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*Master Thesis Economic Policy*

## **How To Live With The Landlord Levy?**

**A Quantitative analysis on Dutch Housing Associations'  
Reactions to the Landlord Levy**

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# Abstract

This thesis aimed to analyse and answer the effects of the heavily debated landlord levy on housing associations. Via a statistical analysis, the research question “What has the effect of the landlord levy on the functioning of housing associations, in particular their housing supply?”, is investigated. This builds on earlier statistical research done on shorter timespan by [Veenstra et. al. \(2016\)](#). Utilising a dataset consisting of all Dutch housing associations between 2008 and 2020, the effect of the landlord levy on income, costs, housing stock mutations and total housing stock variables is analysed. Results obtained via regressions found significant effects of the landlord levy on (1) an increase in the social rental income, (2) an increase in the number of social housing units sold, (3) a decrease in the total number of social housing units. All of these effects were only significant between 2010 and 2016. Regressions for total housing stock variables were not found to be significant. Furthermore, costs were found to not at all be significantly related to the landlord levy. Overall, this thesis supports existing research with an extensive number of econometric analyses and shows that the housing associations could not compensate for the additional costs of the landlord levy without cuts in social housing supply.

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# 1. Introduction

As of 2023, the Netherlands is experiencing a large housing crisis, which includes a major shortage of affordable housing units, in particular social housing. A key supplier of affordable rental housing in the Netherlands are the *Woningcorporaties*, (Housing associations) who operate 80% of Dutch social housing and 30% of the total Dutch housing stock. As the housing crisis has increased, they have been urged by social partners to expand their housing supply. However, housing associations argue that they have been limited in their financial capacity, and point to the *Verhuurderheffing* or “landlord levy” in 2013 as one of main explanations. The landlord levy was a tax on the value of housing stock on mainly housing associations, which in practice equates to an average of 10% of rental income per year. Its implementation came as a way to increase state revenue after the financial crisis from a wealthy sector which had become politically unpopular through scandals the years before.

Research done by [Conijn & Achterveld \(2013\)](#), [Veenstra et al. \(2016\)](#) and [Koopmans & Jongeling \(2020\)](#) found that the additional costs of the landlord levy could not be compensated by increased income or cost restructuring. Housing associations would have to scale back expansion targets to remain profitable. However, research from governmental bodies [Ministerie van Binnenlandse zaken \(2016.2\)](#) and [Ministerie van Binnenlandse Zaken en Koninkrijksrelaties \(2020.2\)](#) contested this view. They argued that housing associations have also gained expanded possibilities of financing and additional income growth together with the landlord levy. There thus was no need to cut back on investments at all. As of 2023, the political discussion ended in favour of the housing associations with the landlord levy being discontinued. However, the question still remains, did the landlord levy have such a great impact?

With its dissolution a fact, what has in practice been the effect of the landlord levy on the operations of housing associations? Earlier statistical research by [Veenstra et al. \(2016\)](#) covered only 2 years a few years of the implementation of the landlord levy. As of 2023 it is now possible to analyse data covering the entire period of the landlord levys’ operation. What. Using this data, a broader analysis of these effects can both inform the discussion of the landlord levy and the broader discussion of how non profits like housing associations react when faced with additional costs.

Central to this thesis is the following research question: “What has the effect of the landlord levy on the functioning of housing associations, in particular their housing supply?”. To answer this question, chapter 2 first lays out the institutional context and framework in which housing associations. Chapter 3 describes the broader relevant literature on the effects of the landlord levy. Chapter 4 sets up an economic framework by reinterpreting a static production theory with the insights from the institutional framework and theories on non-profit organisations. Based on this 5 hypotheses were formulated which argue that the additional costs of the landlord levy would result in housing association; H1: generating higher incomes, H2: reducing costs, H3: Realising less new housing stock, H4: reducing existing stock and H5: Reducing overall housing stock.

To test this hypothesis, this thesis used a novel dataset compiled based on “The accountability information” (*De Verantwoordingsinformatie*) collected from all Dutch housing associations during the period 2008 - 2020. This dataset, which is described in chapter 5, gives detailed information about the development of housing stock and financial information

of every Dutch housing association association. Based on summary statistics, the hypotheses seemed to be correct, with the implementation of the landlord levy coinciding with large changes in both income, costs and housing stock variables. To test whether these effects are statistically significant this thesis ran a number of regression based on the ones used by [Veenstra et al. \(2016\)](#), as explained in chapter 6. The results noted in chapter 7 and discussed in chapter 8 supported partly hypotheses H1, H4 and H5. The landlord levy was found to be significantly related to an increase in social housing rent income, an increase in the number of social housing units sold and an overall decrease in social housing units, however only in the shorter 2010-2016 time period. Finally, this research makes it clear that the endogenous effects of the housing law in 2015 and the steady reduction in the interest rates until 2020, make it hard to truly isolate the effects of the landlord levy.

These results generally support the conclusion that housing associations could not compensate the landlord levy by other means. The implications for policy makers is similar to earlier research. Even with additional possibilities of income expansion, housing associations disinvested significantly, reducing their overall social housing stock. Future housing policy should refrain from additionally taxing housing associations, as housing associations are politically influenced nonprofits, they have shown to not to compensate for these costs by reducing expenditure or increasing income enough, but by reducing their housing supply.

## 2. Institutional Context

To understand the effect of the landlord levy on housing associations, it is crucial to understand the broader context of the Dutch housing market and the role housing associations and other institutions play herein. To do this, chapter 2 will sketch out the institutional context of the Dutch housing association sector. First of all, subchapter 2.1 introduces the Dutch social housing sector and places it in a theoretical context, which explains many of the tensions and problems visible later in the thesis. Subchapter 2.2 describes the History of Dutch social housing and introduces many important policy decisions and organisations which have formed the housing association sector up until 2020. Subchapter 2.3 gives an overview of the main institutions as of 2020, including going into more detail on the landlord levy and 2015 housing law. The Chapter ends setting out specifically how this web of institutions incentivises, limits and controls the actions of housing associations.

### 2.1 The Dutch Social Housing Sector: Introduction and Tensions

The Netherlands has an extensive housing sector, only a small part of which is provided by housing associations. As of 2018 57% of households are owner-occupiers, 33% live in social housing units and 9% live in the so-called “liberalised” rental sector. This thesis focuses solely on the social rental sector and the 80% of this social sector which is supplied by housing associations ([Centraal Bureau voor de Statistiek 2018](#))

How can the Dutch social housing sector be understood? The Dutch social housing sector is dominated by “*Woningcorporaties*” or housing associations. These housing associations are independent foundations that have the task of providing social housing services to lower incomes. [Elsinga et al. \(2008\)](#) argue that the Dutch rental market may be understood as a “Dual rental market”, as theorised by [Kemeny \(1995\)](#). In this vision, the Dutch rental market consists of a commercial rental market and a social rental sector. This social rental sector does not compete directly with the commercial rental market and is heavily influenced/regulated by the government. However, a key aspect of a “Dual rental market”, as also noted by Kemeny, is that they will in time develop into a “developed” social housing sector. This developed social rental sector does not receive any subsidies, exists in coexistence with the liberalised rental sector and can offer lower prices because the social rental sector requires lower returns. Such a developed social rental sector also generates problems and tensions which are mirrored in the Dutch social housing sector, as will be described in chapter 2.2. A developed social rental sector has market-distorting effects by leaving little space for commercial rental suppliers, further exacerbated by cross-subsidizing social rental operations by other operations [Elsinga et al. \(2008\)](#) and [Conijn \(2003\)](#). The non-profit nature of housing associations also brings with it problems of inefficiencies and moral hazard [Hakfoort et al. \(2002\)](#), [Conijn & Achterveld \(2013\)](#), [Elsinga et al. \(2008\)](#) and [Hakfoort et al. \(2002\)](#). Because of these problems, the Dutch housing association sector was deemed to be dominant. This led to policies such as the landlord levy, the 2015 housing law noted in 2.3.

