The relationship between starter loans and house price developments: a panel data analysis

Weerd, Jurrian van der

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Author:	Jurrian van der Weerd
Supervisor:	Dr. M. van Lent
Student number:	S2016990
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Abstract

According to '*De Nederlandsche Bank*' (DNB), central bank of The Netherlands, overheating in the Dutch housing market is partly caused by policy measures that increase the financing capacity of households. Starter loans increase the financing capacity of starters with the aim of making a first owner-occupied home more feasible for starters. Literature on credit and house prices argues that an increase in the total credit volume results in an increase of house prices. Since starter loans increase the financing possibilities of starters by providing credit, it is expected that starter loans will result in an additional price increase of house prices. The relationship between starter loans and house prices is studied by means of a panel data regression with municipality and time-fixed effects. The results in this thesis show that there is a relationship between starter loans and house prices. The estimated effects of starter loans show a negative and positive effect on house prices. Which makes it insufficiently clear whether starter loans lead to an increase in house prices or not.

Content

I. Introduction

Buying a house is becoming increasingly complicated for certain groups of individuals in the Netherlands, such as young adults (Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 2022a; Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 2022b, pp. 13-17). According to '*De Nederlandsche Bank*' (DNB) the Dutch housing market is overheated (DNB, n.d.-a). The overheating of the Dutch housing market culminates in considerable house price increases. House prices in November 2021 increased by approximately 20% compared with November 2020 (CBS, 2022c). The increase in house prices is extraordinarily significant compared to an average house price increase of about 6% per year in the years before 2021 (CBS, n.d.). Overheatiang of the Dutch housing market is caused by a housing shortage, low mortgage interest rates, tax benefits and generous lending standards that positively influence homeowners (DNB, n.d.-a; EC, 2021; IMF, 2021). Several policy measures underlie the determinants of the overheated housing market. The mortgage interest deduction in The Netherlands is an example of a tax incentive for homeowners. Such a measure means that owning an owner-occupied home is fiscally advantageous. The mortgage interest deduction culminates in a higher demand for housing, resulting in a higher rise in house prices. It has been estimated that phasing out the mortgage interest deduction will lead to a 15% decrease in the increase of house prices (CPB, 2020). The CPB argues that local authorities limit the availability of housing locations for reasons of spatial quality and other social objectives. This implies that other policy priorities will result in a limited increase of new houses (CPB, 2019). Both policies contributes to the overheating of the Dutch housing market, because of an increase in demand and limitations in the supply of new houses.

Another potential explanation for the overheating of the Dutch housing market lies in policy measures that increase the financing capacity of households (DNB, n.d.-a). DNB (n.d.-b) argues that the financing capacities of households lead to higher house prices – because of a high degree of correlation between financing capacities and house prices. Starter loans is a policy measure which increases the financing capacity of households whom receive a starter loan (SVn, 2019a; SVn, 2021 SVn, d. -b). The starter loan is a special mortgage loan, that is taken out in addition to a regular mortgage, to finance a first home for first-time house buyers (SVn, n.d.-a). The purpose of a starter loan is to bridge the gap between the financing capacity of households that purchase a house for the first time, and the price of a house. With a starter loan, the purchase of a first home should be more feasible for first-time buyers (Van der, 2022). Anecdotal evidence indicates that starter loans resulted in an improved feasibility for first-time buyers to buy their first owner-occupied house (RTL Nieuws, 2020; SVn, 2019b).

Despite the indication that starter loans have contributed to a higher degree of accessibility of a first house for first-time buyers, it is plausible that starter loans also contains a negative external effect. Starter loans are increasing the financing capabilities of starters by granting additional credit, the additional credit could contribute to an additional increase of house prices (Adelino *et al.*, 2012). Potential increases of house prices caused by starters loans can be identified as a potential negative external effect. The central question in this thesis is what the effect is of starter loans on house prices in Dutch municipalities in the period 2012 to 2021. The Economic Institute for Construction (EIB) already researched the central question in

this thesis. The EIB researched the effect of starter loans on house prices with a hedonic price analysis. Based on the hedonic price analysis, the EIB concludes that the presence of starter loans has led to an increase in housing transactions, construction of houses and employment (EIB, 2014, p. 29). The EIB argues that an increase in demand also leads to an increase in the supply of housing. Possible price developments, resulting from increasing demand for housing, are dampened by an increase in supply, in other words: the price increases of starter loans are limited according to the EIB (EIB, 2014, p. 8). However, this is a theoretical claim, as an actual effect between starter loans and house prices has not been empirically investigated. Which implies the essence of a study to investigate the actual relationship between starter loans and house prices.

Several academic studies have examined the effect of credit on house prices. Based on academic studies on the relationship between credit and house prices, it appears that there is a relationship between credit size and the development of house prices (Adelino et al., 2012; Fitzpatrick & McQueen, 2007; Gimeno & Martínez-Carrascal, 2010; Goodhart & Hoffmann, 2008). Increases in the total outstanding credit, culminates in an increase of house prices. Which implies that credit volume has a price-increasing effect on house prices. The theory of monetarism argues that an increase in the money supply caused by lending results in changing asset valuations (Kaldor, 1970; Metzer, 1995). The value of a house can change due to an increase in the money supply caused by additional lending. Based on the academic literature and the economic theory of monetarism, starter loans are expected to result in an increase of house prices.

A panel data regression model with municipality and time-fixed effects is modeled in this thesis. Adding municipality fixed effects ensures that factors that differ per municipality, but which are constant over time, are controlled for. Time-fixed effects control for factors that are the same for all municipalities, but differ over time. Based on the constructed econometric model, it is being studied whether starter loans, during the period 2012–2021 have influenced the development of house prices in Dutch municipalities. During this period, different municipalities implemented a starter loan at different points in time. Therefore, a more accurate estimation of the effect of starter loans on house prices could be estimated. To control for the robustness of the estimated effects, the constructed model is also regressed into three subsamples based on population size per municipality.

The main finding of the panel data regression model is the indication of a small negative statistically significant effect of starter loans on house prices when municipality and time-fixed effects and confounding variables were included. The foregoing implies that starter loans result in the reduction of house prices. However, the estimated effect of starter loans on house prices is statistically significant at a low significance level, namely 0.1, and has a small standard error. An alternative interpretation of the estimated coefficient is the absence of empirical evidence of a price-increasing effect of starter loans on house prices – given the low level of significance and low standard error. In the robustness checks, starter loans only result in higher house prices in middle-sized municipalities and not in small and large municipalities. However, the level of significance of the estimated coefficient of starter loans is also low and has a low standard error.

In the remainder of this thesis, a theoretical framework will be constructed. The theoretical framework discusses the literature review, characteristics of the starter loan, developments of starter loans, the relation between starter loans and house price and other relevant municipal policy developments. After that, the data and methodology section discusses the operationalization and description of the variables. The econometric approach will also be discussed in the data and methodology section. The results of the performed panel data regression will be analysed in the result section. The estimated coefficients will be further analysed in the discussion section. This thesis ends with a conclusion.

II. Theoretical framework

II.I Literature review

II.I.I Credit and house prices

The economic theory of monetarism theorizes that there is only a causal relationship between credit and house prices and not vice versa. Monetarism theory denotes the urgency of the stability of the money supply to ensure stable economic growth, and thus price developments. The increase of the money supply should be limited by means of monetary policy measures (Kaldor, 1970, pp. 2-3). Monetarists theorize that relative changes in the money supply relative to the stocks of domestic and foreign possessions create a new equilibrium. These changes also lead to relative changes between the marginal utility of money, the marginal utility of domestic and foreign assets, and the marginal utility of consumption. Rational agents try to return to the old equilibrium. Rational agents alter their consumption and investment portfolio choices to re-establish the ratios between marginal utility from money and domestic and foreign assets from the previous equilibrium. These operations result in price changes resulting from changes in consumption and investment strategies (Metzer, 1995, p. 52). The foregoing implies that an increase in money supply, generated by an increase in credit, leads to increasing asset prices – e.g. house prices (Goodhart & Hofmann, 2008, p. 181).

Literature related to credit shows that it is plausible that the size of credit, access to credit, and costs arising from credit influence the long and short term development of house prices (Adelino et al., 2012; Carrington & Madsen, 2011; Fitzpatrick & McQuin, 2007; Gerlach & Peng, 2005; Goodhart & Hofmann, 2008). The intuition about the relationship between access to credit and house prices is that more lending results in more demand for houses—which causes house prices to increase. However, the relationship between credit size and house prices may be endogenous (Fitzpatrick & McQueen, 2007, p. 84). On the one hand, the intuition is that larger loans lead to higher bids, resulting in higher house prices. On the other hand, higher house prices can lead to households needing larger mortgages to finance a home (Fitzpatrick & McQueen, 2007, p. 84; Goodhart & Hofmann, 2008, pp. 181-182). The empirical evidence indicates an endogenous relationship between credit and house prices. However, country-specific effects indicate different relations between credit and house prices in different countries. Implying that the direction and magnitude of the relation between credit and house prices could differ depending on contextual factors.

Fitzpatrick and McQuin (2007) studied the effect of credit on the increase of real estate prices in Ireland between 1996 and 2002. Simultaneously with the increase in real estate prices, the total outstanding loans related to real estate also increased (Fitzpatrick & McQuin, 2007, p. 82). To determine the direction of causality between credit and house prices, both credit and house prices are used as independent and dependent variables (Fitzpatrick & McQuin, 2007). The average size of new loans had a greater effect on the increase of house prices than house prices on the average size of new loans in long-term models (Fitzpatrick & McQuin, 2007, p. 94). In the short term, only the increase in credit size has a positive and significant effect on house prices, and house prices have no significant effect on credit size (Fitzpatrick & McQuin, 2007, pp. 97-99).

Gimeno and Martínez-Carrascal (2010) estimate a vector error-correction model to explain the relationship between credit developments and house prices in Spain. During the 1990s and mid-2000s, Spain endured a similar development in credit and property prices as in Ireland – given the surge in credit and house prices (Gimeno & Martínez-Carrascal, 2010, p. 1850). Empirical evidence shows that credit size is significantly influenced by long-term house prices. When it turns out that the expected credit aggregate deviates from its expected value, based on the long-term determinants, this not only influences developments in credit size, but also house prices (Gimeno & Martínez-Carrascal, 2010, pp. 1854-1855).

