it can unveil patterns and tendencies within the housing development processes that are influenced by the residential composition of neighbourhoods.

To augment the robustness of the conclusions, the Cox Survival Regression model has been employed in a stepwise manner, incorporating an increasing number of variables across three separate models. This approach allows for an intricate examination of how the addition of different variables, ranging from demographic factors like the gender and total population in the area ("man," "vrouw," "inwoner") to more specific regional and housing market characteristics (such as "coropcode," "woning," and various land use percentages), can modulate the effect of homeownership rates on development times. By progressively introducing these variables, a discernment can be made between their individual and collective impacts, enhancing understanding of the complex interplay at play. The interpretations drawn from this analysis are grounded in the hazard ratios and p-values of each variable, which collectively paint a nuanced picture of the factors influencing development times. Through this methodical exploration, this research aims to unravel the layers of complexity surrounding this crucial aspect of housing development, offering insights that are not only statistically sound but also contextually relevant to urban planning and housing policies in the Netherlands.

4.1. Homeownership rates

The homeownership rates in the three Dutch provinces of Noord-Holland, Zuid-Holland, and Limburg provide an intriguing glimpse into the region-specific dynamics of the housing market, which are essential for the interpretation of the results of my master's thesis. These variations in homeownership percentages, with Limburg leading at 60%, followed by Zuid-Holland at 52%, and Noord-Holland at 50%, may be significantly influenced by a confluence of housing prices, urban versus rural landscapes, and population density.

In Noord-Holland and Zuid-Holland, the presence of major urban centres like Amsterdam, Rotterdam, and The Hague likely contributes to higher housing prices. The demand for living space in these bustling metropolitan areas drives up property costs, which can put homeownership out of reach for a larger segment of the population. This economic barrier to owning a home could result in a greater proportion of rental properties and a lower homeownership rate. On the other hand, Limburg's relatively rural character may offer a contrasting housing narrative. Rural areas often present lower

housing costs due to less competition for space and the availability of more land for development. This affordability can enable a higher percentage of the population to purchase their own homes, as may be reflected in Limburg's 60% homeownership rate. Population density is another critical factor that intertwines with the urban-rural divide. High-density areas, characteristic of Noord-Holland and Zuid-Holland's urban environments, generally see a trend towards renting, partly due to the transient nature of urban living and partly due to the premium on space, which can limit the feasibility of widespread homeownership. Conversely, the lower population density in Limburg's more rural setting might not only make homeownership more economically feasible but also culturally preferred, as there may be a stronger inclination towards long-term settlement and property investment in less densely populated areas.

The interplay between housing prices, the urban-rural dichotomy, and population density paints a complex picture of the housing market across these provinces. This understanding is pivotal for my thesis as it informs the interpretation of how these factors might influence housing development times. The nuanced insights gained from considering these specific variables will guide the analytical framework of the thesis, ensuring that the conclusions drawn are reflective of the multifaceted nature of the housing development process in the context of Dutch provincial variances.

4.2.Control variables

This paragraph presents some interesting results regarding the control variables in this research. One interesting control variables is gender. In contrast to for example income or education there is no notable gender inequality concerning home ownership. Houses are often bought by couples which is a possible explanation as to why the amount of female homeowners is almost the same as male homeowners across all provinces in this research. The hazard ratios that will be presented further on in this chapter show that more male homeowners in an area often lead to events happening faster, besides in the construction period where the opposite is true. However, the related P-values are insignificant proving this relationship to be quite meaningless. Earlier in this research a possible explanation as to why gender could play an important role in the development time of housing developments was the example of single mothers in an area. This has however not been proven or disproven based on the results of this analysis, since it was not part of the dataset and is not crucial to add since it does not have a significant enough meaning to be a separate variable in this research.

Another interesting variable is the COROP code, a more extensive explanation as to why this specific regional classification is used seems valuable. The use of COROP codes in research analysing how homeownership rates influence development time offers several key benefits. Firstly, the nodal structure of COROP areas, centred around urban cores and their surrounding regions, provides a more accurate reflection of socio-economic dynamics than traditional administrative divisions. This is particularly relevant for studies on development time, as it captures the intricate interplay between urban centres and their catchment areas, directly impacting homeownership trends and development patterns. Secondly, the stability of the COROP classification system over time is a crucial advantage. This consistency ensures that longitudinal data remains reliable and comparable, allowing for a clearer understanding of trends and changes in development times in relation to homeownership rates over the years. Such temporal stability is vital for drawing accurate conclusions in a dynamic field like housing development. Furthermore, the alignment of COROP areas with European NUTS 3 standards enhances the potential for broader comparative studies, providing a framework that situates the research within a larger context while maintaining a focused regional specificity. This can be

particularly beneficial in understanding how regional factors within the Netherlands compare to broader European trends in homeownership and development.

The observation that variables such as the number of inhabitants, the number of houses, and housing prices surrounding a development vary significantly across housing projects, while the percentage of men and women tends to be more similar, is relevant for the study of how homeownership rates influence development time. Firstly, the large variation in the number of inhabitants and houses in the vicinity of a development is indicative of diverse urban and rural characteristics within the provinces. These differences can have profound implications on development dynamics. In areas with a higher density of inhabitants and houses, the demand for housing is likely to be greater, potentially accelerating the development process due to market pressures. On the other hand, in less densely populated areas, the demand might be lower, potentially leading to longer development times. In densely populated areas, the complexity of development projects may increase due to factors like limited space availability, stricter zoning laws, and the need for more intricate infrastructure planning, all of which can affect the development timeline. Secondly, the variation in housing prices across developments adds another layer of complexity. In areas where housing prices are high, there could be a stronger market incentive for rapid development, as developers seek to focus on higher potential profits. However, high housing prices might also reflect higher land acquisition and construction costs, which could slow down the development process. In areas with lower housing prices, the economic dynamics are different however. Lower prices might indicate less market pressure, potentially leading to a slower pace of development, but they could also mean lower costs, possibly facilitating quicker project completion.

These variables are not just standalone factors but are interrelated. A higher number of inhabitants usually correlates with a higher number of houses, and both can influence housing prices. This complex interplay needs to be carefully considered in the analysis, as it can provide deeper insights into the underlying mechanisms driving development times. The contrast between relatively stable gender distribution and the high variability in inhabitants, housing density, and prices underscores the importance of considering demographic and economic characteristics in understanding housing development dynamics. These variables reflect the complex nature of housing markets and are crucial for a comprehensive analysis of how homeownership rates impact development time. The significant differences in these variables across developments highlight the need for a nuanced approach that accounts for local conditions and market forces, offering a better understanding of the housing development process.

4.3. Development time

As mentioned before, development time is a crucial factor in the success and efficiency of housing projects. The progression from obtaining necessary permits to the actual construction phase encompasses multiple different influences that can extend or shorten this duration. In this research homeownership rates are a particularly significant element that may influence the development time. This chapter looks at the link between homeownership rates and duration of housing developments in three Dutch provinces—Noord-Holland, Zuid-Holland, and Limburg—through a series of Kaplan-Meier survival estimates. By graphically representing the progression timelines from permit approval to construction commencement and eventual completion, this research aims to gain insights into the differences of development efficiency across the regions. These variances not only affect project stakeholders but also shed light on the regional dynamics that could be crucial for policymakers and urban developers for creating future housing initiatives.

4.3.1. Event permit

The Kaplan-Meier survival estimates depicted in the graph provide a visual representation of the time it takes for permits to be granted in three Dutch provinces: Limburg, Zuid-Holland, and Noord-Holland. The x-axis, labelled 'Analysis time,' represents the time period under consideration in months. The y-axis shows the proportion of permits that have not yet been granted, with values ranging from 1 (indicating 100% of permits not granted) to 0 (indicating all permits have been granted). From the graph, it is evident that the probability of permits not being granted decreases over time for all three provinces, which is expected as more permits get approved as time progresses. However, the rate at which this probability decreases varies by province, providing insights into the relative efficiency or speed of the permit granting process in each location.