## 2.2 Historical context of the Dutch housing system

The origins of the Dutch Social housing associations can be found in the emergence of philanthropic and particular housing developments at the end of the 19th century. To combat the low quality of housing of the poorest in society, the first “Woningwet” (Housinglaw) was introduced in 1901. Besides introducing the first legal norms of minimum housing quality, it regulated the relationship between the government and social housing organisations. Housing associations remained independent but became subject to closer government control and were prohibited from paying out profits. In return, these associations received cheap government-backed loans to expand their operations ([Beekers 2013](#)). (Municipality-owned) housing associations became the main organisational form to provide social housing, but their role in the housing market remained limited until after World War Two. The “Wederopbouw Wet” (The Rebuilding Law) of 1950 to rebuild the country after the war also consisted of a number of provisions to fund housing construction. Supported by the Ministerie van Volkshuisvesting (Ministry of Public Housing), it included large centralised buying of plots, urban planning and (partial) allocation to housing associations, which were aided by government grants ([Ministerie van Volkshuisvesting 2003](#)). Between 1945 and 1960, 50% of new houses were built by housing associations, while the other half was subsidised. From 1960 until 1985 housing association housing still made up 30% of the newly built housing stock ([Deelen et al. 2022](#)). This development led to social housing developing from 10 per cent of the housing stock in 1950 to 40 per cent in 1990 ([Hoekstra 2017](#)).

With the economic crisis of the '70s & '80s, economic subsidies were withdrawn in the housing market which was deemed relieved of the post-war shortage. Subsidies and loan support were dropped in 1994 in favour of a Solidarity Fund (Waarborgfonds sociale woningbouw) for Housing associations set up in 1987 ([Beekers, 2013](#)). Housing associations became autonomous in 1994, however still having to provide social housing and with oversight of the Ministry of Housing.. Most housing corporations were reformed into foundations on which the government, renters and municipalities had little control and oversight. The associations controlled and supported each other with the Solidarity Fund. In the 1990s and early 2000s, the newly autonomous housing associations expanded their operations. Supported by low-interest rates and high housing prices, housing associations became increasingly involved with side operations. They invested in large-scale social projects, company real estate but also financial products ([Hoekstra, 2017](#)). The resulting scale of their prestige project and the wages of directors were infamous and had a notable impact on later political decision-making ([Jansen 2012](#)).

The financial crash of 2008 resulted in much of the expanded non-core operations being insolvent and exposing the scale of mismanagement. A key example for many was the *Vestia Affaire*: in 2012 it was discovered that the largest housing association in the Netherlands -Vestia- had lost 2 billion Euros in speculation. These losses could not be covered by the solidarity fund. The entire social housing system was threatened by these scandals and was saved thanks to government intervention. This prompted the Parliamentary enquiry on the housing association system of 2012-2014 ([Parlementaire enquêtecommissie woningcorporaties 2014](#)). In 2013, before the end of the parliamentary enquiry and resulting changes to the housing law, multiple new laws were introduced. These included rules for maximum wages for executives and an additional tax on what in practice would only be housing associations. With the public outcry over the excesses of the wealthy social housing sector and increasing budget deficits on the part of the Dutch government,

the “Verhuurdersheffing” (Landlords levy) was introduced ([Hochstenbach, 2022](#)). Another goal of the landlord levy was to reduce higher income households occupying social housing, the so called “*Scheefhuren*”. Renters had to motivate them to join the “liberalised”, “middle rental” market, freeing up social rental stock ([Veenstra et al. \(2016\)](#)) During the 2010s, the liberalised rental sector was further liberalised by allowing for temporary rental contracts and through easing rent control. Housing associations were to be restricted in their market dominance by limiting them to only providing social rental stock.

The Parliamentary inquiry of 2012-2014 concluded that liberalisation of the social housing sector had led to moral hazards due to the societally crucial position of housing associations. Furthermore, the oversight by the monitoring body “Centraal Fonds voor de Volkshuisvesting”, was found to have failed ([Parlementaire enquêtecommissie woningcorporaties, 2014](#)). The “Woningwet” (housing law) of 2015 introduced new controls on the housing associations. The housing associations had to limit themselves strictly to services of general economic importance, which are directly related with providing social housing to low incomes. The “Authority Housing Associations” was introduced to increase oversight and stakeholders received more influence on housing associations ([Hoekstra 2017](#)). The years after the implementation of the housing law and the landlord levy did result in housing associations becoming less dominant on the rental market. However, increasing prices of liberalised rental housing has increased the demand of social housing by housing associations again as of the 2020’s ([Hochstenbach, 2022](#)). Under political pressure to increase supply of affordable housing, the landlord levy has been discontinued as of January 2023.

## 2.3 Institutional framework.

The historical context shows how the housing associations sector has experienced many changes and crises during its existence. This network of governmental organisations, sector-specific associations and foundations organise, accredit, control and support housing associations in their legally mandated goals of providing affordable housing. The goal of this subchapter is to set up a base institutional context which will later be referred to when analysing the incentives and limits of the housing association sector in how they react to changing cost structure, and in the thesis specifically the landlord levy.

### **The institutional framework as of 2020.**

Housing associations sectors are nonprofit organisations which provide a public good independently from the government ([Aalbers et al. 2017](#)). Housing associations are defined by the Ministry of Internal Affairs as organisations whose main goal is to provide rental housing for people with lower incomes.

Legally, the *Woningwet* of 2015 and before that the “Besluit beheer sociale-huursector” of 1993 defines housing associations as those organisations which are registered as *toegelaten instellingen*, or “allowed institutions” with the *Autoriteit Woningcorporaties* ([Woningwet 2015](#)). Allowed institutions are limited by the 2015 Housing law to only provide *Diensten van algemeen belang* (services of general interest) or *DAEB* services which limit their operations to provide affordable housing and *Leefbaarheid* (neighbourhood liveability) projects. It further sets boundaries on the methods and levels of financing and debt. The Housing Law states that 80% of housing supplied by housing associations should be social housing.



Most of the housing stock of housing associations is subject to rent control. Social housing in the Netherlands is defined as having a rent lower than the *Liberalisatie grens*, or liberalisation limit (see table 5.4 in Chapter 5). Consequently, 80% of housing units of housing associations should be supplied with rent under this limit. Housing below this liberalisation limit is furthermore subject to a points system which indicates how high rent can be, based on the qualitative aspects of a rental unit ([Huurcommissie 2023](#)). Additionally, yearly rent increases on current renters are set as a maximum percentage of rent increase per year, which can be based on the number of points and the income of renters. All of these rent controls are set yearly by the Ministry of Internal Affairs. This means that the sector is subject to strict regulation around rent control. Some optimisation of rents based on the income of renters is possible and was introduced alongside the landlord levy and the 2015 housing law, as will be further later in this subchapter.

To manage demand, the allocation of housing units from housing associations is organised by way of regional waiting lists. Housing is then assigned based on the length of the wait, with sometimes priority to specific groups like for example refugees or people with local jobs. As a result of the 80% rental support eligibility rule, there are income maximums which indicate whether someone is eligible for which kind of association-provided housing. However, when in an active contract, a tenant may remain in their house after their income has increased above the income maximum (so-called *scheefhuren*, or “skewed income-to-rent ratio”). This skewed renting plays an important part in the discussion around the landlord levy.

To support the financial operations of housing associations, allowed institutions are members of the *Waarborgfonds Sociale Woningbouw* (Guarantee Fund Social Housing). This is a solidarity fund between housing associations and guarantees that housing associations can lend at below-market rates generating coverage of loss-making housing associations. To mitigate potential moral hazard risks the Guarantee Funds Social Housing and the *Authority housing associations* (Autoriteit Woningcorporaties), or AW, oversee the financial and internal operations, impose fines and assign overseers in case of malpractice ([Autoriteit Woningcorporaties & Waarborgfonds Sociale Woningbouw 2018](#)).

The day-to-day operations of housing associations are run by a board of directors, whose compensation has since 2013 been maximised based on the size of their housing association ([Gerritsen & van der Werf 2013](#)). This board of directors is directly overseen by a board of commissioners who legally employ the board of directors to oversee their actions and act as the most important level of internal oversight. The board of commissioners oversee finances, large investments and must report financial or directorial integrity problems to the Ministry of Internal Affairs.

Dutch social housing associations do not operate on a free market and lack profit incentives. As an alternative, the targets and incentives of housing associations are -as regulated by the Housing Law of 2015- set out in *prestatieafspraken* or “performance agreements” ([Ministerie van Binnenlandse Zaken en Koninkrijksrelaties 2021](#)). These performance agreements are made every 4 to 5 years by the *Locale driehoek* (local triangle), made up of the housing association, renter associations and the municipality. The goals are set based on consensus, and every 4 years a visitation must be performed to assess whether these goals are met. Failure to achieve these goals can in an extreme case be broad before an arbitration board based on which the Minister will make a decision ([Ministerie van Binnenlandse Zaken en Koninkrijksrelaties 2016.1](#)). Also due to the 2015 housing law, these agreements are influenced by the *Indicatieve Bestedingsruimte Woningcorporaties* (Indication of spending capacity of housing associations). This is an

estimate of the financial means of a housing association per municipality published yearly by the Ministry of Internal Affairs to reduce information asymmetries in the local triangle when setting the performance agreement.