However, a study from Hong Kong conducted by Gerlach and Peng (2005) found an inverse relationship between credit and house prices, namely: house prices influence credit size and not vice versa (Gerlach & Peng, 2005). The strong correlation between credit and house prices therefore seems to arise from the fact that the size of credit adjusts to changes in real estate prices (Gerlach & Peng, 2005, p. 479). According to Gerlach and Peng (2005, p. 479), this one-dimensional relationship between house prices and credit size means that there is most likely no exogenous relationship or that there is a weak exogenous relationship between house prices and credit size.

Goodhart and Hofmann (2008) study the observed coincidence between house prices and monetary variables such as monetary policy, economic cycles, and the size of outstanding loans. They show that money size and the increase in outstanding loans are related to an increase in house prices and that the increase in the amount of total outstanding loans influences, among other things, the increase in house prices in a booming housing market (Goodhart & Hofmann, 2008). Carrington and Madsen (2011) endorse the relationship between credit and house prices. Carrington and Madson (2011, p. 538) argue that credit plays a fundamental role in house price fluctuations in a long-term model. The willingness of banks to provide credit, thereby indirectly determining the total amount of credit, can explain a large part of the house price fluctuations from 1995 to 2007 inclusive.

Previous literature review can be summarized as that the relationship between credit and house prices shows a causal relationship. The extent and direction of this causal relationship is not entirely clear or differs per case histories arising from specific environmental factors. Based on the theoretical perspective of monetarism, a one-dimensional relationship between money size and house prices is expected. An increase in the amount of money due to an increasing amount of credit or credit results in a larger money supply, resulting in an increase in house

prices—among other changes in asset value. However, empirical evidence makes it plausible that the relationship between credit and house prices is endogenous. The studies by Fitzpatrick and McQuin (2007) and Gimeno and Martínez-Carrascal (2010) based on empirical evidence that both credit and house prices influence each other – suggesting an endogenous relationship. However, Gerlach and Peng (2005) find a relationship of credit on house prices.

II.I.II Broader context house price determinants

Affordability of housing is related to household income and is plausibly an important factor which determines house prices (Annett, 2005; Meen, 2002). The importance of income as an important determinant is underlined by multiple studies which find that real income or GDP per capita is a fundamental determinant of house prices (Égert and Mihaljek, 2007; Girouardi et al., 2006; Holly & Jones, 1997). The total demand for housing is influenced by an individual's income, among other factors. An individual's transitory income is related to an individual's consumption related to housing (Henderson & Ioannides, 1987). Another related study includes both transitory and permanent income and finds that permanent income is the primary factor which influences housing location and quality choice (Turner & Struyk, 1984). Meen (2002) argues that income and the income elasticity of house prices influence house prices. Depending on the income elasticity of house prices and other factors, such as downpayment ratio, house prices rise when household income increases and the income elasticity of house prices approaches full inelasticity (Meen, 2002, pp. 18-19). The magnitude of this relationship depends on the income elasticity (Meen, 2002). The development of income influences the development of house prices. Periods of rapid income development appear to be accompanied by rapid house price developments in the same period. Nevertheless, an increase in income cannot explain the entire increase in house prices, which makes it plausible that other factors also influence the development of house prices. (McCarthy & Peach, 2004, pp. 10-11). This development indicates that an increase in income leads to higher house prices – albeit that the development of income on house prices can differ per region (McCarthy & Peach, 2004, p. 12). In a study by Holly and Jones (1997) they found that real income was the single most important determinant of real house prices (Holly & Jones, 1997, p. 563). It is also to be expected that the relationship between (disposable) income and mortgage size will also lead to an increase in house prices (McQuin, 2007, p. 95). The ratio of how much a household can borrow based on a household's income is called the loan-to-income (LTI) ratio. The LTI ratio in Ireland averaged 1.68 between 1980 and 1998 and had increased to 2.06 in the third quarter of 2001. McQuin (2007) simulates how house prices would have developed if the LTI ratio would remain 1.83, which was the LTI in 1996, and would not rise to 2.06. Based on the simulation results, it appears that if the LTI ratio remained at 1.83, house prices would be 13% lower in the fourth quarter of 2001 (McQuin, 2007, pp. 95-96). An increase in the amount of mortgage that can be withdrawn leads to higher house prices.

It can also be assumed that immigration influences the development of house prices (Bocian et al., 2008; Myers, 2004). Ethnicity appears to influence the interest costs related to the mortgage loan. In the United States of America, African Americans and Latinos appear to

be more likely to receive mortgage loans with higher interest rates than white Americans (Bocian et al. 2008, p. 121). When credits with higher interest rates are reinforced, this results in lower borrowings. The foregoing implies that by taking out lower loans, municipalities with more inhabitants with a migration background can take out lower mortgages, so that house prices rise less sharply. Empirical evidence shows a possible link between the influx of migrants into a neighbourhood and house prices. When migrants settle in a neighbourhood, house prices fall. This effect is greater in neighbourhoods where mainly natives live than in neighbourhoods where many individuals with a migration background already live (Myers, 2004, p. 297).

Supply constraints related to new-build homes influence house prices through the price elasticity of supply (Glaeser et al., 2008; Hilber & Vermeulen, 2016; Paciorek, 2013). Such supply constraints negatively affect the price elasticity of supply. It culminates in lower price elasticity in areas with many restrictions than in areas with few restrictions (Paciorek, 2016). When changes in demand occur and the price elasticity is low, house prices increase due to the limited response of supply to demand (Hilber & Vermeulen, 2016; Paciorek, 2013). Regulation may be a supply constraint (Glaeser et al., 2008; Hilber & Vermeulen, 2016; Paciorek, 2013). Hilber and Vermeulen (2016, p. 359) find that in England the English plan system is an important causal factor behind the housing crisis. Glaeser et al., (2008) show that areas with a lot of regulation have a lower price elasticity of supply. Geographical characteristics can influence the supply of available building land (Paciorek, 2013). Based on the above, it is deduced that the absence of supply constraints results in improved price elasticity. When the supply of housing can adequately respond to an increase in demand for housing, the price increase of housing is reduced. This implies that an increase in the number of dwellings leads to lower house prices in a situation where there is more demand for than supply of dwellings. This deduction finds empirical support in the article by Hilber and Vermeulen (2016).

II.II Starter loans

II.II.I Background starter loans

Municipalities offer starter loans to improve the position of starters in the housing market. The law under which municipalities have the ability to offer such an arrangement is regulated by the ‘Gemeente Wet’ (Municipalities Act). On the basis of Articles 147 and 149 of the Municipalities Act, municipalities have the ability to draw up local ordinances. On the basis of these rights granted by law, a significant number of municipalities have established starter loans in local ordinances (MBE, 2015; MBE, 2020). The notion of starter loans is that starter loans try to bridge the difference between the financing capacity of first-time buyer households and house prices (SVn, n.d.-a; Van der Erst, 2022). Therefore, starter loans should make an owner-occupied home more feasible for first-time buyers. This financing is additional to a regular mortgage loan but is not the same as a starter mortgage, which is a regular mortgage loan with a longer term but lower monthly payments (Startershypotheek, n.d.). Since the starter loan is a

framework regulation, municipalities have their own authority to determine the nature of the conditions regarding the starter loan (Rijksoverheid, 2003). However, municipalities must set conditions on the following subjects: definition of target group(s); housing category (existing, new construction, project-based); open to corporate ownership; whether additional work costs may be included or not; maximum purchase price of a home; maximum amount of a starter loan; stacking purchase instruments is not allowed; any age limit; and (annual) budget (SVn, n.d.-c). Such conditions can change over time due to institutional changes, such as: changing composition of the municipal executive or cabinet changes, or other relevant causes (Gemeente Dinkelland, 2013, Gemeente Dinkelland, 2018; Gemeente Dinkelland, 2021). The aforementioned facets are defined in local regulations resulting in the demarcation of starter loans per municipality, which implies that these can differ per municipality. Based on a sample of Dutch municipalities that offer starter loans, the amount of a starter loan and the amount of the maximum purchase price for houses mainly differs between municipalities.

In collaboration with the '*Stimuleringsfonds Volkshuisvesting Nederland*' (SVn), municipalities offer starter loans (SVn, n.d.-c). The SVn was established in 1996 and provides financing products on behalf of cooperation partners – municipalities, provinces, corporations, the government (SVn, 2019, p. 32). When actors work together with the SVn, the relevant cooperation partner opens a 'Starter Fund' in which the cooperation partner deposits the budget that they have made available for the starter loan. The SVn provides starter loans for the cooperation partner as long as the joint fund, between the SVn and the cooperation partner, is sufficient for this (SVn, 2019, p. 32). The government grant ended in 2015, making the relevant cooperation partner fully responsible for financing their starter loan (SVn, 2018). Households that try to acquire a starter loan must submit an application for this to the relevant municipality where a starter loan is offered. The municipality assesses whether the applicant meets their conditions and issues an allocation letter, provided the applicants meet the municipal conditions. After that, the applicant can submit the application (online) to the SVn and submit the necessary documents (online). If the application is complete and approved, the SVn will check the application against the conditions of the municipality and SVn. The SVn sets conditions regarding the following subjects: joint and several liability; loan amount and term; interest and interest rate; payment of principal and interest; interest on additional deposits; settlement; late payments; positive/negative mortgage statement; third-party mortgage; additional securities; costs for debtor; collateral; insurances; interim valuations; rent costs; pledge of rights; payable; to be in default; public sale; continuation/deletion of mortgage right; cancellation; duty of care of SVn and debtor; legal person provisions; balance statement and notification; unilateral changes; consequences nullity; and special government regulations (SVn, 2019).

When the applicant meets the conditions set, they will receive an offer for the starter loan from the SVn. If the applicant approves the quote, they must upload it online after approval and then apply for regular mortgage financing. The applicant also puts the quotation for the regular mortgage in the online environment of SVn. After receipt of both offers, SVn prepares the documents and sends them to the notary of the applicant, where the notary prepares a settlement note. After receipt of the settlement note, the SVn ensures that the starter loan is transferred to the notary, after which the applicant can complete the deed (SVn, n.d.-d). Starter

loans serve the purpose of improving the position of first-time buyers in the housing market by providing additional financing in addition to regular mortgage financing (SVn, 2019; SVn, n.d.-a; Van der Erst, 2022).