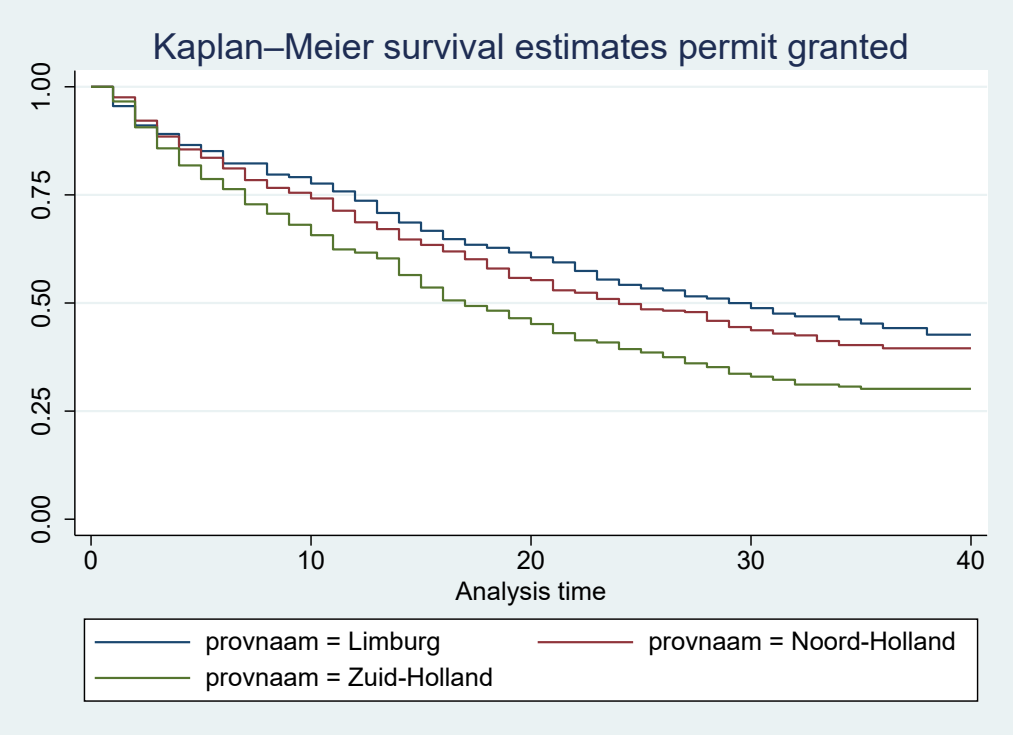

Figure 2: Kaplan-Meier survival estimates permit granted.

Limburg shows the highest probability of permits not being granted across the entire time span, starting off at the same level as the other provinces but diverging as time goes on. This suggests that Limburg is slower in processing permits compared to Zuid-Holland and Noord-Holland, as a larger proportion of permits remain ungranted at any given time. On the contrary, Zuid-Holland demonstrates the fastest permit approval process among the three, as evidenced by the lower survival probability curve. This implies that a permit application in Zuid-Holland is more likely to be granted sooner than in the other two provinces. Noord-Holland's curve lies between Limburg and Zuid-Holland, indicating that its permit granting speed is moderate in comparison. While it starts in line with the other provinces, it gradually shows a better probability of permits being granted over time than Limburg but not as efficiently as Zuid-Holland. These Kaplan-Meier estimates are crucial for understanding regional differences in the permit approval process. They suggest that applicants in Limburg might expect longer wait times, while those in Zuid-Holland might anticipate a quicker response. Such insights are valuable for developers, policymakers, and potential homeowners to set realistic expectations and for authorities to improve permit processing times.

4.3.2. Event start

The Kaplan-Meier survival estimates graph provides a visual representation of the time-to-event data for the permitting to construction phase of housing developments in three Dutch provinces: Limburg, Zuid-Holland, and Noord-Holland. The x-axis, labelled "Analysis time," measures the time in months from when a permit is granted until construction begins. The y-axis represents the proportion of permits for which construction has not yet started, with a higher value indicating a larger percentage of projects still awaiting construction commencement. From the graph, we observe that the survival curves for the three provinces diverge, suggesting differences in the time it takes for projects to move from permitting to construction commencement. The survival curve for Limburg starts higher and descends more slowly than the others, indicating that construction starts more slowly following permit approval in Limburg compared to the other provinces. By the end of the analysis period, a greater proportion of permits in Limburg have not transitioned to the construction phase, suggesting longer delays or a slower process.

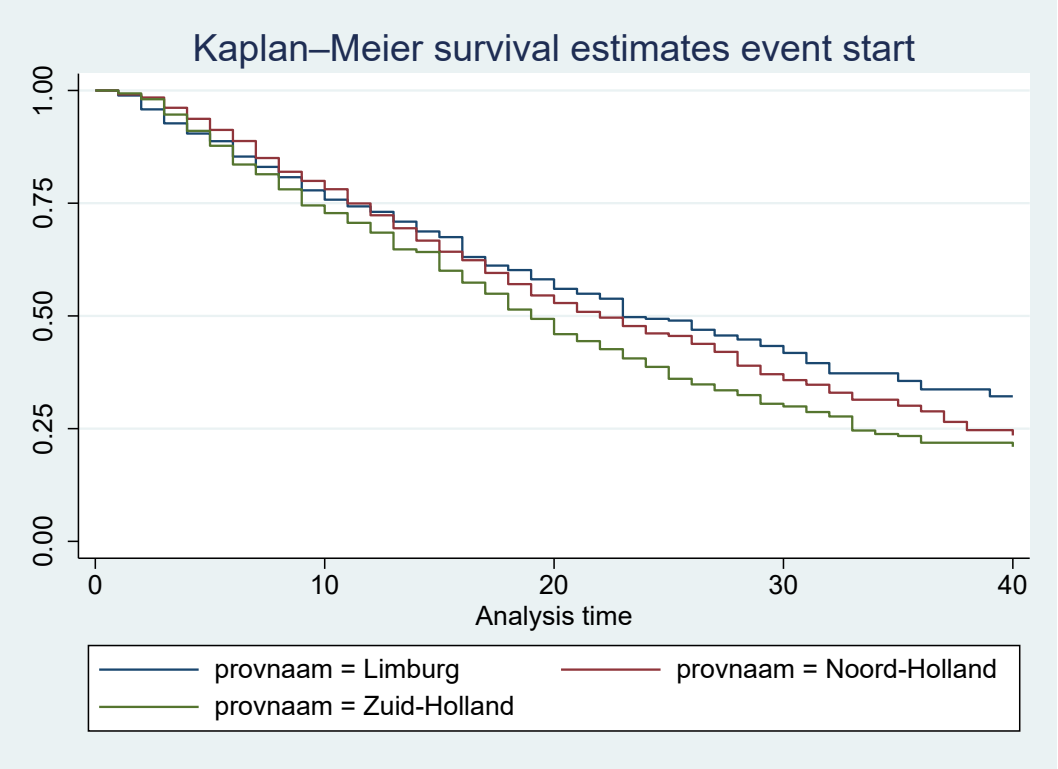

Figure 3: Kaplan-Meier survival estimates event start.

In contrast, Zuid-Holland shows a steeper descent in its survival curve, particularly in the early months, which implies that construction begins more rapidly after permitting in this province. The curve levels out later, but it consistently remains below the other two curves throughout the analysis period, indicating that Zuid-Holland has the quickest turnaround from permitting to construction start. Noord-Holland's curve lies between the other two, suggesting its timeline for starting construction after permits are issued is faster than Limburg but slower than Zuid-Holland. The curves for Noord-Holland and Zuid-Holland converge as the analysis time increases, indicating that the differences between these two provinces diminish over time. The survival curves do not cross over, which can be indicative of proportional hazards — an assumption that the ratio of the hazards for any two groups remains approximately constant over time. However, to confirm this, formal tests of the proportional hazards assumption would be required.

Overall, this graph demonstrates regional differences in the permitting to construction phase within the Netherlands, which could be influenced by a variety of factors including regional policies, economic conditions, and administrative efficiency.

4.3.3. Event completion

The Kaplan-Meier survival estimates depicted in the graph provide a visual representation of the construction phase timelines for housing developments across three Dutch provinces: Limburg, Zuid-Holland, and Noord-Holland. With analysis time in months along the x-axis and the percentage of permits that have led to completed construction on the y-axis, the graph offers a clear comparison of regional efficiency in housing development.

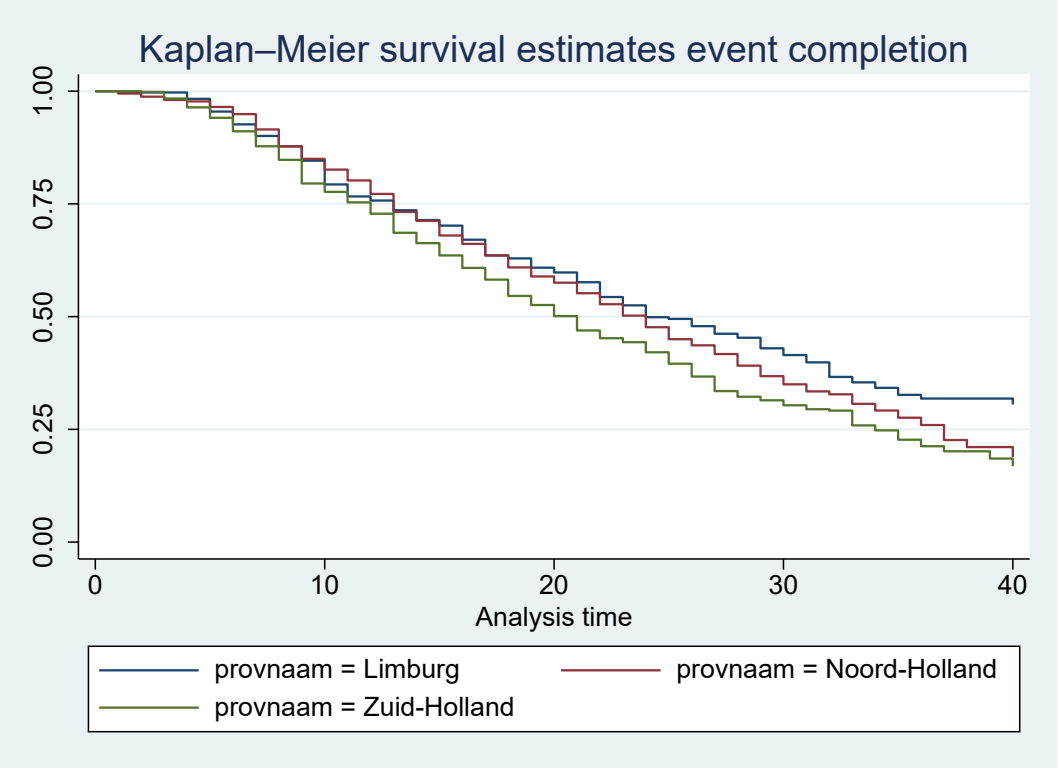

Figure 4: Kaplan-Meier survival estimates event completion.