This sets out in summary the most important institutions and laws for housing associations. The following paragraphs go into more detail on two of the most important institutional developments which take place within the time scope of this thesis.

### **The landlord levy.**

The Landlord Levy was Introduced in 2013 in order to generate an annual governmental revenue of €1.7 billion until 2017 The Landlord Levy targeted rental housing providers with more than 10 rental units with a rent under the Liberalisation Limit As housing associations provide nearly 80% of housing offered below the liberalised rent level in 2012, the tax mostly burdens housing associations.<sup>1</sup> The expansion of a 50-unit exception in 2018 resulted in housing associations paying 95% of the total landlord levy compared to 90% in 2014.<sup>2</sup> The tax was based on the tax assessed house value (WOZ value). Over time, various tax incentives were introduced, such as write-offs for specific investments and regions, to reduce the tax burden. Starting 2020, all new construction could benefit from tax write-offs, further diminishing the levy's impact ([Ministerie van Binnenlandse Zaken en Koninkrijksrelaties \(2020.2\)](#)).

To let housing associations compensate for the additional costs, and to combat “*scheefhuren*”, rental income was allowed to be increased up to 2.5% above the normal rent increase cap for households who make more than €43000,- ([WOON 2015](#)).

### **The 2015 Housing law**

A crucial development during the period of this thesis is the implementation of the 2015 *Woningwet* (Housing law). Influenced by the parliamentary inquiry on the Vestia affair and new European state support guidelines, the Housing law stipulates that housing associations now may only focus on DAEB (Services of General Interest) activities. Non-DAEB activities should be financially and organisationally split or sold before 2018. DAEB activities encompass the rental of housing units and some limited non-housing rental properties ([Inspectie Leefomgeving en Transport 2016](#)). 80% of housing stock must be allocated to individuals under a certain income level. Financing is only possible via the WSW and other financial products are not allowed. Housing associations are furthermore subject to much more scrutinised oversight. Independent oversight was strengthened and expanded by the Autoriteit Woningcorporaties. Stakeholder oversight was improved by making renters part of the board of directors and giving Renters organisations, municipalities and housing associations access to a tenant consultation ([Vereniging van Nederlandse Gemeenten 2015](#)).

The importance of this housing law and the DAEB/non-DAEB split is important due to the exogenous effects of this reform on the operations of housing associations. The law changed incentives and increased oversight but also reduced other forms of income limiting other more profitable operations. The DAEB split also generates problems for the dataset as will be noted in chapter 5.

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<sup>1</sup> 80,2% in 2012, 79,3% in 2015, 79,1% in 2018 and 81,3% in 2021. ([Centraal Bureau voor de Statistiek 2022](#))

<sup>2</sup> 87,3% in 2013, 89,6% in 2014, 92,6% in 2015, 93,3% in 2016, 92,6% in 2017, 94,9% in 2018 and 94,6% in 2019. ([Ministerie van Binnenlandse Zaken en Koninkrijksrelaties 2022](#))

## **Resulting Mechanisms of Influence and Performance**

How do these institutions influence the housing associations' operational incentives? Housing associations lack many normal market incentives, as they are non-profit organisations, without owners and with maximised director income. Furthermore, there is little competition in the association sector as rents are generally below the market clearing rate, generating ample demand. To compensate, it are the stakeholders who, through the institutional framework, attempt to generate alternatives to market incentives. To understand how these stakeholders shape the operational incentives of housing associations, we can categorise their influence into five distinct mechanisms: setting targets, checking on targets, ensuring integrity, maintaining continuity, and promoting efficiency.

**Setting targets:** Set performance goals as a result of the "local triangle". These performance goals are supported by information from the "Indication of spending capacity of housing associations", which alleviate information asymmetry. The AW and WSW check if these plans are well-developed and are deliverable.

**Check on targets:** Visitations check on the state of performance goals every 4 years by way of an appraisal of societal performance housing associations. Furthermore, if members of the local triangle argue that targets are not achieved or not ambitious enough, the minister of internal affairs may intervene in such a dispute

**Integrity:** On the lowest level, associations have a council of commissioners which oversees the board of directors. These commissioners oversee the financial management and continuity of the housing associations. These commissioners need to pass a test with the highest level of oversight, the Authority Housing Associations or AW. The AW is the central body of oversight and oversees the entire sector to test whether organisations act according to the limits of the housing law, make financially sound choices, oversee internal organisational quality and oversee the integrity of the commissioners and the board of directors. The key is to make sure housing associations themselves have sufficient internal oversight, but the AW can act when problems or complaints arise. The AW is authorised to give advice but also sanction housing associations, up until placing them under caregiver oversight.

**Continuity:** The WSW acts as the main lender for housing associations, as housing associations are also limited in the level of non-WSW loans they may have. The WSW framework governs the total debt position of housing associations and works together with the AW to intervene when debt positions are unattainable which may lead to AW intervention named above.

**Efficiency:** The interaction between the local triangle, who push for efficiency and the operational restrictions and oversight by visitations, the AW and the WSW should lead to incentives to maximise production, without problems of integrity or going into unreasonable debt. Efficient operations are needed to reach both goals.

### 3. Literature review

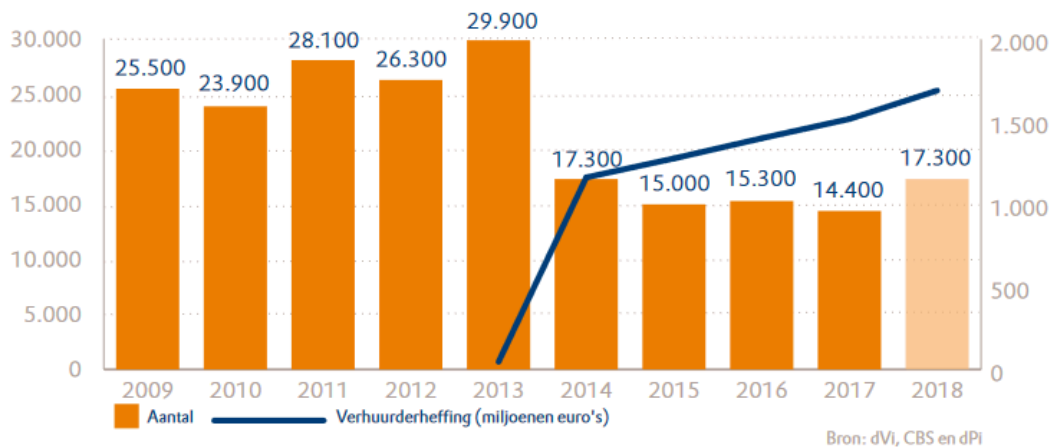
The effects and predicted effects of the landlord levy has been the subject of both political and academic debate both before and after its implementation in 2013. Of each source selected, this literature review attempts to ask the same questions on the effect of the landlord levy. First the financial impact (income and costs) and secondly if and how these financial changes impacted the makeup of the housing stock.