II.II.II Developments starter loans

Starters loan changed over time related to the amount of the starters loan, the number of starters loans granted and other factors. This section discusses several developments of the starter loan.

The maximum amount of a starter loan is determined in a local regulation of a municipality (SVn, 2019). Whereas the average maximum amount of starter loans before 2015 was about € 44,000, after 2015 the average had been reduced to an average of approximately € 31,000. When individuals are granted a starters loan, the starters loan is complementary to a regular mortgage loan. Mortgage lenders do not deduct from the amount of mortgage credit to be taken out if the individual has also been granted a starter loan. When individuals are granted a starters loan, the starters loan is complementary to a regular mortgage loan. Mortgage lenders do not deduct from the amount of mortgage credit to be taken out if the individual has also been granted a Starter Loan. However, starters loans can often only be applied for homes if the house price is below the NHG threshold (SVn, 2019). The NHG limit is a cost limit for homes. If households remain below this cost limit, they are assured of an affordable and responsible mortgage through the National Mortgage Guarantee (NHG). In addition, the NHG waives any residual debt if households have to sell their own home but are left with a residual debt with the lender after the sale (NHG, n.d.-a). When first-time buyers receive a starter loan, the loan received must be sufficient to bridge the difference between the original financing capacity of first-time house buyers (mortgage loan and equity) and the price of a house.

Based on the '*Monitor Koopwoningmarkt*', which is a quarterly report about the Dutch housing market, it can be established that the amount of starter loans granted has changed considerably in the period 2010 to 2017. In 2010, approximately 65% of the granted starter loans had a credit size of above € 30,000. In 2017 this had decreased till approximately 20% (OTB, 2018, p. 14). Municipalities seem to provide fewer large starter loans to first-time buyers in 2017 than in 2010. There could be several reasons for this. The termination of the government subsidy in 2015 could have resulted in the size of the starter loan being lower in 2017 than in 2010 or municipalities did not consider it important to grant large starter loans given the situation on the housing market at the time, or other factors culminated in the decrease in the amount of the starter loans (SVn, 2018).

The number of applications for and granted starter loans developed negatively in the period 2012 to 2019 (OTB, 2018; MBE, 2021, p. 20). In 2014, a total of approximately 2,100 starter loans were applied for per quarter (MBE, 2015, p. 11). However, the total number of applications per quarter decreased in 2019 to approximately 650-750 applications per quarter. The number of applications granted follows the trend of the number of applications with a slight delay. The number of granted applications in 2014 was approximately 1800-1900 per quarter at the national level (MBE, 2015, p. 11). By 2019, this had fallen to approximately 600-700 starter loans granted per quarter at the national level (MBE, 2021, p. 20). The reduction in the

number of applied for and granted starter loans implies that fewer homes were purchased in 2019 that were partly financed with a starter loan compared to 2014. After all, the number of requested and granted starter loans in 2019 decreased by approximately 1350/1450 per quarter in total compared to 2014 (MBE, 2021, p. 20).

During the period 2012 to 2019, the number of applications for and granted starter loans decreased (MBE, 2021, p. 20). In 2014, approximately 2100 starter loans were applied for per quarter nationally (MBE, 2015, p. 11). However, the number of applications per quarter at the national level has decreased to approximately 650-750 applications per quarter in 2019. The number of applications granted follows the trend of the number of applications with a slight delay. The total number of granted applications in 2014 was approximately 1800-1900 per quarter (MBE, 2015, p. 11). By 2019, this had fallen to approximately 600-700 starter loans in total which were granted per quarter (MBE, 2021, p. 20). The reduction in the number of applied for and granted starter loans implies that fewer homes were purchased in 2019 that were partly financed with a starter loan compared to 2014. After all, the number of requested and granted starter loans in 2019 decreased by approximately 1350/1450 in total per quarter compared to 2014 (MBE, 2021, p. 20).

The reduction in the number of applications and granted starter loans can be explained by a number of developments. Municipalities can set a maximum purchase price for owner-occupied homes – usually limited to house prices equal to the NHG-limit. First-time buyers may receive a starter loan if they try to buy a home up to this limit (SVn, 2021; SVn, n.d.-c). However, house prices rose by 34.8% in the period 2015 to 2019 (Statistics Netherlands, 2022a). Due to increased house prices, the number of available homes in the cheap and mid-price segment, homes that often fall within the set maximum purchase price for owner-occupied homes, has decreased (MBE, 2021, p. 20). The foregoing culminates in a decreased demand for starter loans due to a scarcer supply of suitable owner-occupied homes. In order to be entitled to a starter loan, the purchase price of the desired home must not exceed the NHG-limit. The maximum owner-occupied house price to be entitled to an NHG-mortgage was increased in the period 2017 to 2019 from € 245,000 in 2017 to € 290,000 in 2019 (MBE, 2021, p. 21). The average sales price of houses was in 2017 € 263,295 and € 307,978 in 2019 (CBS, 2022a). In both 2017 and 2019, the average selling and selling prices were above the NHG limit to be entitled to an NHG mortgage. Previous development indicates that due to developments in house prices, house prices are above the NHG limit and starters are not entitled to a starter loan, which can contribute to a lower application and granting of starter loans. In addition, fewer municipalities offer a starter loan in 2019 compared to 2014. In 2014, approximately 260 municipalities offered a starter loan and in 2019 this was approximately 246 (MBE, 2015, p. 11; MBE, 2021, p. 20). A declining supply of starter loans can also translate into a lower application for starter loans, which culminates in a situation in which fewer homes are partly financed by a starter loan.

The offer of starter loans by municipalities decreased. In 2015, approximately 260 municipalities offered a starter loan and in 2018 234 (MBE, 2018; OTB, 2015). This is a decrease of 10% compared to 2015. The municipality of Dordrecht stated that the starter loan would be terminated when the contribution from the central government would be stopped –

which happened in 2015 (SVn, 2018). The foregoing can be a motivation for several municipalities to terminate starter loans. Given the housing market situation of 2015-2018, house prices were lower than they are today. For the municipality of Dordrecht, for example, low house prices was also an argument to stop offering starter loans (SVn, 2018). Despite the fact that the previous arguments are based on anecdotal evidence, it provides insight into the potential motivations of municipalities to no longer offer starter loans.

II.III Theoretical framework starter loans and house prices

Based on the literature and theory, it is plausible that there is a relationship between starter loans and house prices. Starter loans provide additional financing in addition to regular mortgage financing for starters in order to increase the feasibility of purchasing a house. However, starter loans can only be granted if the price of the house for which a starter loan is requested, is lower than the maximum house price defined in the local ordinance of the municipality that offers a starter loan. The number of houses for which a starter loan can be granted for is therefore limited – indicating that the price effect can be limited. Nevertheless, it is plausible that the effect of starter loans continues on house prices whose house price is higher than the maximum defined house price in the local ordinance. It can be theorized that starter loans will allow more households to offer a higher amount for a home - leading to an increase in the total credit volume. Households that sell a home can potentially receive a higher price for their homes. The financing capacity of households that have sold their homes will be increased. This also allows them to offer a higher price for their desired homes. The foregoing reasoning makes it plausible that starter loans affect house prices of houses for which no starter loan can be applied for.

From monetarism perspective it can be argued that starter loans results in an increase of house prices. Additional financing arising from the starter loan leads to a change in the money supply – as lending leads to money creation (Boonstra, 2021). Households alter their consumption and asset portfolio choices when there is an increase in the money supply. Households try to recreate the old equilibrium between money supply, consumption, and domestic and foreign possessions in order to derive the same amount of utility from their choices as in the old equilibrium. Actors therefore make different choices regarding their consumption and asset portfolio, which leads to price changes. Due to an increase in the money supply, arising from starter loans, house prices can change due to changing choices of households related to their consumption and asset portfolio choices.

In general, the literature provides sufficient indication that there is a relationship between starter loans and house prices. However, the magnitude of this relationship is not fully understood. As a result, the following hypotheses is formulated:

H0: Starter loans do not increase house prices;

H1: Starter loans cause house prices to rise.

II.IV Other municipal policy developments in the housing market

It is possible that municipalities maintain other policies which influence, or can potentially influence, the development of house prices. Dutch municipalities are required by law to draw up and implement 'land policy'. Land policy includes two policy topics, namely: policy in the field of land development; and policy on land prices (Rijksoverheid, 2022). The land policy pursued should contribute as a means of achieving spatial objectives in the areas of public housing, nature and greenery, infrastructure, the local economy and social facilities. There are three types of land policy. Municipalities can pursue an active land policy whereby the municipality itself acquires and allocates the land. Municipalities can also pursue a passive land policy. The municipality leaves the acquisition and issuance of land to private parties. A hybrid, and therefore intermediate form, concerns public-private partnerships (PPP) in which the acquisition and allocation of land depends on the agreements between the organizations involved (VNG, 2018; VNG, 2021). The land policy to be pursued influences the possibilities of municipalities to realize new-build homes. Deloitte notes that there is a limited statistically significant relationship between active land policy and the production of new-build homes in municipalities. Active land policy results in a higher production of new-build homes than in municipalities that pursue a passive land policy (Deloitte, 2021). The supply of homes and the addition of new homes to the supply is related to the development of house prices (Hilber & Vermeulen, 2016). A lower production of new-build homes means that the supply cannot adapt adequately to the demand. This results in an increase in house prices. It is therefore plausible that the land policy to be pursued by municipalities indirectly, through the production of new-build homes, influences the development of house prices.

III. Data and Methodology

The data used in this thesis is gathered from multiple sources, which will be discussed in the data section. The general characteristics of the data are that for each municipality observed (349), for each year between 2012 and 2021, information is gathered for each variable. The variables standardized income and migration could only be observed between 2012 and 2020 and not up to 2021.

III.I Data

III.I.I Independent variable

The independent variable in this thesis is starter loans. Data related to which municipalities offered a starter loan during 2012-2021 was acquired by receiving a dataset from the SVn. Since the received data on whether municipalities did or did not offer a starter loan in a specific year comes from the SVn, the accuracy and reliability of starter loan data is high. Due to the General Data Protection Regulation (GDPR), it is not possible to receive information about how many starter loans have been issued and the size of the granted starter loans. Such data would be valuable as it would allow a more accurate estimate of the effect of starter loans on house prices. The effect to be estimated can then be traced back to whether the granting, and if so: the amount of starter loans granted, affects the development of house prices. Nevertheless, data on whether municipalities offer a starter loan is a solid proxy. If a starter loans affects house prices in a certain municipality, the potential effect of starter loans on house prices in the municipality in question arises from the total amount of starter loans being granted.