From the graph, it is evident that Zuid-Holland leads the pace, demonstrating the quickest transition from construction commencement to construction completion, as indicated by its survival curve descending most rapidly towards lower percentages. This suggests that housing projects in Zuid-Holland are built at a faster rate over time compared to the other provinces. On the other end of the spectrum, Limburg exhibits the slowest construction rate, with its survival curve remaining the highest over the analysis period. This implies that permits in Limburg take a longer time to culminate in completed houses. Noord-Holland's performance sits between the two, closer to Zuid-Holland, suggesting a moderately quick construction phase.

These survival estimates are crucial for understanding regional discrepancies in the construction phase of housing development. Factors contributing to these differences could include regional policies, economic conditions, workforce availability, and administrative efficiency. The graph illustrates not just the disparities in timelines but also underlines the importance of probing into the underlying reasons that could account for such variations in housing development across the provinces.

4.4. Influence of homeownership rates and control variables on development time

For this master's thesis, a unique dataset has been specifically created to explore a not yet investigated question in urban development: What is the effect of homeownership rates on development time of housing developments in the Netherlands? The results derived from a Cox Survival Regression analysis on this dataset, can be used to shed light on this complex issue, bringing together a variety of key factors that potentially impact the permitting process.

4.4.1. Event permit

In this paragraph a closer look is taken at the results of the Cox Survival Regression that was used to analyse the time it takes from plan initiative until the event "permit granted" takes place. At the heart of this analysis is the variable "p_koopwon," representing the percentage of owner-occupied homes in the vicinity (within a 1,000-meter radius) of proposed housing developments. This variable is crucial as it directly relates to the main focus on homeownership rates. Complementing this are several other variables that capture different dimensions of the housing development environment. These include "plan_cap," which indicates the number of houses planned in the development, demographic details like the number of males ("man") and females ("vrouw") in the area, and the total population ("inwoner"). The dataset also includes regional codes ("coropcode"), information on the existing number of dwellings ("woning"), and various measures of land use, such as the percentage of residential or industrial land in the area. Economic aspects are also considered, with variables like the housing price index and the index of building costs. This specially constructed dataset allows a thorough investigation to take place while taking into account the carefully chosen control variables. By examining the relationships between these variables and the time taken to approve permits, this research can gain insights into what influences this critical phase in housing development.

_t	Haz. ratio	P>z	Haz. ratio	P>z	Haz. ratio	P>z
p_koopwon	1.002032	0.457	1.001533	0.610	1.002632	0.404
plan_cap	.9980089	0.000	.9978531	0.000	.9976823	0.000
man	.9998491	0.341	.9998357	0.311	.9997796	0.188
vrouw	.9998922	0.499	.9998519	0.365	.999807	0.249
inwoner	1.000135	0.393	1.000157	0.332	1.000208	0.211
coropcode	.9826157	0.001	.9845064	0.003	.9791725	0.002
woning	.9999898	0.233	.9999992	0.931	.9999978	0.824
pct_bebouwd_wonen			1.187277	0.687	1.226687	0.638
pct_bebouwd_overig			.1710649	0.091	.2234366	0.162
pct_bebouwd_industrie			1.534811	0.534	1.51765	0.548
pct_bebouwbaar			1.733817	0.404	1.323235	0.677
pct_bebouwbaar_bouwterrein			.818047	0.873	.7017009	0.783
pct_landelijk			.627513	0.206	.6736595	0.292
prijsindex_woning					.3124136	0.249
prijsindex_ondergrens					1.762666	0.263
prijsindex_bovengrens					1.762229	0.262
prijsindex_verandering					.9214703	0.058
prijsindex_verandering_1jr					1.135112	0.000
transacties					.9999492	0.661
transacties_verandering_1jr					.9942257	0.220
verkoopprijs_gem					.9999987	0.239

verkoopprijs_totaal					1.000355	0.363
bouwkosten_index					11.39343	.

Table 2: Results of the Cox regression analysis for permits granted.

In Cox regression, the hazard ratio (HR) is a measure of how a variable's change affects the hazard or risk of the event happening (Samawi, Yu, & Yin, 2023). In this case, the event is the transition from permitting to construction commencement. A HR greater than 1 suggests an increase in the hazard, meaning a longer time until the event (permit granted later), while a HR less than 1 indicates a decrease in the hazard (permit granted sooner).

The P-value is a measure that helps determine the strength of the evidence against the null hypothesis in a statistical test. The null hypothesis states that there is no effect of homeownership rates on housing developments. A low P-value (less than 0.05) suggests that the observed data are unlikely to have occurred under the null hypothesis. A high P-value (equal to or greater than 0.05) suggests that the data do not provide strong evidence against the null hypothesis. This means that any observed effect or association could likely be due to chance. It's important to note that a P-value does not measure the probability that the null hypothesis is true or false. It measures the probability of observing the data instead, assuming the null hypothesis is true. A P-value does not measure the size of an effect. Even a statistically significant result can represent a small or practically insignificant effect (Goodman, 1999).

The hazard ratios for “p_koopwon” across all three models are slightly above one. This indicates that for every percentage point increase in the owner-occupied homes, there is a corresponding slight increase in the likelihood of faster permit approval. However, the increase is minimal, as reflected by the hazard ratios being close to 1. Across all models, the p-values remain above 0.05, which is the conventional threshold for statistical significance. This suggests that even though there is a slight increase in the hazard with higher homeownership rates, this increase is not statistically significant according to the survival regression.

The data suggests that while there is a slight trend towards faster permit approvals with higher homeownership rates, this trend is not statistically significant. This implies that homeownership rates, as captured by the “p_koopwon” variable, are not a major determinant in the speed of permit approval processes in the Netherlands. These findings also indicate that local housing policies and permit decisions might not be heavily influenced by the composition of homeownership in a given area. This could reflect a level of neutrality or standardization in the permit approval process that is not overly swayed by the immediate residential makeup. This could be because the permitting process is more influenced by regulations and policies that are less sensitive to local homeownership demographics. The lack of a significant relationship might also suggest that community pressures or preferences, often associated with areas of higher homeownership, do not significantly impact the pace of permit approvals (Mallach, 2016). This could be an indication of a balanced approach in the consideration of permit applications, regardless of the local homeownership context. It seems that homeownership rates are not negatively influencing this phase of housing developments in Noord-Holland, Zuid-Holland and Limburg, which rejects the null hypothesis of this research. This finding is important as it suggests that other factors, beyond the immediate scope of local homeownership rates, may play more significant roles in influencing the permit approval process.

To provide an even more thorough analysis of the Cox Survival Regression results, this paragraph will delve into the significance and implications of each variable in the context of the research question regarding the effect of homeownership rates on the approval time of housing development permits in

the Netherlands. This analysis will focus on significant variables, but also include insignificant variables, exploring potential reasons for their statistical outcomes.

The control variable plan capacity is significant across all models (p-value = 0.000) with hazard ratios less than 1, indicating that larger developments are associated with longer permit approval times. Larger projects likely face more complexities, such as more extensive environmental impact assessments, more stakeholders to consult, and potentially more public opposition or scrutiny. This complexity logically extends the time required for thorough review and approval, leading to longer permit times (Zhao, Mbachu, Liu, Zhao, & Wang, 2021). Corop code is another variable that is highly significant. This variable becomes more significant in the models (p-value from 0.001 to 0.002), with hazard ratios less than 1, suggesting regional variation in permit approval times. This can be explained by the fact that different regions may have different policies, bureaucratic efficiencies, or community attitudes towards development. This variability can significantly influence how quickly permits are processed and approved.