Before the introduction of the landlord levy as a part of the housing accord in 2013, [Conijn & Achterveld \(2013\)](#) did a costs-benefit analysis for the Dutch Senate on the sustainability of the landlord levy. Based on the maintenance of a minimum solvability of 20% and a total landlord levy of 1.7 billion euros they concluded that both a cut of 10% in operating expenses and a halving of new housing construction was needed in the period 2013 to 2021 to maintain the 20% solvability limit. This reduces new construction from 200.000 to 118.000 in this period. Without these interventions, the solvability will drop below 15% in 2019. [Poulus & Marchal \(2013\)](#), which were commissioned by the Ministry of internal affairs, found that even if housing associations maximised rents at 90% of the rental limit only 85 per cent of the landlord levy could be covered by rent increases. However regional differences were large, especially in the Randstad region where WOZ values have been higher. Analysing the first few years of implementation, the [Autoriteit Woningcorporatie \(2015\)](#) found housing associations' financial positions seemed to be improving. The AW concluded that the proposed investments could still be made. More cost-efficient operations, the low-interest rate and increasing income from housing stock sales improved the financial situation of housing associations. In 2016 [Veenstra et al. \(2016\)](#) evaluated the landlord levy for Aedes. The researchers analysed the effectiveness of the levy following the goals set by the lawmakers in 2013. These goals were 1: To generate revenue, 2: to combat skewed income-to-rent ratios and 3: as repayment of the financial support of the government of housing associations in the past. The researchers note that the possibilities of housing associations to collect the funds needed were to cut back on investments, increase rents, sell housing units or move units from the social housing sector to the liberalised sector, all of which undermine the societal task of housing associations. Veenstra et al. also ran a descriptive and statistical analysis of the dVi data from the period 2010 until 2014. The descriptive analysis found a marked increase in social housing stock that was priced above the liberalisation because existing housing stock was re-priced. They furthermore note an increase in general rent level and a reduction of costs. Using the dVi data for all housing associations they performed multiple panel regressions. Taking the regression of the landlord levy in euros per house as the main independent variable they found significant effects on the % of housing above the liberalisation level (coefficient 0.0059, Significant effect of  $P < 0.001$ ), demolition of housing (coefficient of -0.0008, significant effect of  $p < 0,10$ ), the rental income per housing unit (coefficient 0.2603, significant effect of  $p < 0.05$ ), personnel costs (coefficient of -0,17, significant effect of  $p < 0,01$ ) and maintenance expenditure (coefficient of -0,27, significant effect of  $p < 0.10$ ). In their research, they used dummy variables for years, housing characteristics, tenant characteristics and location characteristics and a fixed effect. Veenstra et al. 2016 did not find significant effects on debt levels, other costs, new construction of housing, sales of housing, acquisitions of housing and energy consumption. They conclude that the housing stock of housing associations has generally increased in price and out of the social housing category with some costs being decreased, leaving a smaller relative supply (from 92% to 80% of the total supply) for a

growing group of eligible social tenants (a group which grew by 3% from 2011 to 2014). They note that the law is targeting the entire group of social tenants which is ineffective on the already declining skewed income-to-rent ratios (Scheefhuren), partly due to new tenant allocation regulation. It may be noted that Veensta et al. did not run specific regressions while specifying the social housing stock as the dependent variable, focusing on the % of housing stock above the liberalisation level.

A broader study of Dutch social housing by [Hoekstra \(2017\)](#) in *Critical Housing Analysis* interprets the verhuurderheffing as being part of a broader development curtailing the policy space of housing associations.. Hoekstra notes that while the landlord levy and the housing law granted additional space to increase incomes, the same legislation demanded “suitable allocation” to poorer households, which curtailed much of the anticipated space for higher rents His descriptive data analysis from 2009 until 2014 notes a decrease of newly built properties by 40%, a decrease in acquisitions by 70%, a doubling of dwellings sold and a general decrease in total mutations with a nominal decrease of 14.000 housing units in 2014. He notes that these effects have increased the social residualisation of the poorest demographics in an increasingly shrinking social rental sector where rents rise faster than incomes. The housing association monitor of [Aedes \(2019\)](#) imply that the rise of the landlord levy has a casual negative effect on the number of housing units constructed by housing associations. Additional tax burdens have hampered the investment capabilities of the housing associations since 2013, resulting in a halving of housing construction. Table 3.1 shows the data used to support their reasoning.

Table 3.1: The orange bars show the construction of housing units for the entire housing association sector per year (left y-axis value). The blue line indicates the landlord levy in millions of Euro per year as tax levied on the social housing sector per year (right y-axis value)



A report from the [Ministerie van Binnenlandse zaken en Koninkrijksrelaties \(2020.1\)](#), regarding the roles and resources of housing associations, aligns closely with projections made by Ortec Finance in 2013. It suggests that by the close of the 2020s, 15 out of 19 housing associations regions will lack the requisite financial capacity to execute their planned investments in expanding social housing and sustainability initiatives. Out of an anticipated €116 billion investment requirement, €30 billion will remain inaccessible until 2035. This limitation stems from management, maintenance, and tax expenses rising more rapidly than rental revenue. Additionally, a significant portion of the sustainability investments yields a minimal return on investment. To address these financial shortfalls, the report recommends halving the landlord levy to generate an additional €20 billion, seeking €10 billion in governmental support, delaying sustainability goals, and exploring avenues for

increased rent to offset these added expenses. Research by [Koopmans & Jongeling \(2020\)](#) for Aedes mirrors the need for the 30 billion euro gap in investments and proposes the same funding solution..

The evaluation report by [Lijzenga et. al. 2020](#) expanded further on these financial problems. Descriptively analysing Aedes dVi based data, they found that the housing associations sector faced a yearly 1.67 billion euro shortfall for the next 10 years. The landlord levy of 1.7 billion euros could not be matched by increased income or reduced costs. These methods have not been sufficient due to housing shortages leading (under pressure from municipalities to fewer sales. Just as noted by [Hoekstra \(2017\)](#), there have been fewer rent hikes due to fears of affordability and fewer *Scheefhuurders* due to stricter tenant income application limits. More efficient operations did reduce “Influenceable operations costs”. However non-influential operations costs have increased, in particular landlord levies and further taxes. The report mirrors the findings of the [Ministerie van Binnenlandse zaken \(2020.1\)](#) report by noting how sustainability investments have little returns and undermine financial position. To compensate for the 1.67 billion euros per year needed for required investments in new construction and sustainability, which is nearly equal to the total costs of the landlord levy, the report argues for the rejection of the landlord levy.

Much of the literature thus seems to be in consensus that the costs of the landlord levy are not compensated and thus lead or will lead to disinvestment and a reduction of housing stock.

However there were competing analyses, especially out of the ministry responsible for housing associations. The Dutch ministry of internal affairs, at the request of parliament, analysed the landlord levy in both [2016](#) and [2020](#). The first analysis [Ministerie van Binnenlandse zaken \(2016.2\)](#) indicates that the financial positions of the housing associations have not worsened since 2013, but have even improved because of a strong rent increase, the sale of housing units and reduced costs. Four years later, the [Ministerie van Binnenlandse Zaken en Koninkrijksrelaties \(2020.2\)](#) again argues that the housing associations are limited in their investment capacity. This time, the rapport concludes that there is a further 29 billion euros of additional financial space available for housing associations while staying within the legal limits of solvability by way of increased lending. This is due to Interest coverage rates(IRC) improving from 1.71 in 2017 to 1.9 in 2018.<sup>3</sup> and the loan-to-value ratio (LTV) increased from 63,7 in 2017 to 53,4 in 2018.<sup>4</sup> This financial space is further increased by the expansion of the minimum limits on the Loan to Value ratio and the interest coverage rate by the Aw and the SWS per May of 2020.

The existing literature on the effect of the Landlord levy shows 2 partly opposing positions. Position 1, as supported by [Conijn & Achterveld \(2013\)](#), [Poulus en Marchal \(2013\)](#), [Veenstra et al. \(2016\)](#), [Hoekstra \(2017\)](#), [Aedes \(2019\)](#), [Dutch Ministry of Internal Affairs \(2020.1\)](#), [Koopmans & Jongeling \(2020\)](#) and [Lijzenga et. al. \(2020\)](#) predict or conclude, based on a descriptive analysis of income and expenditure statistics, that the landlord levy will undermine future investments goals. Future income is not sufficient and thus further debt has to be accrued or cuts made to the housing supply. These researchers also show that most cuts in practice have been made in the housing stock and expenditure and that housing associations have taken on limited additional debt.

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<sup>3</sup> The Interest Coverage Rate is calculated by dividing net profit (before deducting the interest) by the total interest expenses.

<sup>4</sup> The Loan to Value Ratio is calculated by dividing the loan amount by the lender-assessed value of the property



Position 2, taken by [Ministerie van Binnenlandse zaken \(2016.2\)](#) and [Dutch Ministry of Internal Affairs \(2020.2\)](#) conclude by analysing financial metrics, that if housing associations were more willing to finance through debt the needed investments could be funded. However, it seems that housing associations have not used these spare financial capabilities in the past. [Veenstra et al. \(2016\)](#) already concluded in their statistical analysis that housing associations did not take on significant further debt and preferred to change the make-up of their housing portfolio, increase rents and decrease expenditure. This is a reaction visible in the rest of the literature as well.

It should be noted that much of the research which supports position 1 has been either generated by or supported by housing association interest groups. In contrast, the reports which argue that there are ample possibilities to financing via debt are noted by the ministry. This may indicate how this debate is partly politicised.