A dummy variable is created for the independent variable starter loans in which the value '1' refers to the provision of a starter loan by a specific municipality in a given year and the value '0' refers to a municipality which do not offer a starter loan in a given year. The received data received structured as follows, namely: per municipality it was indicated in which year and month they offered a starter loan until which year and month they did so. Since the data was structured per year and month and the data set in this thesis is structured on an annual basis, it was decided to give a municipality a one in each year in the dataset of this thesis if a municipality offered a starter loan in at least 50% of that specific year. Data is collected for 349 municipalities regarding the provision of starter loans during the period 2012 to 2021. Municipalities that have merged into other or new municipalities due to municipal reclassifications are omitted from the dataset. This is important because CBS does not keep statistics for such municipalities for the covariate and the confounding variables. On average in each year, 184 of the 349 municipalities offered a starter loan and 165 municipalities did not offer a starter loan during this period. Given the fact that the data was collected for the period 2012 to 2021, the data is longitudinal in nature. One variables is created for starter loans.

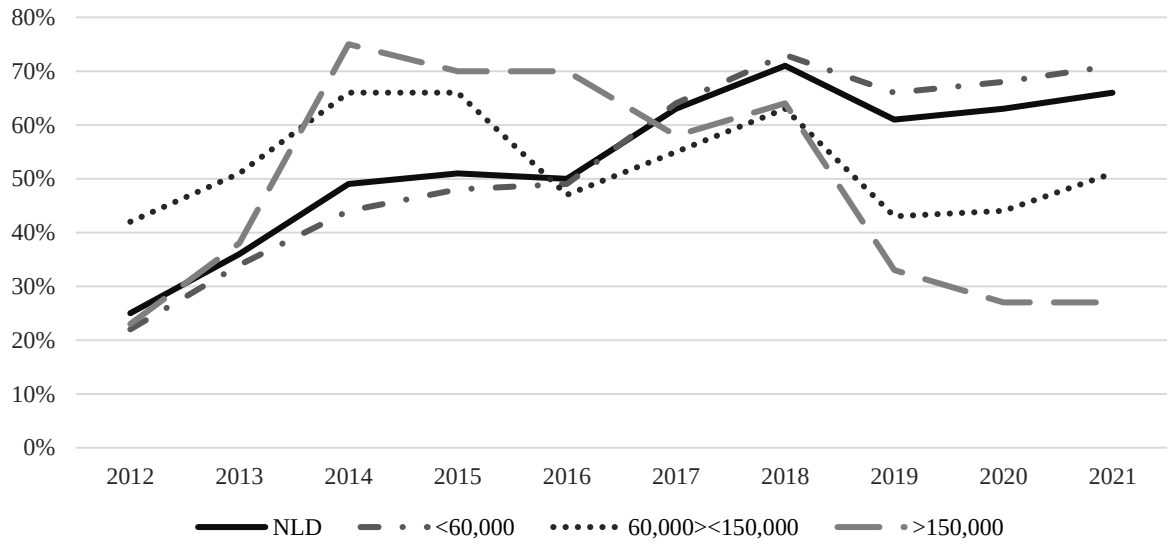

Figure 1: Percentages of total number of municipalities and subsamples that offered starter loans between 2012 and 2021

Figure 1 illustrates what percentage of all municipalities, and in the different subsamples, offer a starter loan in the period 2012-2021. The development in the number of municipalities offering starter loans in the Netherlands over the period 2012-2021 is almost synchronous with the development of the number of small municipalities that offer starter loans. This is because of the total amount of observed units of interest, municipalities, on average in each year 82% are small municipalities. Over time more municipalities in The Netherlands offered a starter loan. However, this is only the case for smaller municipalities. In 2012 approximately 20% of the observed municipalities offered a starter loan. This has increased till approximately 70% in 2018 after which the number of municipalities that offered a starter loan remained virtually stable. Which indicates that different small municipalities implemented a starter loan in a different year. The number of mid-sized and large municipalities offering starter loans decreased between 2012 and 2021. Around 65% of the mid-sized municipalities offered a starter loan between 2013 and 2015. This decreased in 2016 to approximately 48%. After 2016 the total amount of mid-sized municipalities offering a starter loan increased from 48% to approximately 63% in 2018 after which it decreased again. Large municipalities show a steady decline. In 2014 approximately 72% of all large municipalities offered a starter loan. This has decreased over time to a level of about 28% in 2021. All of the aforementioned implies that over in the period 2012-2021 different municipalities decided to implement or retract a starter loan at different moments in time.

III.I.II Dependent variable

Data of the dependent variable house prices are collected from the WOZ-value CBS database – in which CBS registers the average WOZ-value per municipality per year. The WOZ regulates the valuation of all real estate in the Netherlands for purposes such as taxation and the home valuation system, per municipality per year on the basis of land registry data (CBS, 1997–2020; CBS, 2021b). The WOZ-Act guarantees that real estate in the Netherlands is valued using the same method by means of an objectionable decision (Article 22 paragraph 1 of the Real Estate Valuation Act). An equal methodological basis for determining house prices ensures the comparability of house prices between municipalities over time. WOZ-value data is collected by CBS for 349 municipalities during the period 2012-2021 (CBS, 1997-2020). The dependent variable house prices is the annual percentage change of WOZ-values per municipality. Dividing the average WOZ-value of a municipality in a given year by the average WOZ-value of that municipality in the previous year results in the annual change of the WOZ-value of a specific municipality. Because the average house value per municipality is measured in the same way, it is ideally suited to use as a benchmark for the development of house prices in municipalities. Based on the collected WOZ-value averages the percentage change of WOZ-values per municipality per year will be calculated and is used as the dependent variable.

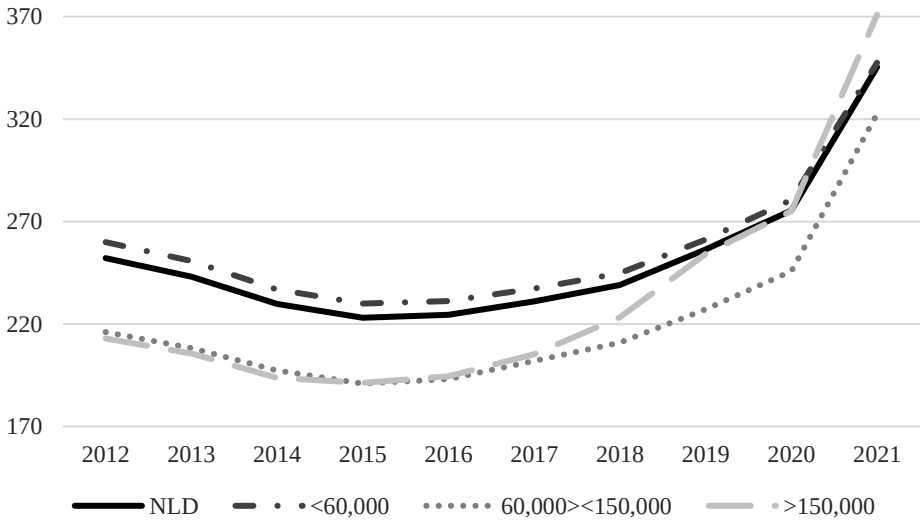

Figure 2: Average WOZ-value development of total number of municipalities and subsamples between 2012 and 2021

Figure 2 shows that municipalities in The Netherlands follow a common pattern till 2018. After 2018 WOZ-values in municipalities with a population larger than 150,000 shows a more significant growth than WOZ-values in small and mid-sized municipalities. Middle-sized and large municipalities had approximately equal average WOZ-values from 2012 to 2017, and WOZ-values in small municipalities were approximately 40,000 euros higher in the same period. The development of WOZ-values in large municipalities has led to higher dwellings in

large municipalities in 2021 than in small and middle-sized municipalities. Which indicates a deviation from the trend between 2012 and 2017. Moreover, it can be noted that WOZ-values have increased significantly from 2021 compared to previous years - which shows the tightness in the housing market.

Table 3.1: Average WOZ-values per municipality

Year	NLD	*Percentage Change*	<60,000	*Percentage Change*	60,000> <150,000	*Percentage Change*	>150,000	*Percentage Change*
2012	252,14		259,97		216,08		213	
2013	243,1	-3,59%	250,67	-3,58%	208,22	-3,64%	205,53	-3,51%
2014	229,76	-5,49%	236,88	-5,50%	197,33	-5,23%	193,68	-5,77%
2015	223,05	-2,92%	229,97	-2,92%	190,92	-3,25%	191,29	-1,23%
2016	224,53	0,66%	231,17	0,52%	193,02	1,10%	194,52	1,69%
2017	231	2,88%	237,36	2,68%	201,97	4,64%	205,32	5,55%
2018	239,06	3,49%	244,85	3,16%	210,84	4,39%	223,17	8,69%
2019	256,36	7,24%	261,27	6,71%	227,08	7,70%	254,11	13,86%
2020	275,46	7,45%	280,51	7,36%	245,72	8,21%	275,11	8,26%
2021	345,35	25,37%	347,51	23,89%	322,51	31,25%	371	34,86%
2012 vs. 2021 % growth		36,97%		33,67%		49,25%		74,18%

Source: CBS, 1997-2020; CBS, 2021b

** NLD is the category which represents all the municipalities in The Netherlands.*

The average WOZ-value of all Dutch municipalities, of municipalities with fewer than 60,000 inhabitants, between 60,000 and 150,000 inhabitants and more than 150,000 inhabitants is shown in table 3.1. The development of the average WOZ-values was approximately equal in all three categories of municipalities in 2013 and 2014. From 2015, WOZ-values, and therefore house prices, will increase more substantially in middle-sized and large municipalities than in small municipalities. Moreover, WOZ-values are increasing more substantially than in middle-sized municipalities. From 2016 to 2020, WOZ-values only increased by a few percent per year. In 2021, the increase in WOZ-values has increased very significantly, given an increase of 23.89% in small municipalities compared to the previous year, 31.25% in middle-sized municipalities and 34.86% in large municipalities. It is evident that house prices have increased explosively from the year 2020, since WOZ-values from 2021 have been measured over the year 2020. It should be noted here that the larger the municipality, the greater the increase in housing values.