The variable bebouwd_overig shows some level of significance in the second and third model, suggesting it might have a marginal impact on permit times. The proportion of land used for purposes other than residential might slightly influence permit approval times, possibly due to considerations of land-use diversity and the need for a balanced community infrastructure. However, the effect is not strongly significant. "Prijsindex_verandering" is also relatively significant, while "prijsindex_verandering_1jr" is significant. Changes in the housing price index over the past year being significant suggests that recent market dynamics might influence permit approval times. A rapidly changing market might prompt quicker responses from permitting authorities, either due to increased demand pressure or due to a desire to stabilize fluctuating markets (Schuetz, 2022). Furthermore, variables such as "woning" and "transacties" are insignificant. This might be because permit approval is more influenced by the specifics of the proposed development rather than the existing housing density or market transactions. Other notably insignificant variables include, but are not limited to: "pct_bebouwd_wonen", "pct_bebouwd_industrie", "pct_bebouwbaar" and "pct_bebouwbaar_bouwterrein". This could indicate that the focus is more on the suitability of the specific project rather than the existing land use composition.

4.4.2. Event start

The paragraph investigates how homeownership rates affect the duration between the permitting phase and the start of construction in Dutch housing developments. To delve into this, the study again employs Cox Survival Regression analysis, leveraging a dataset encompassing homeownership rates, demographic data, and specific project attributes. The analysis aims to discern the impact of homeownership rates on development timelines while factoring in various control variables such as the size of the housing plan and socio-economic demographics. These variables help in refining the understanding of the role homeownership rates play in housing project timelines. The study's findings are intended to guide policy makers and urban planners by providing detailed interpretations of the data through hazard ratios and P-values, highlighting the significance of homeownership rates and other influential factors on housing development processes.

_t	Haz. ratio	P>z	Haz. ratio	P>z	Haz. ratio	P>z
p_koopwon	1.001135	0.659	1.001027	0.718	1.001601	0.592
plan_cap	.9983668	0.000	.9983172	0.000	.9982835	0.000
man	.9996868	0.033	.9997193	0.061	.9997224	0.071
vrouw	.9996968	0.038	.9996992	0.045	.9997118	0.060

inwoner	1.000313	0.033	1.000291	0.051	1.000284	0.064
coropcode	.9809035	0.000	.9813201	0.000	.9750532	0.000
woning	.9999934	0.418	.9999999	0.990	.9999996	0.966
pct_bebouwd_wonen			2.094759	0.071	2.345539	0.041
pct_bebouwd_overig			.5022349	0.473	.6447128	0.656
pct_bebouwd_industrie			1.623808	0.470	1.842698	0.370
pct_bebouwbaar			3.068366	0.077	3.060917	0.085
pct_bebouwbaar_bouwterrein			.1567816	0.122	.1568671	0.128
pct_landelijk			1.024133	0.947	1.086316	0.822
prijsindex_woning					.266163	0.166
prijsindex_ondergrens					1.74817	0.245
prijsindex_bovengrens					2.133194	0.113
prijsindex_verandering					.9796743	0.609
prijsindex_verandering_1jr					1.043706	0.078
transacties					.999855	0.133
transacties_verandering_1jr					1.000317	0.944
verkoopprijs_gem					.9999975	0.009
verkoopprijs_totaal					1.000652	0.026
bouwkosten_index					.9954965	1.000

Table 3: Results of the Cox regression analysis for event start

The hazard ratios are slightly above 1, suggesting a very small increase in the time between permitting and construction commencement with higher homeownership rates. However, the P-values are not significant in any model, indicating that this effect is not statistically significant. The lack of statistical significance suggests that, based on this dataset and model, homeownership rates do not have a meaningful impact on the timeline for housing development projects. The addition of more variables in subsequent models did not significantly alter the effect of homeownership rates. This suggests that the effect (or lack thereof) of homeownership rates is consistent, regardless of the inclusion of other variables. Even with the corrected understanding of hazard ratios, homeownership rates do not exhibit a statistically significant effect on the time between permitting and construction commencement.

The lack of a significant effect of homeownership rates on the time between permitting and commencement of construction in housing developments, as indicated by the Cox Survival Regression analysis, can be attributed to several potential reasons. Understanding these reasons requires a nuanced look at both the context of housing development in the Netherlands and the specifics of the data analysis results. Homeownership rates might indirectly influence housing development processes through broader socio-economic factors, rather than having a direct, measurable impact on specific development phases. If homeownership rates are relatively stable over short periods, their influence might not be noticeable in the dynamic process of development, where other more variable factors play a dominant role (Grevenbock, Ludwig, & Siassi, 2023). The time between permitting and construction commencement is often driven by technical, logistical, and regulatory factors rather than socio-economic ones. These could include availability of materials, contractor schedules, or finalizing construction plans. In the Netherlands, the regulatory environment and zoning laws might play a more significant role in the timeline of housing developments. These factors are often more standardized and less susceptible to variations in homeownership rates. The housing market's dynamics, including demand, supply, and financing conditions, could have a more direct impact on development timelines than homeownership rates.

This paragraph explores the effects of the most noteworthy control variables in this Cox Survival Regression analysis, focusing on those with significant effects on the time between permitting and commencement of construction in housing developments, as well as some with non-significant effects. Understanding these variables is crucial for comprehending the broader context of the research question.

The control variable plan capacity consistently shows a hazard ratio slightly below 1 across all models with a P-value of 0.000, indicating a highly significant and inverse relationship with the development timeline. Since the hazard ratio is consistently below 1, it implies that as the plan capacity increases, the hazard of commencing construction decreases. This means that higher plan capacity is associated with a longer time between permitting and construction commencement. The event (start of construction) is less likely to happen at any given time point, indicating a delay. This could suggest that larger-scale projects or those with higher capacity might involve more complex planning, greater regulatory scrutiny, or logistical challenges, leading to longer preparation times before construction can begin (Santolini, Ellinas, & Nicolaides, 2021). Similar to the permit phase, corop code is another significant variable. The hazard ratio is consistently below 1 (around 0.98) with a significant P-value of 0.000 in all models. This suggests that different regional areas have an influence on the timeline. Regions may vary in their regulatory environment, economic conditions, or urban planning policies, which can affect development timelines.

The control variables gender (indicated by the variables “man” and “vrouw”) is initially significant in Model 1, but its significance diminishes in subsequent models. This change suggests that while there may be an initial appearance of an effect, it is likely adjusted by other variables. The initial significance might reflect underlying socio-economic or demographic factors that correlate with gender distribution, such as labour market conditions or community engagement in development projects (Grevenbock, Ludwig, & Siassi, 2023). However, the loss of significance indicates these are not primary drivers and do not have a significant direct impact on development times. Similar to gender demographics, the initial significance of population (“inwoner”) might hint at underlying factors like urban density or local community size impacting development processes. However, its diminishing significance implies these effects are either indirect or overshadowed by other more influential factors. Percentage of buildable land (“pct_bebouwbaar”) has a very high hazard ratio in the second and third models, with a P-value approaching significance (0.077 in the third model). Percentage of land ready for building (“pct_bebouwbaar_bouwterrein”), on the other hand, has hazard ratios significantly below 1 (around 0.156) in the third model with a P-value of 0.128.

4.4.3. Event completion

This paragraph investigates the impact of homeownership rates on the construction phase duration within housing development projects in the Netherlands. By employing a Cox Survival Regression analysis with a dataset that includes homeownership rates, demographic details, and project-specific characteristics, the research aims to determine the extent to which homeownership rates influence the time it takes to build housing. The research thoroughly considers additional potential control variables—ranging from planning capacities to area demographics and socio-economic factors—to provide an in-depth understanding of how these rates affect the construction timeline. The findings are intended to aid policymakers, urban developers, and industry stakeholders in recognizing the complex interplay between homeownership rates and the construction phase. Detailed results from the regression analysis, including hazard ratios and P-values, will be discussed in subsequent sections to elucidate the nuances of these relationships.

_t	Haz. ratio	P>z	Haz. ratio	P>z	Haz. ratio	P>z
p_koopwon	1.000137	0.957	.9990629	0.739	.9999695	0.992
plan_cap	.9983399	0.000	.9982901	0.000	.9982245	0.000
man	.9997095	0.046	.9997543	0.100	.9997767	0.147
vrouw	.9997137	0.048	.9997237	0.064	.999751	0.103
inwoner	1.000295	0.042	1.000262	0.078	1.000237	0.121
coropcode	.9819372	0.000	.9825182	0.000	.9797534	0.003
woning	.9999896	0.203	.9999987	0.887	.9999983	0.858
pct_bebouwd_wonen			2.731668	0.014	2.946321	0.009
pct_bebouwd_overig			.444222	0.388	.5907019	0.586
pct_bebouwd_industrie			1.616943	0.473	1.892025	0.348
pct_bebouwbaar			2.668139	0.122	2.609746	0.140
pct_bebouwbaar_bouwterrein			.2442234	0.234	.2571372	0.257
pct_landelijk			.993875	0.986	1.060199	0.873
prijsindex_woning					.3353152	0.244
prijsindex_ondergrens					1.583202	0.330
prijsindex_bovengrens					1.87938	0.179
prijsindex_verandering					.9344349	0.087
prijsindex_verandering_1jr					1.031421	0.212
transacties					.9998939	0.260
transacties_verandering_1jr					.9989249	0.814
verkoopprijs_gem					.9999984	0.072
verkoopprijs_totaal					1.000494	0.070
bouwkosten_index					.9989314	.