The literature review indicates mostly on descriptive statistical analyses that housing associations have reacted to the landlord levy by decreasing new production, liberalising their housing stock, increasing rents and reducing operational expenses, effects which [Veenstra et al. \(2016\)](#) shows to be statistically significant before 2016.

### **Gaps in the Literature Review**

The descriptive statistical analysis has indicated a relatively convincing effect of the landlord levy on the finances and housing stock development of housing associations. Gaps however are still present. It has been shown that the landlord levy has impacted total housing production. However, the last statistical analysis dated by [Veenstra et al. \(2016\)](#) is from 2016 and focuses mostly on the percentage of the liberalised housing stock of housing associations. Research on the effect on the social housing stock seems to be an interesting variable, as this is the housing stock in shortest supply. This gives us three interesting new perspectives of study:

1. The effect of the landlord levy on the number of social housing units instead of the effect on the total housing of housing associations as used by [Veenstra et al. \(2016\)](#). The DAEB/Non-DAEB split forced housing associations to discard non social housing stock, thus decreasing total housing stock independent of the landlord levy.
2. Furthermore, a better unit of the landlord levy, namely as a percentage of rental income, may be useful to measure the relative costs compensated for the possibilities for higher rental income provided by the law that passed the landlord levy.
3. Taking a longer time sample. [Veenstra et al. \(2016\)](#) used data from the period from 2010 until 2014. Calculating the effect for a longer period might compensate for developments which were already happening before the landlord levy as pointed out by [Hoekstra \(2017\)](#).

Concluding: The research by [Veenstra et al. \(2016\)](#) is highly elaborate and forms a sound foundation to base new investigations on. Using the dVi of a longer time-period and with additional variations of dependent variables gives a better insight into how the landlord levy has affected the operation of housing associations.

## 4. Economic Framework

Before delving into the reactions of housing associations to the landlord levy, it's crucial to establish an economic framework. This will help us understand how housing associations generally respond to economic changes.

To generate an understanding on how housing associations do react to economic changes, This chapter starts with a basic model of how a company would set the supply of rental housing, how would they react to the landlord levy? Chapter 2 highlighted how housing associations are subject to different incentives and limitations compared to normal companies. With these limitations in mind, this thesis analyses how the actions of housing associations are constrained compared to market actions and which reactions remain open. To better understand the possible incentives and thus the actions of these housing associations, economic theory on non-profit organisations and their incentives and shortfalls are discussed and included. Based on the supply theory of housing, together with the institutional limitations of the Dutch social housing sector and insight into the incentives of non-profit organisations, we will stipulate the hypotheses of this thesis.

### Supply and Demand Theory

According to the classical law of demand and supply, the demand for houses will decrease when house prices increase and the housing supply will increase. Those who demand goods are willing to pay a price for these goods. Suppliers are willing to provide goods as long as their costs are below the price a consumer is willing to pay. [Olsen \(1969\)](#) and [De Leeuw et al. \(1971\)](#) show how theoretically the rental sector can be analysed as a competitive market where housing services are provided as a homogenous good.

Economic production theory further details how these costs are determined. firms produce goods by combining production factors; these inputs together generate a production price for a unit of production. However, assuming technology and other prices stay the same, each additional unit of production costs more compared to the unit before due. This is due to increasing demand and scarcity for production inputs such as land or labour. Thus more production leads to higher costs of production, the costs per unit are the marginal costs of production (MC). On the demand side, the quantity demanded decreases as the price of a product increases. From the perspective of producers, this price is represented as the marginal rate of return (MRR). Thus in a perfect market, the number of goods supplied is set at such a level that the MC is equal to the MRR of the product.

### Basic model of rental market Supply

[De Leeuw et al. \(1971\)](#) describe a basic model of supply and demand based on the static production theory to describe the housing rental market. In this model, a housing unit is an abstract normalised homogeneous unit of housing service, which includes quality, location size etc. Using the model of De Leeuw et al. (1971) as a basic, demand and supply can be abstracted as follows:

$$\text{Demand: } Q_d = H * f(Y, R/P)$$

$$\text{Supply: } Q_s = f(R, C, O, Q_d)$$



This model  $Q_d$  represents the total quantity of housing services demanded as the sum of individual demand functions by the number of households  $H$ ,  $Y$  represents the income per household,  $P$  is the general price level and  $R$  is the rent price.  $Q_s$  represents the total quantity of housing services supplied as a function of the rent price  $R$ , costs of construction  $C$ , operational costs  $O$ , and demand  $Q_d$ . With this model, housing supply is set through supply and demand, with the supplier of housing services setting supply based on whether the marginal rate of return (MRR) of an additional housing unit is higher than the marginal costs (MC). Supply of housing units will increase as long as the MRR on the housing market is higher than MC of supplying one additional measure of housing. For existing housing stock, housing services will be provided in the same way. Thus housing supply expands as long as additional profits can be made.

### **The effect of a landlord levy on a model rental market.**

In the basic model, supply noted above additional costs (such as a tax on the value of housing stock eg. the landlord levy) increases the operational costs of the rental unit suppliers. How the number of housing units supplied change depends on the level of price elasticity of demand and supply. If there is low price elasticity, a higher price will result in only very little reduction in demand and thus the supply stays relatively the same. When there is a high price elasticity, the price increase will reduce demand much more significantly and thus fewer housing units are supplied. In this model due to competition operational costs are already minimised.

### **A landlord levy in the Dutch context.**

The effect of the landlord levy on the Dutch liberalised rental sector can be analysed based on this theoretical model. The Dutch rental market has high levels of demand which results in low demand elasticity. In contrast, supply is relatively inelastic due to difficulties in generating new supply in the regulated Dutch housing market and due to the large marginal costs of new construction. Thus in the regular Dutch rental market, the landlord levy would result in mostly an increase in rent prices ([Centraal Planbureau, 2017](#)).

However, as noted in the institutional framework, the Dutch social housing sector does not operate as a market. The housing associations that supply housing are non-profit organisations that experience different incentives and are institutionally constrained to not react as market players.

### **Housing associations as Non-profit organisations.**

Dutch housing associations are not companies, but non-profit organisations. Housing associations are “hybrid organisations” and occupy an organisational position between a government entity -due to the large amount of regulation and influence of the government on operations due to housing associations providing a public good- and -due to the financial independence from government and need to make a profit to sustain their operation- a commercial company ([Elsinga & Van der Schaart, 2014](#) & [Karre, 2007](#)).

Non-profit organisations emerge and exist because of information asymmetries present in product markets. The “Trust theory” of [Hansmann \(1987\)](#) argues from a demand side that non-profit organisations have a comparative advantage when a market experiences information asymmetry between supplier and financier who is not the main end consumer. The “non-distribution constraint” (the removal of a profit motive) of nonprofits generates higher levels of trust for the funding party that the profit motive will not lead to cutting

corners. From a supply-side perspective, according to [Ben-Ner & Van Hoomissen \(1991\)](#)9) “Stakeholder control theory” nonprofits are created by demand-side stakeholders themselves. Demand side stakeholders do not only demand non-profits, but they create them themselves to maximise control over output in the face of information asymmetries”. As a result, a key demand-side stakeholder becomes a stakeholder in the supply-side organisation as well.

Non-profit organisations have several positive and negative characteristics based on the market context they operate. Negative aspects are: (1): less efficiency due to a lack of efficiency incentives from the market and the government, which makes them inherently less efficient ([Koning & Leuvensteijn, 2010](#) & [Hansmann, 1987](#) & [Brandesen & Karré, 2011](#)). (2): Less ability to react to market dynamics ([Handy, 1997](#)). Due to these problems, [Handy \(1997\)](#) argues that housing associations only exist temporarily when there is a temporary failure of the market, disappearing from competition when the market rebalances. However, [Glaeser & Sleifer \(2001\)](#) and [Elsinga et al. \(2008\)](#) argue that nonprofit organisations can be comparatively more efficient compared to market actions if (1): The quality of a service declines after the contract has been signed. (2): The market for a good has low profit margins. (3): The product or service is ideological or altruist in nature. (4): There are high costs associated with changing suppliers (such as moving house) are high. Furthermore, [Brandesen & Karré \(2011\)](#) show that the moral and inefficiency risks are mitigated in Dutch hybrid organisations through active regulation and professional actors.