III.I.III Data confounding variables

III.I.III.I Standardized Income

The variable income is measured by the CBS and concerns the average standardized disposable income per municipality. CBS has corrected disposable income for the size and composition of households on the basis of equivalence factors – economies of scale that arise from running a joint household. Such equivalence factors reduce the income of households to the income of a single-person household, making the income between different types of households comparable (CBS, 2021b). The confounding variable income is the average standardized disposable income per municipality per year.

Table 3.2: Average standardized income per municipality

Year	NLD	*Percentage Change*	<60,000	*Percentage Change*	60,000> <150,000	*Percentage Change*	>150,000	*Percentage Change*
2012	27,04		27,44		25,52		23,83	
2013	27,2	0,59%	27,6	0,58%	25,64	0,47%	24,08	1,05%
2014	28,76	5,74%	29,24	5,94%	26,96	5,15%	25,38	5,40%
2015	28,39	-1,29%	28,79	-1,54%	26,89	-0,26%	25,59	0,83%
2016	29,56	4,12%	30	4,20%	27,82	3,46%	26,61	3,99%
2017	30,61	3,55%	31,09	3,63%	28,89	3,85%	27,44	3,12%
2018	30,81	0,65%	31,29	0,64%	29,08	0,66%	27,77	1,20%
2019	33,23	7,85%	33,8	8,02%	31,05	6,77%	30,04	8,17%
2020	33,81	1,75%	34,33	1,57%	31,85	2,58%	30,93	2,96%
2012 vs. 2020		*25,04%*	*6,89*	*25,11%*	*6,33*	*24,80%*	*7,1*	*29,79%*

Source: CBS, 2021b

Table 3.2 shows the development of the standardized income of all Dutch municipalities, of municipalities with fewer than 60,000 inhabitants, between 60,000 and 150,000 inhabitants and more than 150,000 inhabitants. Based on table 3.2, the standardized income in small municipalities is higher than in middle-sized and large municipalities. The development of standardized income is approximately the same for small, medium and large municipalities. Compared to 2012, the income of small municipalities increased by 6,890 euros in 2020, in middle-sized municipalities by 6,330 euros and in large municipalities by 7,100 euros.

III.I.III.II Supply of houses

The confounding variable housing supply reflects the percentage change in the housing stock per municipality in each year in the period 2012-2021. This ratio variable is constructed based on data collected and compiled by the CBS. CBS collects data related to changes in the housing stock of municipalities from the Key Register of Addresses and Buildings (BAG). Two variables from the CBS data set are used to calculate the annual percentage changes in the

housing stock in municipalities, namely: the number of homes at the start of a year per municipality and final stock of homes of the starting year per municipality. When the stock of homes at the end of a year in a municipality is divided by the stock of homes at the beginning of that year in the same municipality, the annual percentage change in the housing stock per municipality is calculated. The effect of changes in the housing supply on house prices can therefore be studied (CBS, 2022b).

Table 3.3: Average percentage housing stock mutation per municipality

Year	NLD	<60,000	60,000> <150,000	>150,000
2012	0,94%	0,95%	0,79%	1,17%
2013	1,22%	1,24%	1,03%	1,36%
2014	0,67%	0,65%	0,74%	0,82%
2015	0,66%	0,65%	0,56%	0,92%
2016	0,66%	0,67%	0,63%	0,59%
2017	0,79%	0,83%	0,54%	0,82%
2018	0,85%	0,83%	0,80%	1,30%
2019	0,88%	0,85%	0,94%	1,27%
2020	0,93%	0,92%	0,89%	1,17%
2021	0,91%	0,88%	0,96%	1,14%
On average each year	*0,85%*	*0,85%*	*0,79%*	*1,05%*

Source: CBS, 2022b

The average percentage development of the housing stock of all Dutch municipalities, of municipalities with fewer than 60,000 inhabitants, between 60,000 and 150,000 inhabitants and more than 150,000 inhabitants is shown in table 3.3. The annual average indicates that large municipalities build more new-build homes than small and middle-sized municipalities. On average, the housing stock in large municipalities increases by 1.05%, in small municipalities by 0.85% and in middle-sized municipalities by 0.79%. In the period 2012 to 2021, the addition of new-build homes to the housing stock for small municipalities, compared to middle-sized and large municipalities, is consistent.

III.I.III.III Migration

The variable migration is also measured by extracting data from the CBS (CBS, 2020). Migration has been operationalized as a ratio variable. The value of the variable migration is an absolute value that indicates the net balance of migration per municipality per year. The net balance shows whether more individuals have immigrated to a municipality (positive balance) or emigrated (negative balance). Data on the migration balance is obtained from the CBS

dataset *'Immi- and emigration according to various characteristics*'. This dataset contains data on the migration balance of municipalities per year during the period 2012-2020 (CBS, 2020).

Table 3.4: Average migration balance per municipality

Year	NLD	<60,000	60,000> <150,000	>150,000
2012	40,95	24,73	84,82	229,61
2013	54,85	31,47	112,44	346,38
2014	96,56	48,53	157,26	756,81
2015	148,65	72,74	219,14	1202,52
2016	219,94	131,43	261,67	1553,83
2017	233,48	120,39	234,75	2052,88
2018	251,7	100,08	301,95	2577,23
2019	309,56	111,25	401,27	3188,05
2020	38,95	23,88	85,65	153,94
On average each year	155,64	73,9	207,02	1406,32

Source: CBS, 2020

Table 3.4 shows the development of the migration balance of all Dutch municipalities, of municipalities with fewer than 60,000 inhabitants, between 60,000 and 150,000 inhabitants and more than 150,000 inhabitants. It should be noted that there is a considerable difference between the three categories of municipalities with regard to the migration balance and the development over the years. In 2012, the population of small municipalities increased by 25 due to migration. This was 85 in middle-sized municipalities and 230 in large municipalities. It is clear that large municipalities increase more due to migration than in small and middle-sized municipalities. The migration balance of large municipalities in 2012 was approximately a factor of 9.3 compared to small municipalities and approximately a factor of 2.7 compared to middle-sized municipalities. In the period 2012 to 2019, the previous factors increased. In 2019, the migration balance of large municipalities was 28.7 times greater than small municipalities and 7.9 times greater than middle-sized municipalities. Table 3.4 shows that large municipalities received more migrants between 2012 and 2019 than small and middle-sized municipalities. The consequence of this is that housing must also be arranged for these migrants. Which could imply that, given the current tightness in the housing market, the pressure on the housing market is increasing.

III.II Fixed-effects: characteristics

Panel data is hierarchically organized given that the data is a combination of cross-sectional and longitudinal data. Observations of units of interest, read: municipalities, are measured over multiple units of time. A fixed effect (FE) model is used in order to model to estimate the relationship between starter loans and house prices. Gangl (2010) argues that FE models are useful for establishing causal inferences. Ordinary Least Squared (OLS) regression methods

produce biased estimates when problems related to omitted variables (OVB) are involved – a common occurrence in economics. To avoid OVB problems, no OLS regression approach is used. It is likely that there could be unobserved heterogeneity that could influence the covariates or confounding variables – negatively affecting the accuracy of the estimates (Best & Ludwig, 2014, pp. 327-328).

In this thesis, an FE model is constructed to estimate the relationship between starter loans and house prices, while also trying to reduce problems surrounding OVB by adding FE. FE models assume that omitted variables are correlated with the included predictive variables (Schmidheiny, 2013, p. 5). FE models attempt to more accurately identify the effect of the predictors on the dependent variable by controlling for stable individual specific effects and/or time-fixed effects through a demeaning process. In short, the demeaning process involves calculating an average of a variable of a unit of interest over the entire time period and subtracting that from each observation of that variable of the relevant unit of interest. The demeaning leads to controlling for individual specific observable and unobserved effects and removes them from the model's estimation (Wooldridge, 2012). Because unobserved variables are incorporated in individual specific effects and these are removed from the model, the estimation of the covariate and confounding variables becomes more accurate. A basic FE model looks as follows:

$$Y_{it} = a_i + Xit + \beta_n[\dots] + u_{it}$$

The dependent variable is Y_{it} of unit of interest i, which are municipalities in The Netherlands, at time t, a year in the period of 2012-2021. Other parts of the basic structure are the covariate of unit of interest i at time t (X_{it}) and the confounding variables (β). The error term is divided into two components, namely: stable individual specific effects (a_i) and which shows unobserved effects arising from time-invariant individual heterogeneity; and an idiosyncratic error term (u_{it}) that varies between individuals and over time (Schmidheiny, 2013, pp. 1-2). Time-fixed effects, indicated by λ_t, will also be included. Time-fixed effects control for unobserved heterogeneity which is the same for all municipalities, but differs between years. The inclusion of time-fixed effects results in the following FE model:

$$Y_{it} = a_i + Xit + \beta_n[\dots] + \lambda_t + u_{it}$$

Municipality specific effects of municipalities can be derived by looking at the difference between the mean value of Y_i and the mean values of X_i and β – the process of demeaning.

$$\hat{a} = \hat{y}_i - \hat{x}_i$$

$$\hat{a} = \hat{y}_i - \hat{\beta}_i$$

When controlling for municipality specific effects, and thereby for potential omitted variables, it is possible to more accurately estimate the effect of the covariates on the dependent variable. Since individual specific effects explain the variance of the dependent variable that cannot be explained by covariates.

III.III Fixed-effects model: starter loans and house prices

In order to test the constructed hypothesis in the theoretical framework, two models are constructed. The difference between the models is the ex- and inclusion of time-fixed effects. Model 1 estimates the effect of the independent variable starter loan on the dependent variable house prices when only municipality fixed effects (u_{it}) are controlled for. Model 1 also includes the already conceptualised and operationalised confounding variables.