Table 4: Results of the Cox regression analysis for event completion.

In all three models, the hazard ratios for "p_koopwon" hover very close to 1 (1.000137, 0.9990629, and 0.9999695), indicating an almost neutral effect on the development time. A hazard ratio close to 1 suggests that changes in homeownership rates have little to no proportional impact on accelerating or decelerating the construction phase of housing developments. The p-values associated with "p_koopwon" are 0.957, 0.739, and 0.992 across the three models. These values are significantly higher than the conventional threshold of 0.05 for statistical significance. High p-values imply that any observed variation in development time associated with changes in homeownership rates is likely due to random chance rather than a systematic influence of homeownership rates. The interpretation of the observations associated with this model are similar to those in the models linked to the first two phases.

Given the hazard ratios and p-values observed across the models, it can be concluded that homeownership rates (p_koopwon) do not have a statistically significant effect on the development time during the construction phase of housing developments in the Netherlands. The consistency of this finding, even after the introduction of additional variables, underscores the robustness of the conclusion. Possible reasons for why homeownership rates are insignificant can be found in other overriding factors, such as market dynamics, regulatory processes and capacity of developers. Furthermore, it is harder for the local community to have an effect on the construction phase, since the building plans are already set in stone. This insight is crucial for stakeholders in the housing sector, as it suggests that factors other than the surrounding homeownership rates are more influential in determining the timeline of the construction phase in housing developments (Mallach, 2016). This

finding contributes to a nuanced understanding of the factors that drive housing project timelines, which is essential for informed decision-making in urban planning and development policy.

Similar to the previously analysed phases, the variables with the highest significance are plan capacity and corop code. The significant P-value (0,000) and hazard ratio slightly below 1 suggests that higher planning capacity is associated with longer development times in the construction phase. As planning capacity increases, it likely complicates the construction process, leading to slower completion. A results that could be expected, since a higher plan capacity means more houses need to be built which logically takes more time. As mentioned before for the other phases the significant corop code (0,000) slightly below 1 indicates that the effect of homeownership rates on construction time may vary from region to region, highlighting the importance of considering geographic and regional context in housing development studies. Some possible reasons for why there are differences in local rapidness in construction could be regional policy and regulation differences, economic and demographic variations, geographical and environmental factors and local community engagement.

In the nuanced exploration of factors affecting construction timelines in Dutch housing developments, this analysis sheds light on several significant variables beyond the expected norms. Though gender demographics ('man' and 'vrouw') initially appeared influential, their impact on construction times lessened with the inclusion of more comprehensive variables. This trend underscores the predominance of other factors such as population size ('inwoner') and economic indicators. The population variable, for instance, hinted at a nuanced relationship with construction times, suggesting that higher population densities might slightly extend the construction phase, perhaps due to logistical complexities or regulatory challenges in more populated areas. These insights reveal the intricate interplay of socio-demographic and economic elements in shaping the construction landscape, offering a deeper understanding of the multifaceted nature of housing development timelines. To put things into perspective, however, it should be noted that even when the effects of these variables are significant they have an extremely limited impact on the construction time.

4.4.4. Comparative assessment of homeownership impact across phases

In the comprehensive assessment of the impact of homeownership rates on housing development timelines across three phases—permitting, time between permitting and commencement, and construction—the Cox Survival Regression analysis reveals a complex interplay of various factors.

In the permitting phase, the variable "p_koopwon" suggests a negligible effect on permit approval times, with hazard ratios slightly above 1 and non-significant p-values across all models. This indicates that homeownership rates barely influence the permitting phase. Notably, "plan_cap" and "coropcode" are consistently significant, hinting at longer permit times for larger projects and regional variations in permit approval times, respectively. These suggest that project scale and regional administrative processes may be more influential than homeownership rates during the permitting phase. Similar to the permitting phase, homeownership rates show a minimal and non-significant effect on the timeline from permit to construction commencement. Again, "plan_cap" and "coropcode" stand out, implying that larger-scale projects tend to face delays before construction begins, and regional disparities affect the speed of transitioning from permit to construction start. The construction phase exhibits a pattern consistent with the previous phases, where homeownership rates ("p_koopwon") have an almost neutral and non-significant effect on development time. The significant variables "plan_cap" and "coropcode" reinforce the notion that the complexity of larger projects leads to longer construction times and that regional factors contribute to differences in construction speeds (Santolini, Ellinas, & Nicolaides, 2021).

Kaplan-Meier survival estimates for the all three phases reveal distinct regional efficiencies. Zuid-Holland shows the fastest total development completion rates, whereas Limburg is the slowest, with Noord-Holland in the middle. These differences between the three provinces are apparent in all models, however the differences seem to become slightly less in every phase. These differences are likely rooted in factors such as regional policies, economic conditions, administrative practices, and possibly demographic influences.

Across all three phases, homeownership rates have minimal to no significant impact on housing development timelines. This finding suggests that other factors, such as the complexity of development plans and regional characteristics, play a more pivotal role in shaping development timelines than the socio-economic measure of homeownership rates. The consistency of this result across different phases and models underscores the robustness of this conclusion. As mentioned before, the influence of homeownership rates on the development time of housing projects in the Netherlands is statistically insignificant. Instead, the capacity of planning efforts, regional codes, and the inherent complexities of larger-scale developments are more determinant factors affecting the housing development process (Zhao, Mbachu, Liu, Zhao, & Wang, 2021). These insights are critical for policymakers and stakeholders who are looking to streamline housing development processes, indicating that attention may be more effectively focused on planning capacities and regional policy frameworks rather than homeownership rates.

It has also become apparent through this analysis that homeownership rates lose significance through the development phases. Even in the permitting phase the influence of homeownership rates is insignificant, however with a P-value of 0.457 it is more relevant than the phase in between permitting and construction, with a P-value of 0.659, and the construction phase, with a P-value of 0.957. Even though these results all show an insignificant causal relationship, there is a notable decline in significance.

5. Conclusion

5.1. Answers to Research Questions

This chapter addresses the core inquiries that have driven this research, exploring the relationship between homeownership rates and the development time of housing projects in the Netherlands. This chapter is structured methodically to provide clear and comprehensive responses to each of the sub-questions, leading to an in-depth understanding of the main research question. The findings presented here are a product of statistical analysis and thoughtful interpretation, offering valuable insights into the dynamics of housing development. Each section within this chapter is dedicated to a specific question, ensuring a focused and detailed exploration of the various aspects of the study. The conclusions drawn not only respond to the research questions but also contribute significantly to the field of urban planning and housing policy, providing practical implications and directions for future research.

5.1.1. Sub question 1

In concluding the analysis of the first sub-question, "What is the effect of homeownership rates on approval time in the permitting phase of housing developments in the Netherlands?", it's evident from the research that homeownership rates, encapsulated by the variable "p_koopwon," have a minimal and statistically insignificant influence on the approval times of permits in housing developments. This conclusion is drawn from a thorough examination of hazard ratios and p-values obtained through Cox Survival Regression analysis, which consistently indicated that the variance in homeownership rates does not significantly influence the timeline for permit approvals.

The research initially hypothesized a notable impact of homeownership rates on permit approval times, based on the understanding that areas with higher homeownership might exhibit longer development times due to factors like community resistance or more strict review. However, the empirical data contradicted this assumption. Even with a slight trend towards faster permit approvals in areas with higher homeownership rates, the statistical insignificance of these findings – evidenced by p-values consistently exceeding 0.05– underscores that homeownership rates are not a significant factor in the pace of permit approvals. This conclusion is particularly evident in the context of Dutch housing development, where the study indicates a level of neutrality or standardization in the permit approval process that seems largely unaffected by the immediate residential composition. Such a finding is essential in understanding the dynamics of housing development in the Netherlands, suggesting that local housing policies and permit decisions are possibly governed more by regulations and policies that are less sensitive to local homeownership demographics than previously thought. The research also sheds light on the complexity of housing development processes, where factors other than homeownership rates – such as regional policies, bureaucratic efficiencies, and community attitudes – might play more significant roles in influencing permit approval times. The lack of a substantial relationship between homeownership rates and permit approval times could also indicate that community pressures or preferences, often associated with areas of higher homeownership, do not significantly impact the pace of permit approvals.

The findings from this study challenge the expected ideas about the influence of homeownership rates on the permitting phase of housing developments in the Netherlands. They open up new perspectives for policymakers and urban planners, emphasizing the need to look beyond socio-economic factors like homeownership rates to more influential elements such as regulatory frameworks and regional policies when seeking to optimize the efficiency of housing development processes.

5.1.2. Sub question 2

In addressing the second sub-question, "What is the effect of homeownership rates on the time between permitting and commencement of construction in housing developments in the Netherlands?", the research findings present a nuanced understanding of the housing development process. The study carefully analyzed the relationship between homeownership rates and the period from permit approval to construction start, utilizing Cox Survival Regression analysis. Contrary to initial expectations, the results reveal that homeownership rates, represented by the variable "p_koopwon," have a negligible and statistically non-significant effect on this phase of housing development.