Thus how do housing associations as non-profit organisations act differently from market actors? (1): nonprofits are output maximisers instead of profit maximisers and thus expand operations as long as the entire operation remains profitable ([Hansmann, 1987](#)). (2): Efficiency is generally lower due to the lack of competitive incentives, which generates problems in reducing operating costs.

### **How Housing associations can react to the landlord levy.**

Housing associations are not allowed to react as normal market players due to controls and regulations imposed by stakeholders. Where in the rental market supply and prices are set by firms reacting to demand via the price mechanism, housing associations are explicitly not able to do this.

The main market mechanisms are prices, but for housing associations, these are regulated by the government by way of a point system for the social housing units. These social housing price maximums are below market prices which leads to demand being much higher than supply. To regulate this demand social housing assignment is based on a waiting list. As these waiting lists are commonly more than 10 years long, we can suppose that at the current social housing price, demand elasticity for social housing can be judged as being inelastic. As Dutch Housing associations lack the profit incentive found in market-based housing suppliers, supply is mandated by way of production and supply targets. Without efficiency being the result of market incentives, incentives are generated by regulation.

Knowing that nonprofits are output maximisers, price increases are limited and supply is mandated, how will housing associations react? Based on the literature review and economic theory 2 avenues of reaction are analysed and hypothesised, namely increasing income or decreasing costs. The 3rd avenue of research is the influence of the landlord levy on the actual units of housing provided by housing associations.

## **Hypotheses**

The main hypothesis is “What has the effect of the landlord levy on the functioning of housing associations, in particular their housing supply?”. To answer large hypotheses five sub hypotheses have been formulated for each of the possible method adaptations for the housing association.

### **Income:**

Price is the main measure to shoulder the costs of the landlord levy in an inelastic market, however, price increases are heavily regulated. However additional regulatory space allowed for rent increases may indicate that housing associations will expand. Other forms of income will also probably be increased, such as housing sales. We assume housing associations will use these measures.

Hypothesis 1:

$H_1$ : *A higher landlord levy has resulted in housing associations generating more revenue.*

### **Costs**

To shoulder the additional costs of the landlord levy, housing associations may also reduce expenditure levels. But housing associations as non-profits lack the competitive incentives to reduce costs. However based on the literature review and the increased oversight a decrease in other influenceable costs is expected.

Hypothesis 2:

$H_1$ : *A higher landlord levy has resulted in housing associations reducing costs*

### **Housing stock**

Housing associations are output optimisers, however, they are also risk averse. As housing associations have limits on how they can generate revenue and incentives for cost reductions are limited, reducing output is an alternative method of reducing costs. This can be done by saving on new investments such as a reduction of new production (as was noted in the literature review), but can also be done by sales of less profitable housing stock or fewer investments overall.

Hypothesis 3:

$H_1$ : *A higher landlord levy has resulted in less expansion of housing stock*

Hypothesis 4:

$H_1$ : *A higher landlord levy has resulted in higher disinvestments in housing stock*

The literature review is quite clear on the negative effects of the overall landlord levy on the housing stock of housing associations. If price increases are limited and cost reductions are hard to implement as well, selling housing stock which is not replaced may be a prime source of revenue. If this is the case, we expect the total number of housing units to be negatively influenced by the landlord levy.

Hypothesis 5:

$H_1$ : *A higher landlord levy resulted in a decrease of housing association housing stock*

## 5. Data

### 5.1 Construction of data set and variables.

To generate a dataset on the landlord levy, income, expenditure, housing stock mutation and housing stock the “Verantwoordingsinformatie woningcorporaties” (*Accountability information housing associations*) or “dVi” was used. This is based on an obligatory yearly detailed survey self-reported by every Dutch housing association. A yearly dVi dataset is compiled by the Ministry of Internal Affairs which includes every individual dVi information of every “Toegelaten instelling” in that year. Thus the sample covers all Dutch housing associations. The dVi was chosen as a dataset due to the long period available and the high number of observations which are at the level of housing associations. Other data platforms like Aedes-Datacentrum do not go back before 2012 and do not provide data on a more detailed level than provinces or municipalities. The yearly data files were sourced from data.europa.eu, the data portal of the data repository of the European Union, due to problems with accessing the data via Dutch governmental sources ([Accountability information housing corporations, 2008-2020](#))

For this research the datasets from 2008 until 2020 were chosen. The verhuurderheffing was introduced in 2013 and implemented fully in 2014. Taking 2014 as the true earliest year of the verhuurderheffing this results in 5 years without and 7 years with the verhuurderheffing.

The process of merging the yearly dVi files brought with it challenges which limited the options for statistical analysis. The format and reporting rules of the dVi changed drastically during the years, notable in 2012, 2015 and 2017. At these moments changes were made by adding, reorganising or removing information requested and thus changing many of the variables collected in the dVi. Much of the changes were related to the Landlord levy and the Housing law of 2015 which redesigned the entire dVi. Because of this not all variables are generated equally every year and some variables were not able to be generated because of this.

The dataset starts with 430 housing associations in 2008, reducing to 380 in 2012, 355 in 2016 and 286 in 2020. [Veenstra et al. \(2016\)](#) fused his housing associations together for all the years based on this last year observation. However, as no overview of the housing association merging of the 2008-2020 time period could be found, this could not be done in this research. In the dataset, this results in housing associations disappearing and some housing associations gaining large amounts of housing stock as “other mutations”. The effects on the regression however should not be too significant overall, due to the number of housing units disappearing this way as at their highest in 2010, the 52.000 represent only 2% of the total housing stock at that moment, with most years at 0.5%.

This data was collected specifically on the stock of social housing units instead of the total housing stock. This is because of the transfer of non-daeb housing units away from housing associations after the 2015 housing split, leading to an exogenous decrease in the housing stock of “toegelaten instellingen” through the administrative split of ownership. However, some data, such as cost variables, could be not separately available for only social housing units.

When constructing the dataset, a major problem with making this social housing split was that there was no clear definition of social housing in the dVi. A replacement definition was generated based on the dVi division of “with or without rent support eligibility”. As noted

in Chapter 2, social housing has a rent level below the liberalisation and those are eligible for *Huurtoeslag* (rent support). Using this definition, in the dVi up until 2013 the social housing stock can be calculated as totalling the stock of *Goedkope huurwoningen* (Cheap rental units), *Betaalbare huurwoningen* (affordable housing units) and *Dure huurwoningen tot huurtoeslaggrens* (expensive housing units eligible for rental support limit). The introduction of the social housing as DAEB-activity distinction in 2014 and the termination of the “eligible for rental support” distinction after 2017 led to the need to calculate a new definition of social housing which encompassed the same housing stock before and after this 2014-2017 period. The dVi includes data from both the current year and the year before. This was used to calculate by hand the definition of social housing units that generated the same number of housing units both in the old and new dVi systems in the transition years of 2014 and 2017. This was hand-calculated and checked for multiple housing associations in Utrecht. After 2014 social housing units were defined as follows: 2014 & 2015: DAEB housing units in own management, minus housing units above the rental support limit. 2016 & 2017: DAEB housing units until rental support limit, including housing units without a price class and non-independent housing units. After 2018: DAEB housing and care housing units.

The definition of total housing units of housing associations was done until and including 2013 by taking the total housing stock. After 2014 by taking the DAEB and Non-DAEB total housing stock together. This may have resulted in shocks in the dataset due to housing units of housing associations themselves changing how individual units of housing stock were defined, especially in the transition years.

Different forms of housing stock mutations have only been collected as mutations of social housing stock. This is due to the landlord levy not impacting non-social housing stock. Furthermore, the endogenous effect of the DAEB Non-DAEB split would generate untrustworthy estimations of the effect of the landlord levy.

All of the housing data collected above is noted as a single housing unit. There is no distinction between the size, location or quality of a housing unit, These qualitative effects are outside of the scope of this research.

Income and cost data were also collected successfully. The total rental income is clearly defined on the dVi. Social housing stock income is available after 2012 by taking the rental income of DAEB housing stock. This DAEB distinction is not available before 2012. To overcome this the percentage of 92% of total rental income was used. This was the ratio of social rental income to total rental income in the year 2012, the last year for which separate data is available. To better understand the increasing landlord levy in the context of increasing rental income, a variable of the landlord levy as a percentage of rental income was generated as well. Cost variables only are available as total expenditure, not specified based on whether the number of housing units is either social or non-social. The landlord levy variables were collected as yearly expenditures and available from 2013. Expenditure and income variables were collected as a nominal yearly amount. They have been transformed into income and costs per (social) housing unit for each housing association.