(1) $$HousePrice_{it} = a_i + X_1 StarterLoan_{it} + \beta MigrationBalance + \beta HousingStockMutations + \beta MunicipalityStandardizedIncome + u_{it}$$

(2) $$HousePrice_{it} = a_i + X_1 StarterLoan_{it} + \beta MigrationBalance + \beta HousingStockMutations + \beta MunicipalityStandardizedIncome + \lambda_t + u_{it}$$

The second model also estimates the effect of the independent variable starter loans on the dependent variable WOZ-values (house prices) This model includes municipality fixed effects (u_{it}) and time-fixed effects (λ_t). In both models the dependent variable is the ratio variable of house prices ($HousePrice_{it}$) and the independent variable is the dummy variable starter loans ($StarterLoan_{it}$). The confounding variables are the migration balance, mutations in the housing stock and the standardized income of municipalities.

IV. Results

The results from the panel data regressions with municipality fixed effects and time-fixed effects are discussed in this section. The hypothesis formulated in the theoretical framework expects starter loans to have a price-increasing effect on house prices. Two panel data regression models are conducted. The first regression includes the independent and confounding variables as well as municipality fixed effects in order to determine the potential effects on house prices while controlling for unobserved heterogeneity between municipalities. The second regression includes the independent and confounding variables while also controlling for municipality and time-fixed effects. Finally, a robustness check is conducted in order to determine if the estimated effects of the previous regressions are also present in three different subsamples of municipalities.

IV.II Panel data regression with fixed effects

Table 4.1: Panel data regression with municipality fixed effects

	(1)
Starter loans	0.010***
	(0.0017)
Mutation in Housing Supply	-0.096
	(0.084)
Migration Balance	0,000009***
	(0.000)
Standardized Household Income	0.006***
	(0.021)
Constant	0.001
	(0.002)
R-squared	0,22
Observations	2,593
Number of municipalities	346

Standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

Table 1 presents the estimated results of panel data regression with fixed effects in which the confounding and independent variables are regressed on the dependent variable. As expected on the basis of academic literature, offering a starter loan results in higher house prices. When municipalities offer starter loans, the percentage change of WOZ-values is 1.0 percentage point higher than in municipalities that do not offer starter loans. This finding is in line with the theoretical expectation that expanding buyers' financing options by granting additional credit

will lead to higher house prices. It is nevertheless remarkable that table 2 finds no statistically significant effect of percentage changes in the housing stock on house prices. Academic literature shows that an increase in the housing stock leads to a fall in house prices (Hilber & Vermeulen, 2016; Paciorek, 2013). Based on table 2 and the estimated effect of changes in the housing stock, it is not plausible that changes in the housing stock lead to changes in house prices.

Nevertheless, table 1 shows that it is likely that migration influences the percentage growth of WOZ-values in municipalities. The estimated effect of migration is statistically significant at a level of 0.01. When the migration balance in a municipality increases by one unit, the percentage growth of WOZ-values in municipalities increases by 0.0009 percentage point. Given the small coefficient of migration, the effect of migration on the development of WOZ-values, and thus house prices, feels limited. When the coefficient is multiplied by the average migration balance (155) of municipalities between 2012 and 2021, migration would in theory lead to a 0.14 percentage point higher percentage growth of WOZ-values. This makes it plausible that, despite the small coefficient, migration can have a substantial influence on the percentage growth of WOZ-values – and thus house prices. The estimated effect is not in line with the academic literature. Myers (2004) argues that house prices fall when migrants settle in certain residential areas. However, the results in table 1 show the opposite effect, namely an increase in house prices when immigration increases. The different effects may arise because of the context of the Dutch housing market. As the Dutch housing market is overheated and an increase in the population due to migration leads to additional demand for housing. This culminates in further pressure on the housing market and results in rising house prices.

Alterations in income appears to affect the development of house prices in municipalities. The estimated effect of the standardized income per municipality on the percentage growth of WOZ-values is statistically significant at a level of 0.01. When the standardized income in municipalities increases by one unit, the percentage growth of WOZ-values in municipalities increases by 0.6 percentage point. The findings in Table 1 are in line with academic literature and support that empirical evidence that income is a determinant of house prices (Égert and Mihaljek, 2007; Girouardi et al., 2006; Holly & Jones, 1997). It is plausibly that income affects the development of house prices via mortgages. A higher income implies that households could take out a higher mortgage credit. With greater financing options, households have the opportunity to offer a higher bid for a specific house of interest. It is highly likely that this leads to an increase in house prices. However, the explanatory power of the model of Table 1 is. Since the model is only able to explain 22% of the variance of the dependent variable. This causes the model in table 4.1 without time-fixed effects to be of less importance of explaining the development of house prices.

IV.III Panel data regression with municipality and time-fixed effects

Table 4.2: Panel data regression model with municipality and time-fixed effects

	(1)
Starter loan	-0.002*
	(0.001)
Mutation in Housing Supply	-0.069
	(0.043)
Migration Balance	0.00000348***
	(0.000)
Standardized Household Income	0.0018***
	(0.008)
Constant	-0.027***
	(0.008)
R-squared	0,8688
Observations	2,593
Number of Municipalities	346

Standard errors in parentheses

**** p<0. 01, ** p<0. 05, * p<0. 1*

(1) Panel data regression with municipality and time-fixed effects

Table 2 presents the results of a panel data regression in which all confounding and independent variables and municipality and time-fixed effects are included. Municipality and time-fixed effects were included in this panel data regression model in order to control for unobserved heterogeneity. As discussed before, municipality fixed effects controls for unobserved heterogeneity related to differences between municipalities, but consistent during the observed period. Time-fixed effects controls for unobserved heterogeneity related to heterogeneity which is the same for all municipalities, but differs per year.

When municipality and time-fixed effects are included it changes the estimated effects of several variables in comparison with table 1. The most remarkable alteration in table 2 is that the estimated effect of starter loans has a negative slope and is statistically significant at a level of 0.1. Based on table 2, the estimated effect of a starter loan on the percentage growth of house prices is -0.2 percentage point. This implies that if a municipality facilitates a starter loan, the percentage change of WOZ-values is 0.2 percentage point lower than in municipalities which do not offer a starter loan. The estimated negative effect of starter loans on house prices in table 2 is not in line with the theoretical expectations derived from academic literature. Since empirical evidence shows that higher credit has results in an increase of house prices.

The in- or decrease of the housing stock in municipalities has no statistically significant effect on the development of WOZ-values, and thus house prices, in the panel data regression when municipality and time-fixed effects are included. Based on academic literature and empirical findings, it was expected that an increase in the housing stock would lead to a decrease of house prices. The fact that an increase in the housing stock has no significant effect on house prices can most likely be explained by the context of the Dutch housing market. DNB argues that the Dutch housing market is overheated which is, among other things, caused by a housing shortage (DNB, n.d.). The Ministry of '*Binnenlandse Zaken en Koninkrijksrelaties*' calculated that in 2021 the estimated housing shortage was 279,000 houses and that this shortage will increase until 2025 due to demographic developments (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2021). To solve the housing shortage, 100,000 homes must be built per year to reduce the housing shortage and prevent overheating in the housing market (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2022). Dutch municipalities build on average 63,462 homes per year (CBS, 2022b). Given the fact that the number of new-build homes is below the desired capacity to meet the housing demand in order to reduce the housing supply shortage, it is highly likely that the increase in the housing stock will not be sufficient to counteract and reduce the increase in house prices. The foregoing provides an explanation for why the variable regarding an increase in the housing stock is not statistically significant. It is possible that, on average, Dutch municipalities pursue a more passive land policy, which results in a lower house production to meet the demand for houses than when an active land policy is applied (Deloitte, 2021). This can lead to insufficient construction, so that an addition to the housing stock will not have a statistically significant effect on house prices. However, the foregoing is an assumption and not empirically tested.

Table 4.2 shows that migration affects the percentage growth of WOZ-values, and thus house prices. The effect of migration found is statistically significant at a level of 0.01. When the migration balance increases by one unit, the percentage growth of WOZ-values in municipalities increases by 0.00035 percentage point. As already mentioned, the coefficient intuitively feels negligible. However, if the average migration balance of municipalities per year (155) is taken into account, migration leads to a 0.05 percentage point higher percentage growth of WOZ-values. As in table 1, the estimated effect of migration is not in line with the academic literature. Migration does not lead to lower house prices, as expected on the basis of academic literature. The estimated effect can be explained by the context of the Dutch housing market. An increase in demand for homes, caused by migration, in a tight housing market results in an increase of house prices.

House prices also increase due to changes in income. The estimated effect of percentage changes in standardized income is statistically significant at a level of 0.05. This shows the presence of a relationship between income and house prices. When the standardized income in a municipality increases by one unit, the percentage change in WOZ-values increases by 0.18 percentage point. The estimated effect is in line with the theoretical expectations arising from the literature. When income increases, households are able to expand their financing options by taking out a higher mortgage. As a result, households can place a higher bid for a specific home of interest resulting caused by a higher mortgage. It is likely that this will lead to more substantial increases in the price of housing.

IV.IV Panel data regression with municipality and time-fixed effects in subsamples, robustness check

Table 4.3: Panel data regression model with municipality and time-fixed effects, subsamples

	<= 60.000	> 60.000 & <= 150.000	> 150.000
Starter loan	-0.001	0.004*	0.002
	(0.001)	(0.002)	(0.006)
Mutation in Housing Supply	-0.081*	-0.180	0.105
	(0.044)	(0.164)	(0.372)
Migration Balance	0.000	0.000	0.00000249**
	(0.000)	(0.000)	(0.000)
Standardized Household Income	0.002***	0.004	0.001
	(0.0005)	(0.059)	(0.182)
Constant	-0.049**	-0.034*	-0.038***
	(0.020)	(0.018)	(0.012)
R-squared	0,8654	0,9132	0,9138
Observations	2,130	336	127
Number of municipalities	284	51	18

Standard errors in parentheses

**** p<0. 01, ** p<0. 05, * p<0. 1*

Table 4.3 shows the results of a panel data regression with municipality and time-fixed effects for different subsamples. Three different subsamples were created, namely: municipalities with a population up to and including 60,000 (small municipalities); municipalities with a population between 60,000 and 150,000 (middle-sized municipalities); and municipalities with a population larger than 150,000 (large municipalities). The preceding subsamples were created to check the robustness of the results from Table 4.2. It is checked whether the estimated effects in Table 4.2 are consistent in municipalities that differ in population size. Previous subsamples have been created because of the different price developments in small, medium and large (CBS, 1997-2020). Because of the variation in house price development between small, medium and large municipalities, it is possible that starter loans have a different effect in small, medium and large municipalities on house price development. Moreover, the confounding variables show variation in mean values between small, medium and large municipalities. Hypothetically, this could lead into a situation that a confounding variable has a statistically significant effect in one subsample and not in the other subsamples. Nevertheless, it should be noted that both the N and the number of observations are small for medium and large municipalities. This is not the case for small municipalities since the N is 284 and the number of observations is 2,130. For middle-sized municipalities the N is 51 and the number of observations is 336 and for large municipalities the N is 18 and the number of observations 127. From a methodological point of view, the small number of observations can be a problem in

estimating a possible effect of starter loans, confounding variables and time and municipality fixed effects on house prices. Problems regarding reliability and validity can therefore arise if the N is too small and if there are too few observations. However, the problem of too few observation and a too low N is only limited for middle-sized and large municipalities. For the period 2012 to 2021, all middle-sized and large municipalities are included in the dataset. The entire population of middle-sized and large Dutch municipalities is included in the relevant subsample. Problems with regard to reliability and validity then arise to a lesser extent, since the entire population of middle-sized and large municipalities is included. As a result, a methodological choice was made to use the three subsamples described above.