The basis of this conclusion lies in the observation that the time between permitting and construction commencement is not meaningfully influenced by the homeownership rates in the area. This insight is crucial, especially given the often assumed correlation between local community characteristics and development dynamics. The research hypothesized that higher homeownership rates might lead to delays in this phase, potentially due to community involvement or resistance. However, the data consistently showed hazard ratios slightly above 1 for the "p_koopwon" variable, with p-values well above 0.05 for statistical significance. This pattern persisted even with the inclusion of various control variables, underlining a consistent lack of substantial impact from homeownership rates. These findings suggest that the time lag between permit issuance and construction start is influenced more by factors unrelated to the local residential composition. This phase of development appears to be governed more by practical, logistical, and regulatory considerations than by the socio-economic characteristics of the surrounding community. For instance, factors such as the availability of construction materials, contractor schedules, and the finalization of construction plans may play more significant roles. Additionally, the regulatory environment and zoning laws in the Netherlands, which are often standardized, might outweigh any potential influence of homeownership rates. The research also underscores the complex nature of housing development processes, where socio-economic factors like homeownership rates might interact with the operational dynamics of development projects. This understanding is crucial for urban planners and policymakers, as it directs attention towards more influential aspects of the development process, such as logistical planning and regulatory compliance, rather than socio-economic demographics.

In conclusion, the effect of homeownership rates on the duration between permitting and construction commencement in Dutch housing developments is minimal and statistically insignificant. This finding challenges the hypothesis about the impact of local homeownership demographics on development timelines, offering new insights into the factors that could possibly influence the efficiency of housing projects. The study therefor provides a valuable perspective for improving housing development strategies, emphasizing the importance of focusing on technical, logistical, and regulatory aspects rather than solely on the socio-economic composition of communities.

5.1.3. Sub question 3

The exploration of the third sub-question, “What is the effect of homeownership rates on development time in the construction phase of housing developments in the Netherlands?” reveals insightful conclusions regarding the dynamics of the housing development process. This part of the research specifically focused on the construction phase – the period from the commencement of building activities to their completion. Using the Cox Survival Regression analysis, the study closely examined the relationship between homeownership rates in the surrounding areas of development projects and the duration of this construction phase.

Contrary to what might be expected, the analysis disclosed that homeownership rates, as indicated by the "p_koopwon" variable, have an almost negligible impact on the construction phase timeline. Similar to the other development phases, the hazard ratios for "p_koopwon" were consistently close to 1, with p-values far exceeding the 0.05 threshold for statistical significance. This pattern of results was consistent across various models that incorporated different control variables, thereby reinforcing the conclusion that homeownership rates do not significantly affect the duration of the construction phase. This finding is interesting, because it challenges the perception that the socio-economic build of a community, particularly homeownership rates, would have a direct influence on the speed and efficiency of construction activities. The study hypothesized that higher homeownership rates might lead to longer construction times, possibly due to increased community scrutiny or resistance. However, the results suggest that the construction phase is less susceptible to the influence of local homeownership demographics and more driven by factors closer to the construction process itself.

The construction phase is likely influenced more by practical aspects such as the availability of resources, efficiency of the workforce, and the complexity of the project rather than the socio-economic characteristics of the surrounding area. Factors such as planning capacity, regional codes, and complexities of larger-scale developments appeared as more important in affecting the housing development process. These elements highlight the importance of focusing on project management, logistical planning, and attachment to regulatory frameworks for improving construction efficiency. The research shows that once the construction phase has started, the influence of the local community, as reflected in homeownership rates, decreases considerably. This might be due to the fact that major decisions and approvals have already been established, and the construction phase is more about the execution of already approved plans.

In conclusion, the impact of homeownership rates on the construction phase of housing developments in the Netherlands is once again minimal and statistically insignificant. This finding has significant implications for housing policy and development strategies. It suggests that efforts to hasten construction phases should concentrate more on enhancing operational efficiencies, improving supply chain logistics, and ensuring effective project management. For policymakers and urban planners, this insight points the focus toward internal project factors and regulatory compliance instead of homeownership rates, for improving the pace and efficiency of housing construction.

5.1.4. Main research question

In addressing the main research question, "What is the effect of homeownership rates on development time of housing developments in the Netherlands?", this thesis has navigated through a comprehensive and methodical exploration to find out whether homeownership rates influence housing development timelines. The investigation, grounded in robust statistical analysis using the Cox Survival Regression model, has spread the impact of homeownership rates across three main phases of housing development: the permitting phase, the interval between permitting and construction commencement, and the construction phase itself. The conclusion of this research is that homeownership rates, encapsulated by the variable "p_koopwon," have a minimal and statistically insignificant influence on the development times of housing projects in the Netherlands. This finding is consistent across all three examined stages of housing development, revealing a pattern that rejects the initial hypothesis. It was presumed that higher homeownership rates would potentially lead to longer development times, possibly due to greater community involvement or resistance in areas with a high proportion of owner-occupied homes. However, the data has

continuously demonstrated that the rate of homeownership in the vicinity of development projects does not significantly influence the timeline of these projects.

In the permitting phase, the study found that homeownership rates have little to no impact on the speed of permit approvals. Similarly, in the phase between permitting and the commencement of construction, and in the construction phase itself, homeownership rates were shown to have a negligible influence on the duration of these stages. Instead, the research highlights other factors, particularly the scale of the development project and regional characteristics, as more influential determinants of housing development timelines. Larger projects and differences in regional policies and administrative practices appeared to be crucial elements shaping the housing development process. These results take the focus away from the socio-economic makeup of neighborhoods as a critical factor in housing development times. It challenges expectations and directs attention towards internal project management and external regulatory environments. The findings suggest that efficiencies in the development process are more likely to be gained through improving operational aspects such as project planning, management, resource allocation, and adherence to regional policies and procedures. The research also underlines the importance of considering regional characteristics and administrative practices in understanding the housing development process. The significant variations observed between different provinces in the Netherlands – notably between Zuid-Holland, Noord-Holland, and Limburg – underscore the influence of regional policies and local administrative efficiencies on housing development timelines.

In summary, this thesis contributes to the broader understanding of housing development in the Netherlands by highlighting that while homeownership rates are an important aspect of the housing market, they do not significantly influence the time it takes to develop housing projects. This finding holds certain implications for policymakers and developers, indicating that efforts to speed up housing development should be more focused on project management and regulatory frameworks rather than the socio-economic characteristics of neighborhoods. As the Netherlands deals with its housing crisis, this insight provides a direction for strategic planning and policy formulation aimed at solving housing shortages and improving market accessibility and affordability.

5.2. Possible further development of theory based on the results of the study

The results of this study, which highlight the minimal impact of homeownership rates on the development time of housing projects in the Netherlands, provide a ground for further theoretical development. This finding challenges existing theories that emphasize the significant role of socio-economic characteristics in influencing urban development processes. It encourages a re-examination and evolution of theoretical models to better align with the complexities observed in real-world housing development scenarios.

This study prompts a reconsideration of how homeownership rates are integrated into theories of urban planning and development. Traditionally, models like Fischel's Homevoter Hypothesis have underscored the influence of homeowners in shaping local policies, often resulting in more restrictive development regulations. However, the findings of this research suggest that the link between homeownership rates and development times is not as direct or influential as such theories propose. This invites the development of new theoretical frameworks that more accurately reflect the many different factors influencing housing development timelines, more comprehensive than the aspect of community ownership structures. Additionally, the study's results encourage a deeper exploration of the role of regional policies and specific factors in housing development. Theories focusing on the influence of regional administrative practices, zoning laws, and project management could be

expanded or newly developed. This theoretical shift would emphasize the significance of bureaucratic efficiency, regulatory environments, and internal project dynamics over community-based socio-economic factors. The minimal impact of homeownership rates observed in this study could also lead to a renewed focus on institutional factors in housing development theories. New Institutionalism, which considers the influence of institutions like local governments and planning authorities on housing supply and demand, could be further elaborated to examine how their policies and decisions directly affect development timelines.

This research also opens possibilities for integrating interdisciplinary perspectives into urban development theories. Insights from fields such as economics, sociology, and environmental studies could provide a more comprehensive understanding of what drives housing development processes. For example, economic theories could research market dynamics, financing structures, and resource allocation, while sociological theories could explore community engagement, demographic changes, and social equity in development processes. It can be said that the potential for further development of theory based on the results of this study is there. It calls for an expansion of current theoretical frameworks, the integration of interdisciplinary perspectives, and the formulation of new models that tackle the complexities of housing development processes. These theoretical possibilities could deepen our understanding of urban development dynamics and inform more effective policies and strategies for housing development and urban planning.