Some relevant variables which could not be collected are as follows: Income variables Government subsidies and service contracts. The expenditure variables are Investment costs, Improvement costs and non-landlord levy taxation costs. Data on liabilities and assets such as the value of total assets. The separation of the DAEB and non-DAEB part of housing associations in 2012 makes any data before and after 2012 not comparable. There was no successful way found to get a value of assets which remained consistent when using both versions of the dVi.

## 5.2 Descriptive Statistics

Using the data collected in chapter 5.1, it is possible to do an initial descriptive analysis of the hypotheses effects of the landlord levy. The central question is how housing associations have reacted to the implementation of the landlord levy. In Chapter 4 five hypothetical reactions of housing associations to the introduction of the landlord levy were argued for. This subchapter will go over each of these hypotheses by going over the development of the housing stock, specific mutations and financial data, with a specific focus on social housing stock and development. All of the data collected is analysed relative to the landlord levy. Table 5.1 analyses its development.

Table 5.1: Landlord levy per year for housing associations. Averages are weighted on the number of housing units per housing association.

Year	Total Landlord- a levy paid by housing associations per year in millions of euros	Average landlord levy per social housing unit.	Average landlord levy per total housing unit	Average Landlord levy as a percentage of social rental income	Average Landlord levy as a percentage of total rental income
2008	0	0	0	-	-
2009	0	0	0	-	-
2010	0	0	0	-	-
2011	0	0	0	-	-
2012	0	0	0	-	-
2013	€63,5	€28,11	€27,18	0,51%	0,49%
2014	€1.129	€509,69	€492,15	8,81%	8,37%
2015	€1.247	€568,36	€554,15	9,49%	9,12%
2016	€1.370	€619,24	€603,45	10,18%	9,78%
2017	€1.516	€692,96	€655,86	11,30%	10,66%
2018	€1.675	€726,19	€699,25	11,30%	10,86%
2019	€1.647	€699,34	€671,94	10,62%	10,19%
2020	€1.859	€783,98	€752,48	11,54%	11,09%

### Changes in income

*H1 : A higher landlord levy has resulted in housing associations generating more revenue.*

Table 5.2 shows a weighted average of rental income together with income from housing sales as a weighted average for the entire Dutch housing association sector per year. The results do indicate that H1 may be significant. Social rental income has indeed increased nominally and relatively compared to the maximum of the liberalisation limit, from 63.4% in 2008 to 74.4% in 2020. This may infer that housing associations may have used the additional space for rent increases allotted to them by both the landlord levy law and the 2015 housing law. However this is a development already present before 2013. Income from housing sales however occur mostly after 2015, with massive spikes in 2016 and 2018 (with data being absent in 2017), which may indicate a large impact of the 2015 housing law.

Table 5.2: Rent data concerning maximum allowable social rent.

Year	Weighted average rental income per social housing unit per year.	Weighted average of house sales revenue per housing unit.	Liberalisation limit per year	rent as a percentage of the liberalisation limit
2008	€ 4.816,42	-	€ 7.580,76	63,5%
2009	€ 4.814,11	-	€ 7.770,36	62,0%
2010	€ 5.122,75	-	€ 7.770,36	65,9%
2011	€ 5.265,43	€ 342,55	€ 7.830,24	67,2%
2012	€ 5.310,70	€ 349,57	€ 7.968,24	66,6%
2013	€ 5.526,81	€ 351,08	€ 8.172,24	67,6%
2014	€ 5.803,81	€ 450,41	€ 8.393,76	69,1%
2015	€ 6.003,42	€ 417,50	€ 8.528,16	70,4%
2016	€ 6.074,41	€ 1.715,38	€ 8.528,16	71,2%
2017	€ 6.138,35	-	€ 8.528,16	72,0%
2018	€ 6.398,35	€ 1.019,18	€ 8.528,16	75,0%
2019	€ 6.510,75	€ 852,23	€ 8.645,04	75,3%
2020	€ 6.717,18	€ 121,87	€ 9.027,96	74,4%

### Changes in costs

*H2 : A higher landlord levy has resulted in housing associations reducing costs*

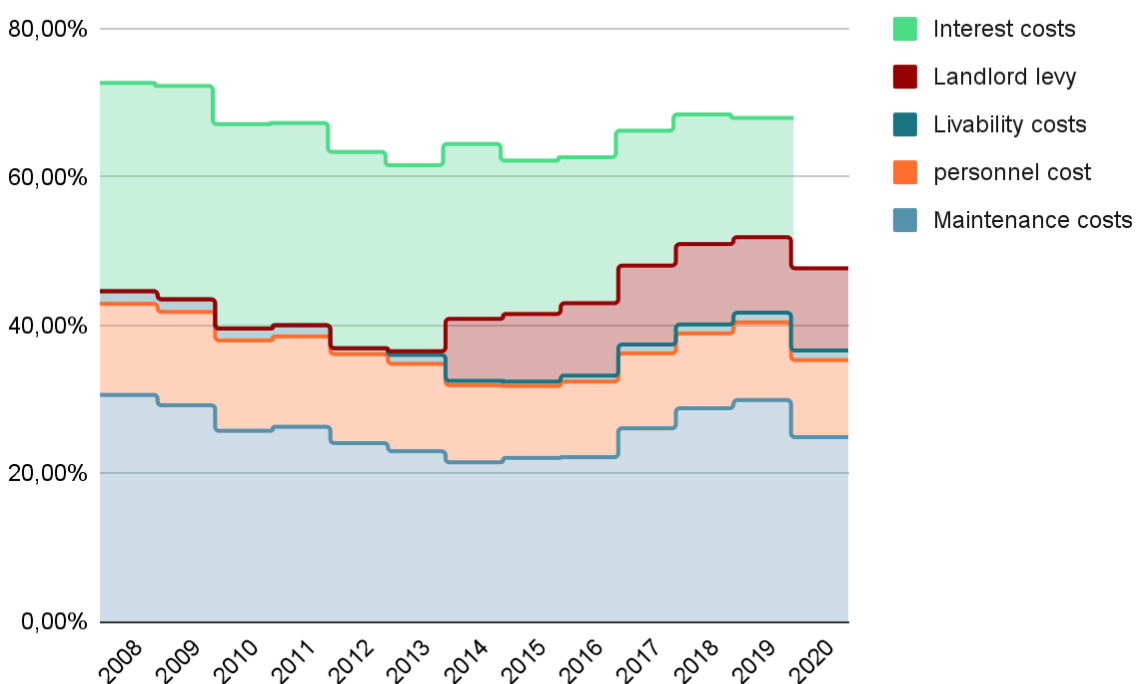
As shown by table 5.2, nominally all costs except for livability expenses and interest costs have increased. Maintenance costs decreased both nominal and relatively before 2013, reaching a low of 23% of rental income, but surprisingly increasing slightly after 2013. Personnel costs as a percentage of income lowered from 12% to a stable 10% after 2013. Expenditure on livability projects was cut by half after 2013, going up by a quarter after 2016. Finally, the largest decline of costs relative to income are the costs of interest, which decline from 28% of rental income to 16%. However this may be mostly exogenous due to a decrease in interest rate, but this distinction is outside of the scope of this research because data on debt levels has not been collected.

Concluding, hypothesis 2 is not directly supported by this descriptive analysis. The implementation of the landlord levy actually coincides with an increase in costs compared to the downwards trend before 2013. As graph 5.1 shows, the only reason these 4 cost variables together did not cover a higher percentage of rental income was due to the interest rate reducing by 12% points to 16% of rental income in 2019.

Table 5.2: Weighted averages of expenditures per house of total housing stock in Euro per year.