The estimated effect of starter loans is not statistically significant in municipalities under 60,000 inhabitants or with more than 150,000 inhabitants. However, the effect of starter loans on percentage growths of WOZ-values in municipalities with a population between 60,000 and 150,000 inhabitants is statistically significant at a level of 0.1. Starter loans results in a 0.4 percentage point higher percentage growth of WOZ-values in municipalities that offer starter loans. The results from table 3 imply that the statistical significant effect of table 1 only occurs in municipalities with a population between 60,000 and 150,000 inhabitants. The estimated effect in table 3 is lower than the estimated effect in table 1 and shows that home prices increase due to starter loans. The robustness check makes it plausible that starter loans do not have a statistically significant effect on house prices in small and large municipalities. Only in middle-sized municipalities does offering starter loans lead to an increase in house prices.

An increase in the housing stock results in a lower development of house prices in municipalities with fewer than 60,000 inhabitants. When the housing stock increases by one percent, the percentage growth of WOZ-values decreases by 8.1 percentage points. In municipalities with a population between 60,000 and 150,000 inhabitants and more than 150,000 inhabitants, a change in the housing stock has no statistically significant effect on the WOZ-values, and thus house prices. The statistically significant effect of changes in the housing stock in table 4.2 on house prices only applies to small municipalities. The '*heat-map*', a map of the Netherlands indicating the degree of overheating of the housing market in each municipality, of the '*Bouwfonds Gebiedsontwikkeling*' – a Dutch housing market institution which develops the aforementioned heat map – indicates that middle-sized and large municipalities experience a higher demand and scarcity of supply of houses. It is plausible that house prices in middle-sized and large municipalities do not decrease if the housing stock increases because of a higher demand of houses, higher scarcity of houses and more significant increases of house prices in comparison with small municipalities (BPD, 2021; CBS, 1997-2020). In addition, it is possible that medium-sized and large municipalities have other preferences regarding land policy. As a result, it is also possible that the production of housing in medium-sized and large municipalities is insufficient to meet the demand for housing. However, this claim is an assumption and has not been empirically tested.

Table 4.3 shows that the estimated effect of changes in the migration balance is only statistically significant, at a significance level of 0.1, in municipalities with more than 150,000 inhabitants. When the migration balance increases by one unit, the percentage growth of WOZ-values in municipalities with more than 150,000 inhabitants increases by 0.000239 percentage points. No statistically significant effect was found in municipalities with a population of less than 60,000 inhabitants and between 60,000 and 150,000 inhabitants. These results show that the statistically significant effect found in table 4.2 is only reflected in larger municipalities with more than 150,000 inhabitants. The fact that the effect of migration on the development of house prices is only statistically significant in large municipalities may be due to the fact that more individuals migrate to large municipalities than to small and middle-sized municipalities. The average migration balance of large municipalities per year was 1,406. In small municipalities the average migration balance was 74 and in middle-sized municipalities 207. The population of large municipalities increase more significant because of migration, than the population of small or middle-sized municipalities. Which in turn results in significantly more demand for housing in larger municipalities than in small and middle-sized municipalities causing migration only to effect. Given the difference in population growth caused by migration between small and middle-sized municipalities and large municipalities it is seems logical that the inflow of migration only effects house prices in large municipalities.

When the average standardized income of municipalities increases with one unit, house prices in municipalities with less than 60,000 inhabitants will increase. The estimated effects in the aforementioned subsample are statistically significant at a level of 0.01. When the average standardized income in municipalities increases by one unit, the percentage growths of WOZ-values in municipalities with less than 60,000 inhabitants increase by 0.2 percentage points. No statistically significant effect was found in municipalities with a population between 60,000 and 150,000 inhabitants and more than 150,000 inhabitants. Based on the robustness check, the statistically significant effect in table 4.2 only manifests itself in municipalities with a population of less than 60,000 inhabitants. The findings provide limited support for the assumption from the academic literature that income is an important determinant of house prices.

The explanatory power of the three models can be classified as very strong. For all three models, the R-squared is between 0.8621 and 0.9148. Which indicates that all three models can explain at least 86% and 92% of the variance of the dependent variable.

V. Discussion and Implications of the Results

In the result section the results were analysed and briefly discussed. This section further explores and discusses the estimated coefficients of the independent and confounding variable. Potential policy implications of the estimated coefficient in the result section are also discussed.

V.I Starters loans and house prices

Based on the literature, credit was identified as a mechanism leading to an increase of house prices. This mechanism culminated in the expectation that making extra credit available, in the form of starter loans, would result in an increase of house prices. Given the statistical significance of the estimated coefficients of starter loans and their estimated coefficients, it is likely that there is a relationship between starter loans and changes in house prices. However, the direction of this relationship cannot be indicated due to differences in the slope of the estimated coefficients in table 4.2 and 4.3 – positive and negative. Therefore, the null hypothesis cannot be rejected. After all, it cannot be fully demonstrated that starter loans results in an increase of house prices. Follow-up research should study whether starter loans merely drive up the price of house prices in middle-sized municipalities, as presented in table 4.3, or whether it leads to a general decline in house prices, which is presented in table 4.2 in the results section.

The estimated effects in the panel data regression models only contribute on a limited scale to the current discussion in the Dutch society whether starter loans causes house prices to increase and if starter loans contributes to making an owner-occupied home more feasible for first-time buyers. Based on the estimated effects in table 4.2 and 4.3, it is not possible to indicate whether starter loans contribute to increasing house prices, which is what DNB argues, or whether it leads to an improvement in the position of first-time buyers. DNB argues that measures that facilitate financing will result in a larger increase in house prices (DNB, n.d.). Based on the analysis of the estimated effects in the result section in this thesis it is not sufficiently clear whether starter loans lead to an in- or decrease of house prices. Table 4.2 indicates that starter loans decrease house prices. However, it should be noted that the negative coefficient in table 4.2 can also be interpreted as that the presence of starter loans do not result in higher house prices. This is because of the low level of significance and low standard error in table 4.2 of the independent variable starter loan. The robustness checks shows that a potential price increasing effect of starter loans only occurs in middle-sized municipalities. Just as in table 4.2, the significance level is low and the standard error is small for the coefficient of starter loans. Because of the different directions of the coefficient of starter loans in table 4.2 and 4.3, and their low level of significance and small standard error, the effect of starter loans on house prices is insufficiently clear. However, since both estimated coefficients are statistically significant that it is plausible that there is a relationship between starter loans and the development of house prices.

The objective of the starter loan is to bridge the difference between the financing capacity of first-time buyers and the price of a house. This should help first-time buyers find their first home and improve the position of first-time buyers in the housing market. Given the conflicting slope coefficients in tables 4.2 and 4.3, it is unclear whether the starter loan strengthens or worsens the position of starters. When starter loans results in a decrease of house

prices, it is highly likely that the position of starters in the housing market will be improved – ceteris paribus other potentially influencing on the housing market. Due to lower purchase prices, a first-time buyer needs less capital, which makes it easier to purchase a home. However, if starter loans lead to an increase in house prices, the position of first-time buyers in the housing market can deteriorate – also ceteris paribus. Starters are less financially strong and the income is lower compared to the further course of their professional career. This may mean that first-time buyers cannot obtain enough financing through a mortgage loan, their own capital and the starter loan to meet higher house prices brought about by starter loans. In addition, it is theoretically possible that fewer homes will be sold below the NHG limit due to a price-increasing effect of starter loans. The supply of homes for which a starter loan can be applied for may decrease as a result. Both possibilities could worsen the position of starters.

Further research is required to determine the magnitude and direction of the effect of starter loans on house prices. This thesis shows that it is plausible that there is an effect of starter loans on house prices. However, the direction of the effect is unclear. In order to gain clarity about the direction of the effect, two suggestions for further studies are formulated in order to estimate the direction of the relationship between starter loans and house prices. Follow-up studies are recommended to use transaction data. Transaction data makes it possible to study possible effects of starter loans on house prices on a micro level. The accuracy of the estimate can be improved by a micro level study. This may provide clarity regarding the direction of the coefficient of starter loans on house prices. In addition, in this thesis the methodological choice was made to give the dummy variable starter loans a one if municipalities offered a starter loan for more than 50% of that year in a given year. In order to make better use of the acquired data, which is specified at month-year level (for example: April 2014 to June 2017), it is proposed to study the relationship between starter loans and house prices per month. Studying by month provides a better fit between the dependent variable and the time periods. This improves the cross-sectional comparison between cases per time period and can positively influence the estimate.

V.II Confounding variables and house prices

The results section presented the effects of the confounding variable and were analysed and discussed. The estimated effects of the confounding variables in the result section will be further discussed.