5.3. Recommendations for praxis

The findings of this study, revealing the limited influence of homeownership rates on the development time of housing projects in the Netherlands, lead to several practical recommendations for stakeholders involved in housing development, including policymakers, urban planners, and developers. One of the primary recommendations is to redirect focus from homeownership rates to more impactful factors such as regional policies and project-specific variables. For policymakers, this means prioritizing the refinement of regional development policies and administrative procedures to enhance efficiency in the housing development process. It's essential to streamline permit approvals and construction processes by reducing bureaucratic procedures and simplifying regulatory frameworks. Policymakers should also consider revising zoning laws and regulations to facilitate quicker development processes, especially in areas with acute housing shortages. Urban planners are encouraged to integrate a more nuanced understanding of the factors influencing development times into their planning and decision-making processes. This involves paying closer attention to the scale and complexity of housing projects, and adapting strategies accordingly. Urban planners should collaborate with developers from the early stages of a project to ensure that plans are feasible within the existing regulatory and policy frameworks. This collaboration can help identifying potential bottlenecks early and strategizing on how to overcome them. For developers, the recommendation is to focus on efficient project management, especially for larger-scale developments which are prone to longer timelines. Developers could invest in robust project planning, effective stakeholder management, and acquisition of modern construction technologies and methods that can speed up building processes.

Additionally, there is a need for all stakeholders to engage in dialogue and partnership. This collaborative approach can lead to the identification of shared goals and the development of beneficial solutions that address the challenges in the housing market. Public-private partnerships can be explored as a way to combine resources and expertise, potentially leading to more efficient and effective housing development projects. Another recommendation is for continuous monitoring

and evaluation of housing development processes. This involves collecting and analyzing data on different stages of development to identify patterns and areas for improvement. Such data-driven approaches can inform policy revisions, planning adjustments, and development strategies, leading to more streamlined and efficient development processes.

Finally, there is an opportunity for further research and innovation in the field of housing development. This includes exploring new materials and technologies that can shorten construction times, as well as developing and testing new models of housing development that are more responsive to current market demands and societal needs. The recommendations arising from this study promote a shift in focus towards more impactful factors affecting housing development times. As mentioned before, streamlining policies and processes, enhancing collaboration, adopting data-driven approaches, and encouraging innovation, stakeholders can work towards addressing the housing shortage more effectively and efficiently.

5.4. Reflection on the limits of the study and on further research

Reflecting on the limitations of this study and considering directions for future research is crucial to improving understanding of the dynamics in housing development. This thesis, while comprehensive in its approach, encounters several limitations that provide opportunities for further investigation. One limitation is the geographic scope of the study, confined to three Dutch provinces: Noord-Holland, Zuid-Holland, and Limburg. While these provinces offer diverse urban and rural contexts, they may not fully capture the mixed housing market dynamics of the entire Netherlands. Regional differences in other provinces, with their unique socio-economic and policy landscapes, might give different insights into the relationship between homeownership rates and development times. Future research could expand the geographical reach, incorporating more provinces or even conducting comparative studies with other countries to provide a broader perspective.

Another constraint lies in the reliance on secondary data from provincial housing databases and the Dutch Central Bureau of Statistics. While this data is valuable, it inherently limits the study to existing datasets and their parameters, because it is very hard to capture certain aspects with quantitative research. For instance, certain potentially influential variables, such as the complexity of development plans, concrete stakeholder involvement, and community opposition, were not included in the analysis. These factors could have a substantial impact on development times and deserve exploration in future research. Qualitative methods, such as interviews or case studies, could complement the quantitative approach taken in this thesis, offering deeper insights into the nuanced interplay of various factors influencing housing development. It is also worth mentioning that because this dataset was provided by the provinces and is confidential it is not allowed to share the dataset itself, which could be considered a limitation since it weakens transparency.

Another possible limitation is that the study mainly used Cox Survival Regression analysis, a strong statistical method, but one that might not capture the entire complexity of housing development processes. Future research could explore alternative or supplementary statistical techniques to analyze the data, possibly uncovering new aspects or relationships that didn't come forward in this study. The focus on homeownership rates as the primary independent variable is another area for reflection. While this thesis found minimal influence of homeownership rates on development times, other socio-economic factors, such as income levels, demographic changes, or urbanization trends, might also play crucial roles. Investigating these variables could provide a more comprehensive understanding of what drives housing development times.

The rapidly evolving nature of the housing market, influenced by factors like technological advancements, environmental considerations, and policy changes, suggests that the findings of this study can change with time. Continuous research is needed to keep up with these changes and to understand their implications for housing development. Areas for future research could include the impact of sustainable building practices, the role of digital technologies in streamlining development processes, and the effects of new housing policies and regulations. In conclusion, while this thesis contributes significantly to our understanding of housing development times in the Netherlands, its limitations highlight the need for ongoing and diversified research. Expanding the geographic scope, adding additional variables, employing a mix of qualitative and quantitative methods, exploring alternative statistical techniques, and continuously adapting to market changes are essential steps to deepen our understanding of this complex and dynamic field.

References

Andrews, D., & Sánchez, A. (2011). *Drivers of homeownership rates in selected OECD countries.*

Asendorpf, J., Conner, M., De Fruyt, F., De Houwer, J., Denissen, J., Fiedler, K., . . . Wicherts, J. (2013). Recommendations for increasing replicability in psychology. *European journal of personality, 27*(2), pp. 108-119.

Babińska, M., Chudek, J., Chełmecka, E., Janik, M., Klimek, K., & Owczarek, A. (2015). Limitations of Cox Proportional Hazards Analysis in Mortality Prediction of Patients with Acute Coronary Syndrome. *Studies in logic, Grammar and Rhetoric, 43*(1), pp. 33-48.

Been, V., Madar, J., & McDonnell, S. (2014). Urban Land-Use Regulation: Are Homevoters Overtaking the Growth Machine? *Journal of Empirical Legal Studies*(11), pp. 227-265.

Binnenlands Bestuur. (2022, March 11). *'Een miljoen huizen extra niet haalbaar'*. Retrieved from Binnenlands Bestuur: https://www.binnenlandsbestuur.nl/ruimte-en-milieu/een-miljoen-extra-huizen-tien-jaar-gaat-niet-lukken

Bruning, A., & Siersma, J. (1994). *Grote projecten in Nederland; een analyse van het tijdsbeslag van twintig besluitvormingsprocessen.* Den Haag: Wetenschappelijke Raad voor het Regeringsbeleid.

Butler, S. (1985). *PRIVATIZING FEDERAL SPENDING. A STRATEGY TO ELIMINATE THE DEFICIT.* New York: Universe Books.

Centraal Bureau voor de Statistiek. (2022, June 29). *Woningmarket in coronatijd*. Retrieved from cbs: https://www.cbs.nl/nl-nl/visualisaties/welvaart-in-coronatijd/woningmarkt

Centraal Bureau voor de Statistiek. (N.D.). *Kaart van 100 meter bij 100 meter met statistieken*. Retrieved from Centraal Bureau voor de Statistiek: https://www.cbs.nl/nl-nl/dossier/nederland-regionaal/geografische-data/kaart-van-100-meter-bij-100-meter-met-statistieken#:~:text=In%20deze%20kaart%20met%20vierkanten,en%20nabijheid%20van%20voorzieningen%20samengesteld.

DiPasquale, D., & Glaeser, E. (1999). Incentives and social capital: Are homeowners better citizens? *Journal of Urban Economics, 45*(2), pp. 354-384.

Doodeman, M., Du Saar, N., & Tokmetzis, D. (2022, February 3). *Aanpak woningnood op drijfzand: plannen voor 1,2 miljoen nieuwe woningen gebaseerd op wensdenken*. Retrieved from Follow The Money: https://www.ftm.nl/artikelen/dev-plancapaciteit?&utm_source=nieuwsbrief&utm_medium=persbericht&utm_campaign=WoningnoodDrijfzand

Erik Bradley, P., & Kohler, N. (2007). Methodology for the survival analysis of urban building stocks. *Building Research & Information, 35*(5), pp. 529-542.

Fischel, W. (2001). *The homevoter hypothesis: How home values influence local government taxation, school finance, and land-use policies.* Cambridge, MA: Harvard University Press.

Fitzmaurice, G., Davidian, M., Verbeke, G., & Molenberghs, G. (2008). *Longitudinal data analysis.* Boca Raton: CRC press.

Fox, J., & Weisberg, S. (2002). Cox proportional-hazards regression for survival data. *An R and S-PLUS companion to applied regression, 2002*.

Frank, K. (2000). Impact of a confounding variable on a regression coefficient. *Sociological Methods & Research, 29*(2), pp. 147-194.

Glaeser, E. (2005). Reinventing Boston: 1630-2003. *Journal of Economic Geography, 5*(2), pp. 119-153.

Glaeser, E. (2011). *Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier.* New York: Penguin Books.

Glaeser, E., & Gyourko, J. (2003). The Impact of Building Restrictions on Housing Affordability. *FRB New York - Economic Policy Review*, pp. 21-39.

Glaeser, E., & Ward, B. (2009). The causes and consequences of land use regulation: Evidence from Greater Boston. *Journal of urban Economics, 65*(3), pp. 265-278.

Goodman, S. (1999, June 15). Toward Evidence-Based Medical Statistics. 1: The P Value Fallacy. *ACP Journals*.

Grevenbock, N., Ludwig, A., & Siassi, N. (2023, September 25). Homeownership rates, housing policies, and co-residence decisions. *Macroeconomic Dynamics, 26*(8).

Groenemeijer, L. (2021, June 17). *Het statistisch woningtekort nader uitgelegd*. Retrieved from abfresearch: https://abfresearch.nl/publicaties/het-statistisch-woningtekort-nader-uitgelegd/

Groenemeijer, L., & Gopal, K. (2022, September 19). *Rapportage Primos Prognose 2022 beschikbaar.* Delft: ABF Research. Retrieved from abfresearch: https://abfresearch.nl/2022/09/20/rapportage-primos-prognose-2022/

Groenemeijer, L., & Van der Lelij, M. (2020). *Inventarisatie Plancapaciteit April 2020.* Delft: ABF Research.

Guba, E., & Lincoln, Y. (1994). Competing paradigms in qualitative research. *Handbook of qualitative research, 2*(163-194), p. 105.

Gyourko, J., & Molloy, R. (2015). Regulation and housing supply. *Handbook or regional and urban economics*(5), pp. 1289-1337.

Gyourko, J., Saiz, A., & Summers, A. (2008). A new measure of the local regulatory environment for housing markets: The Wharton Residential Land Use Regulatory Index. *Urban studies, 45*(3), pp. 693-729.

Haffner, M., & Boumeester, H. (2015). Housing affordability in the Netherlands: The impact of rent and energy costs. *Journal of Housing and the Built Environment, 30*, pp. 293-312.

Herdt, T., & Jonkman, A. (2022). *Spatial justice and the NIMBY effect: An analysis of the urban densification debate in Switzerland and the Netherlands.*

Hilber, C., & Robert-Nicoud, F. (2013). On the origins of land use regulations: Theory and evidence from US metro areas. *Journal of Urban Economics, 75*, pp. 29-43.

Hochstenbach, C., & Ronald, R. (2020). The unlikely revival of private renting in Amsterdam: Re-regulating a regulated housing market. *Environment and Planning A: Economy and Space, 52*(8), pp. 1622-1642.

Jager, K., Van Dijk, P., Zoccali, C., & Dekker, F. (2008). The analysis of survival data: the Kaplan–Meier method. *Kidney international, 74*(5), pp. 560-565.

Jokovi, J., Boon, C., & Filius, F. (2006). *Woningproductie ten tijde van Vinex.* Rotterdam/Den Haag: NAi Uitgevers/RPB.

Kraniotis, L. (2021, February 17). *Schreeuwend tekort aan woningen, wat moet eraan gedaan worden?* Retrieved from NOS: https://nos.nl/artikel/2369109-schreeuwend-tekort-aan-woningen-wat-moet-eraan-gedaan-worden

Lakschmi, S., & Mohideen, M. (2013). Issues in reliability and validity of research. *International journal of management research and reviews, 3*(4), pp. 2752-2758.

Mallach, A. (2016, August 23). Homeownership and the Stability of Middle Neighborhoods. *Community Development Innovation Review*.

Manturuk, K., Lindblad, M., & Quercia, R. (2012). Homeownership and civic engagement in low-income urban neighborhoods: A longitudinal analysis. *Urban Affairs Review, 48*(5), pp. 731-760.

McAllister, P., Street, E., & Wyatt, P. (2016, February 1). An empirical investigation of stalled residential sites in England. *Planning Practice & Research*, pp. 132-153.

Michielsen, T., Groot, S., & Veenstra, J. (2019). *Het bouwproces van nieuwe woningen: Een kwalitatieve economische blik.* Den Haag: Centraal Planbureau.

Molotch, H. (1976). The City as a Growth Machine: Toward a Political Economy of Place. *American journal of sociology, 82*(2), pp. 309-332.

Mulder, A., Van de Kassteele, J., Heederik, D., Pijnacker, R., Mughini-Gras, L., & Franz, E. (2020). Spatial effects of livestock farming on human infections with shiga toxin-producing escherichia coli o157 in small but densely populated regions: the case of the netherlands. *GeoHealth, 4*(11).

Needham, B. (2016). *Dutch land-use planning: The principles and the practice.* London: Routledge.

Ollongren, K. (2018). *Integrale visie op de woningmarkt.* Den Haag: Tweede Kamer.

Osborne, J. (2008). Bringing balance and technical accuracy to reporting odds ratios and the results of logistic regression analyses. *Best practices in quantitative methods, 11*(11), pp. 385-389.

Park, Y., Konge, L., & Antino, A. (2020). The positivism paradigm of research. *Academic Medicine, 95*(5), pp. 690-694.

Perin, C. (2014). *Everything in its place: Social order and land use in America.* Princeton, NJ: Princeton University Press.

Ploegmakers, H., Van der Krabben, E., & Rouwendaal, J. (2022, December). Van definitief bestemmingsplan naar bouwvergunning. *Real Estate Research Quarterly*, pp. 1-22.

Pourhoseingholi, M., Baghestani, A., & Vahedi, M. (2012). How to control confounding effects by statistical analysis. *Gastroenterology and hepatology from bed to bench, 5*(2), pp. 79-83.

Priemus, H. (1998). Contradictions between Dutch housing policy and spatial planning. *Tijdschrift voor Economische en Sociale Geografie, 89*(1), pp. 31-43.

Rakoff, R. (1977). Ideology in everyday life: the meaning of the house. *Politics & Society, 7*(1), pp. 85-104.

Riley, S. (2012). Land use regulations and the returns to low-income homeownership. *The Annals of regional science, 49*, pp. 745-766.

Roberts, P., & Priest, H. (2006). Reliability and validity in research. *Nursing standard, 20*(44), pp. 41-46.

Rohe, W., & Stegman, M. (1994). The impact of home ownership on the social and political involvement of low-income people. *Urban Affairs Quarterly, 30*(1), pp. 152-172.

Rohe, W., & Stewart, L. (1996). Homeownership and neighborhood stability. *Housing policy debate, 7*(1), pp. 37-81.

Rosen, H. (1985). Housing subsidies: Effects on housing decisions, efficiency, and equity. *Handbook of public economics, 1*, pp. 375-420.

Sainani, K. (2014). Explanatory versus predictive modeling. *PM&R, 6*(9), pp. 841-844.

Samawi, H., Yu, L., & Yin, J. (2023, April 26). On Cox proportional hazards model performance under different sampling schemes. *PLOS ONE, 18*(4).

Santolini, M., Ellinas, C., & Nicolaides, C. (2021). Uncovering the fragility of large-scale engineering projects. *EPJ Data Science, 10*(36).

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students* (5 ed.). Essex: Pearson Education Ltd.

Schuetz, J. (2022, November 21). Are new housing policy reforms working? We need better research to find out. *Brookings*.

Seebauer, S. (2021). How to make building renovation work for low-income renters: Preferences for distributional principles and procedural options in Austria. *Energy Research & Social Science, 82*.

Slack, M., & Draugalis Jr., J. (2001). Establishing the internal and external validity of experimental studies. *American journal of health-system pharmacy, 58*(22), pp. 2173-2181.

Smit, L., & Heederik, D. (2017). Impacts of intensive livestock production on human health in densely populated regions. *GeoHealth, 1*(7), pp. 272-277.

Sorensen, A. (2017). New Institutionalism and Planning Theory. In M. Gunder, A. Madanipour, & V. Watson, *The Routledge Handbook of Planning Theory* (1 ed., pp. 250-263). New York: Routledge.

Stec Groep. (2021, October 4). *COVID-19: Invloed op woningmarkt beperkt – marktupdate najaar 2021*. Retrieved from stec: https://stec.nl/covid-19-en-de-woningmarkt-marktupdate-najaar-2021/

Tweede Kamer. (2021, June 3). *Wonen en het coronavirus*. Retrieved from tweedekamer: https://www.tweedekamer.nl/debat_en_vergadering/uitgelicht/wonen-en-het-coronavirus

Van Kempen, R., & Wassenberg, F. (2019). New institutionalism and urban governance: The case of Dutch urban development corporations. *Urban Studies, 56*(13), pp. 2752-2769.

Van Loon, J., & Aalbers, M. (2017). How real estate became 'just another asset class': The financialization of the investment strategies of Dutch institutional investors. *European Planning Studies, 25*(2), pp. 221-240.

Van Thiel, S. (2014). *Research methods in public administration and public management: An introduction.* New York: Routledge.

Vermeulen, W., & Rouwendaal, J. (2007, July 31). Housing Supply and Land Use Regulation in the Netherlands. *Tinbergen Institute Discussion Paper*(07-58/3).

Wagenmakers, E., Wetzels, R., Borsboom, D., Van der Maas, H., & Kievit, R. (2012). An agenda for purely confirmatory research. *Perspectives on psychological science, 7*(6), pp. 632-638.

Zhao, L., Mbachu, J., Liu, Z., Zhao, X., & Wang, B. (2021, August 20). Investigating the Causal Relationships between Project Complexities and Project Cost: An Empirical Study from New Zealand. *Advances in Civil Engineering*.