V.II.I Standardized Income

Changes in income has a statistically significant effect on house prices. Table 4.2 shows that the annual percentage growth of house prices increases by 0.2 percentage point if income increases by one unit. Table 4.3 implies that the effect of changes in income on house prices only manifests itself in small municipalities. Based on the estimated effects of income on house prices in table 4.3, income has no statistically significant effect on house prices in middle-sized and large municipalities. However, it is not sufficiently clear why the estimated effect in the table only occurs in small municipalities. It is plausible that the housing market in middle-sized

and large municipalities is too 'overheated' causing it not to be affected by an increase of standardized income of inhabitants of a middle-sized or large municipality. This theoretical claim can be further substantiated by the heat map of the Bouwfonds Gebiedsontwikkeling. This heat map indicates which housing market in which municipality is the most overheated. Based on the heat map middle-sized and large municipalities experience the most overheated housing markets. The foregoing indicates that the gap between supply and demand of housing is more significant in middle-sized and large municipalities than in small municipalities. Potential buyers can also come from outside the municipal boundaries which further exacerbates the shortage of housing in middle-sized and large municipalities. Since this is causing a further increase in the demand for housing culminating in a higher increase of house prices. Due to a greater shortage of housing in middle-sized and large municipalities, income developments of inhabitants of a municipality may be less relevant in explaining house price developments in middle-sized and large municipalities.

Another explanation could be the development of standardized income of municipalities between 2012 and 2020. Table 3.2 shows that the standardized income of small municipalities between 2012 and 2020 was larger than the standardized income of middle-sized municipalities and large municipalities. This could lead to households in small municipalities receiving higher mortgages causing households in small municipalities to bid and offer a higher price for a house than households in middle-sized and large municipalities. However, this does not exactly explain entirely why there is not a statistical significant effect in middle-sized and large municipalities. It indicates that the effect is plausibly not statistically significant in middle-sized and large municipalities because of a too low income of households or too small changes in income to effect house prices in the context of the housing market. Or it could explain differences in magnitude of the estimated coefficients. Despite the foregoing, the question of why income has no significant effect on house prices in middle-sized and large municipalities falls outside the scope of this thesis.

V.II.II Migration

The result section indicates that migration influences house price developments in Dutch municipalities. Table 4.2 shows that, for all municipalities, an increase of one unit in the migration balance results in a 0.000348 percentage point higher percentage increase of house prices. However, table 4.3 shows that the effect estimated in table 4.2 only applies to large municipalities. It is plausible that this can be largely explained by differences in migration balance between small, middle-sized and large municipalities. In small municipalities, the average migration balance in each year was 74, in middle-sized municipalities 207 and in large municipalities 1406. Large municipalities experience a considerably larger population increase caused by migration influx than small and middle-sized municipalities. Which implies that the demand for housing in large municipalities increases grows more than in small and middle-sized municipalities. Since the increase of the demand for housing in small and medium is limited by the limited influx of immigrants – in comparison with large municipalities. Due to the considerably larger increase in population resulting from migration in large municipalities

and relatively limited increase in small and middle-sized municipalities, it is likely that migration only has an effect on house prices in large municipalities.

The estimated coefficients contradicts the empirical implications derived from the academic literature. Myers (2004) argues that house prices fall due to the influx of migrants. This thesis estimates that an increase in the population, due to migration, causes house prices to rise. The contextual factors of the Dutch housing market can provide a plausible reason why migration leads to higher house prices. According to the DNB and the Bouwfonds Gebiedsontwikkeling, the Dutch housing market is overheated. This indicates the scarcity of houses in the Dutch housing market. Additional demand arising from migration leads to a greater housing need and thus demand for housing. Given the current tightness on the housing market, additional demand arising from migration results in additional shortages on the housing market. Since housing markets in large municipalities do experience a more significant shortage of housing supply and experience a significant higher inflow of migration, it is plausible that migration, and the additional demand caused by it, only affects house prices in large municipalities. Given the low level of migration and lower house price development in small and middle-sized municipalities it is plausible that migration does not affect the development of house prices in the aforementioned municipalities.

V.II.III Housing stock mutations

Changes in the housing stock does not influence the development of house prices according to table 4.2. However, table 4.3 shows that a one percent increase of the housing stock results in lower house prices in small municipalities. Caution must be exercised in concluding, based on the estimated effects in table 4.2 and 4.3, that adding new houses to the housing stock cannot lead to price changes in the (long) term. It is plausible that the non-statistically significant estimated effect of housing stock on house prices in table 4.2 and table 4.3 are not statistically significant because of contextual factors related to the Dutch housing market. The goal of the Ministry of Binnenlandse Zaken en Koninkrijksrelaties is to build 100,000 homes per year in the Netherlands in order to reduce the shortage of houses (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2021; Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2022). Given the heat map of the Bouwfonds Gebiedsontwikkeling, the demand is greatest in middle-sized and large municipalities (BPD, 2021). In order to improve the balance between supply and demand in middle-sized and large municipalities, more houses needs to be constructed in these municipalities. In 2020, the addition of the number of houses to the housing stock was 74,232. Of the new total production of new houses, 43% was produced in small municipalities, 23% in middle-sized municipalities and 34% in large municipalities (CBS, 2022b). It is plausible that middle-sized and large municipalities produce insufficient new houses to meet the demand for homes in their respective municipalities. Or that the allocation of new houses is not efficient given the fact that more houses are produced in less overheated housing markets and less houses in more overheated housing markets.

The foregoing indicates that is likely that not enough houses are being constructed in order to meet the housing demand in middle-sized and large municipalities. Another potential

reason why an increase in the housing supply does not result in a reduction of house prices is related to geographic and other social priorities (CPB, 2019). Smaller municipalities have built 12.67% of their municipal surface in 2020 – both industrial buildings and homes. In middle-sized municipalities this is 28.1% and in large municipalities 34% (CBS, 2018). Larger municipalities have fewer options for designating new construction sites as they have already used more of their municipal for construction territory than small municipalities – indicating geographical constraint. Moreover, municipal authorities nowadays need to take more account of other social issues – such as sustainable electricity generation – that also require space (CPB, 2019). The available space can therefore also be allocated to other social issues in order to achieve those objectives. Another reason for a non-statistically significant effect of an increase in the housing stock on house prices may arise from local regulation, which is also a form of constraints caused by regulation. The theoretical framework discussed the possibilities of municipalities to conduct land policy. The estimated effects could imply that small municipalities pursue different land policies in comparison with middle-sized and large municipalities. Different kind of land policies could result in different regulatory impact on the production of new houses (Deloitte, 2021). Since the foregoing has not been empirically tested, the foregoing statement is based purely on assumptions.

V.III Policy implications of the estimated effects

The estimated effects of the independent and confounding variables have some policy implications in order to reduce problems on the housing market and plausibly improve the position of first-time buyers.

The estimated coefficients in the results section give an unclear picture of the effect of starter loans on house prices. Starter loans drive up prices in medium-sized municipalities or fall house prices for all Dutch municipalities. Nevertheless, the effect of both estimated coefficients is low; it concerns a low significance level and a small standard error. As already mentioned, it is not possible to state that starter loans unequivocally lead to a price increase or to a deterioration of the position of first-time buyers in the housing market. When starter loans result in a price-increasing effect on house prices, this occurs most frequently in medium-sized municipalities—albeit also to a limited extent. It is therefore plausible that policy on starter loans can be continued without serious price distortions in homes. Based on the estimated effects of migration, policy can also focus on the distribution of migrants. A better distribution of migrants in the Netherlands can prevent large municipalities from experiencing a price-increasing effect on house prices due to migration. Despite the fact that the estimated effect of changes in the housing stock was only significant in small municipalities, this thesis argues that housing construction is essential for lowering house prices. As has already been argued, it is plausible that the current production of houses is insufficient to slow down house price developments. Government policy must continue to focus and make efforts to further intensify the production of homes. If housing production is sufficient and this leads to a decrease in the housing shortage, it is likely that this will lead to a reduction in house prices.

VI. Conclusion

Starter loans were a much used policy instrument of municipalities during 2012 and 2021. The aim of starter loans is to make a first owner-occupied home more feasible for first-time buyers. However, based on academic literature starter loans could affect the development of house prices. This negative externality, namely the effect of starter loans on house prices in Dutch municipalities, was studied in this thesis. Based on the panel data regressions with time and municipality fixed effects, it is plausible that starters loans have an effect on house prices. However, it is insufficiently clear whether the presence of starter loans in a municipality leads to an in- or decrease of house prices. The results of the regression of the panel data, which includes municipality and time-fixed effects, indicates that house prices fell in municipalities that offered a starter loan. The negative estimated effect of starter loans on house prices is not in line with the academic literature. After all, academic literature argues that an increase in the total amount of outstanding loans results in an increase in house prices (Adelino et al., 2012; Fitzpatrick & McQueen, 2007; Gimeno & Martínez-Carrascal, 2010; Goodhart & Hoffmann, 2008). However, the robustness checks indicates that starter loans results in an increase of house prices in middle-sized municipalities. But not in small and large municipalities. Both estimated coefficients of starter loans are significant at a low significance level and have a low standard error. Although the estimated effects are significant, the empirical evidence is not convincing enough to reject the null hypothesis. This thesis does not find convincing evidence to establish that starter loans result in an increase in house prices. However, despite not being able to reject the null hypothesis, it is plausible – given the current level of significance – that there is a relationship between starter loans and house prices.

Given the findings in this thesis, it is likely that municipalities will be able to continue their policy on starter loans. However, the other confounding variables provide insights that future housing market policy can take into account to reduce overheating in the housing market and indirectly improve the position of first-time buyers. If migrants are more evenly distributed across municipalities, it will most likely put less pressure on the housing market in large municipalities. Despite the fact that changes in the housing stock in this thesis do not influence the development of house prices, it is concluded that an undiminished effort is needed to add more houses to the housing stock. It is plausible that the current addition of housing to the housing stock is insufficient to reduce overheating in the housing market - which most likely explains the non-statistically significant effect of changes in the housing stock on house prices.

Due to methodological limitations in the current thesis the relationship between starter loans and house prices could not be fully studied. Future research, which focusses on the relationship between starter loans and house prices, is recommended to make use of variables which suit the data of starter loans more adequately. The data showing which municipality offered starter loans was presented in a 'month/year' structure. If possible, follow-up research maintains the same structure as the data related to starter loans. Resulting in a more accurate estimation of the effect of starter loans on house prices. Such a methodology provides further insights into the relationship between starter loans and house prices. In addition, it is advised to collect better data about house prices. Despite the fact that WOZ values form a thorough proxy, it is advisable to use residential transaction data in the future. By studying the development of

house prices at the micro level, the effect of starter loans on the development of house prices can also be estimated more accurately.

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