	Maintenance costs	Maintenance costs as % of rent income	Personal cost	Personal cost as % of rental income	Livability costs	Livability costs as % of rental income	Interest costs	Interest costs as a % of rental income
2008	1468.9	30,6%	585.64	12,3%	77,67	1,7%	1352	28,1%
2009	1468.35	29,2%	592.77	12,6%	80,23	1,7%	1413	28,8%
2010	1344.96	25,75%	613.36	12,2%	79,88	1,6%	1544	27,6%
2011	1377.89	26,3%	632.37	12,2%	78,39	1,5%	1555	27,3%
2012	1296.14	24,1%	638.99	12%	43,53	0,8%	1507	26,5%
2013	1285.13	23%	653,-	11,8%	66,61	1,2%	1434	25,1%
2014	1259.20	21,5%	614.62	10,4%	33,56	0,6%	1485	23,6%
2015	1352.29	22,1%	591.26	09,7%	37,31	0,6%	1291	20,7%
2016	1360.32	22,2%	629.98	10,2%	45,84	0,8%	1259	19,7%
2017	1701.38	26,1%	626.05	10,1%	71,52	1,2%	1158	18,2%
2018	1873.51	28,8%	647.13	10,1%	74,67	1,2%	1167	17,5%
2019	1968.04	29,9%	690.22	10,5%	84,63	1,3%	1082	16,1%
2020	1683.87	24,9%	696.68	10,4%	88,50	1,3%	-	-

Graph 5.1: Weighted average of costs per total house per year as % of rental income per total housing unit per year





### Forms of mutations of housing stock.

H3 : A higher landlord levy has resulted in less expansion of housing stock

H4 : A higher landlord levy has resulted in higher disinvestments in housing stock

Table 5.3 notes the total number of mutations of social housing stock mutation, while graph 5.2 visualises these results as a line graph. Regarding H3: The number of new social housing units is indeed almost half from the peak of 26000 in 2013 to 15000 in 2014. This result mirrors the effect found by [Aedes \(2019\)](#), but a major difference is that the number of social housing units constructed have been part of a longer decline, with 2012 and 2013 being exceptional peaks of new construction. The number of social housing units acquisitioned fluctuated after 2013 but was in line with the larger trend after 2010. This descriptive analysis does indicate some short term effects, indicating that possibly in the short term, the hypothesis that expansion declined significantly as a result of the landlord levy can be expected.

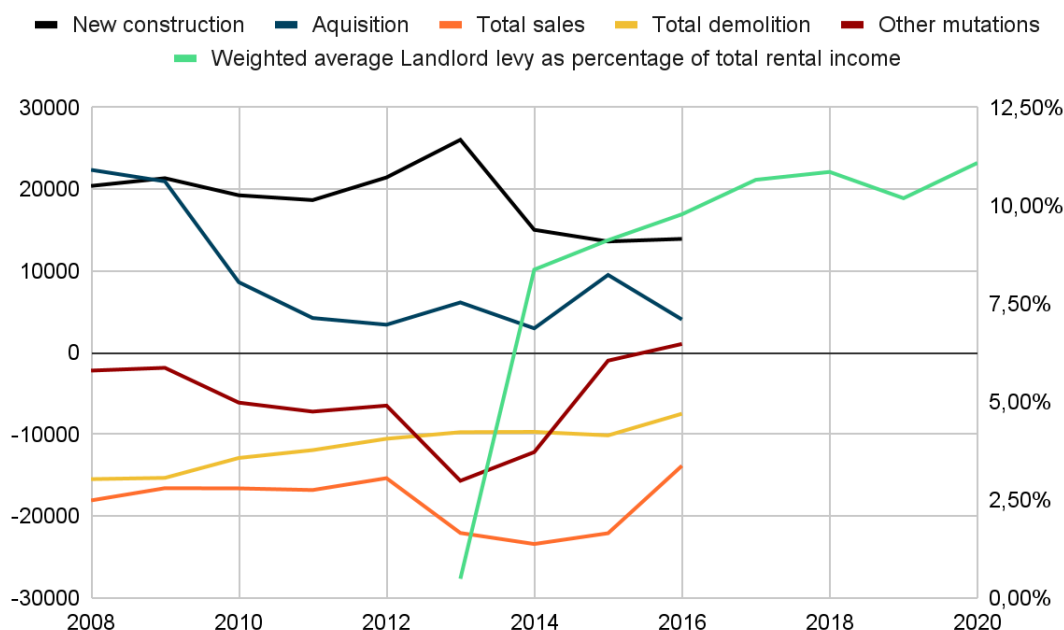
Hypothesis 4 states that the number of disinvestments will reduce. Indeed the number of housing units sold rose sharply from 16000 before 2013 to more than 22000 units in the years 2013, 2014 and 2015, lowering in 2016 to below the pre-2013 level. The Number of demolitions is actually reduced after the landlord levy. The number of “Other mutations” decreased rapidly in 2013 by nearly 10,000 units compared to a decrease of 6,000 units in 2012, which indicates according to [Veenstra et al. \(2016\)](#) indicates a large transfers from the social to non-social wings of housing associations

As hypothesised, the landlord levy does overlap with a large increase in disinvestments. However this effect appears to be short term, with the number of sales returning in 2016 to pre 2013 levels and “other mutations” actually indicating a net increase in 2016.

Table 5,3: Total changes in social housing stock operated by all housing associations. Noted in Units of social housing stock per year.

Year	New Construct ion	Acquisiti on	Total sales	Total demolitio n	Other mutations	Net social housing mutation	Net total housing mutation.
2008	20415	22379	18064	15458	-2179	-	-
2009	21360	20975	16564	15303	-1839	11559	16060
2010	19272	8639	16591	12868	-6097	-7707	3607
2011	18682	4255	16791	11908	-7196	-9500	796
2012	21455	3435	15340	10518	-6462	-5486	4374
2013	26059	6159	22046	9715	-15660	-13412	3872
2014	15046	2992	23394	9672	-12153	-22678	-14445
2015	13622	9527	22078	10104	-959	10556	-14551
2016	13937	4075	13822	7456	1081	-1771	-3527
2017	-	-	-	-	-	-68470	-14460
2018	-	-	-	-	-	2178	-5166
2019	-	-	-	-	-	3402	5570
2020	-	-	-	-	-	4779	11469

Graph 5.2: Yearly changes of units of social housing stock operated by all housing associations. Including landlord levy.



### The development of the total housing stock.

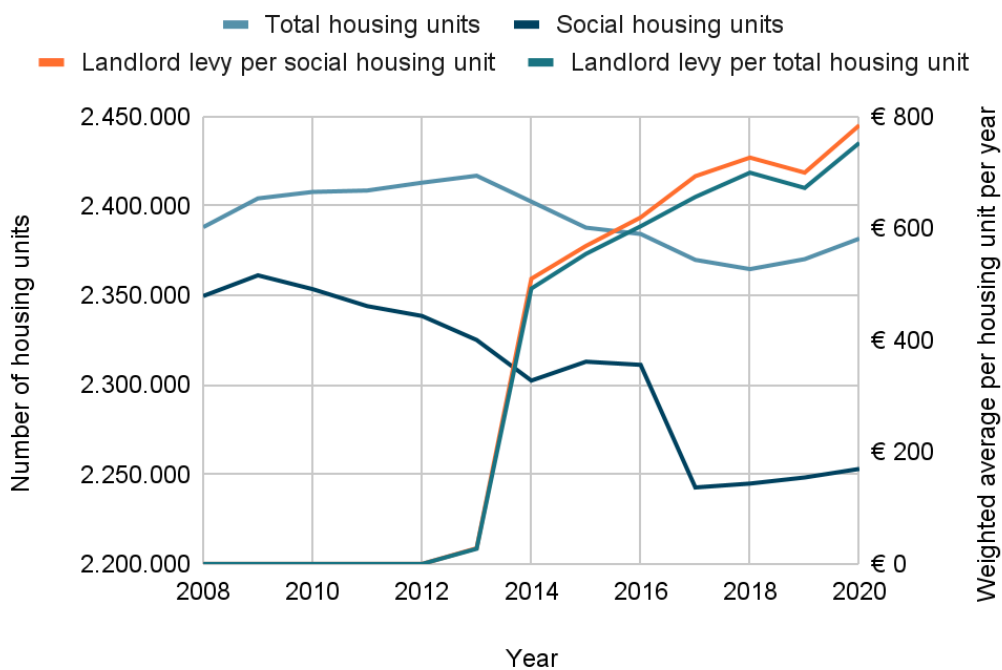
H5 : A higher landlord levy resulted in a decrease of housing association housing stock

Tables 5.5 and 5.1 together with graph 5.3 and 5.4 show summary data which indicates that the introduction of the landlord levy coincides with a reduction in the number of both social and total housing units. The number of social housing can be seen reducing already after 2009 before the introduction of housing associations in 2013. However, the number of total housing units does begin to experience a drop after 2013. The large fluctuation in social housing units in 2017 probably has to do with the implementation of the DAEB-non DAEB distinction in which housing units had to be transferred to the non-DAEB arm of housing associations. Graph 5.4 shows while the landlord levy nominally kept increasing after 2014, as a percentage of rental income the levy remained stable after 2018. Thus hypothesis 5 is likely to be significant.

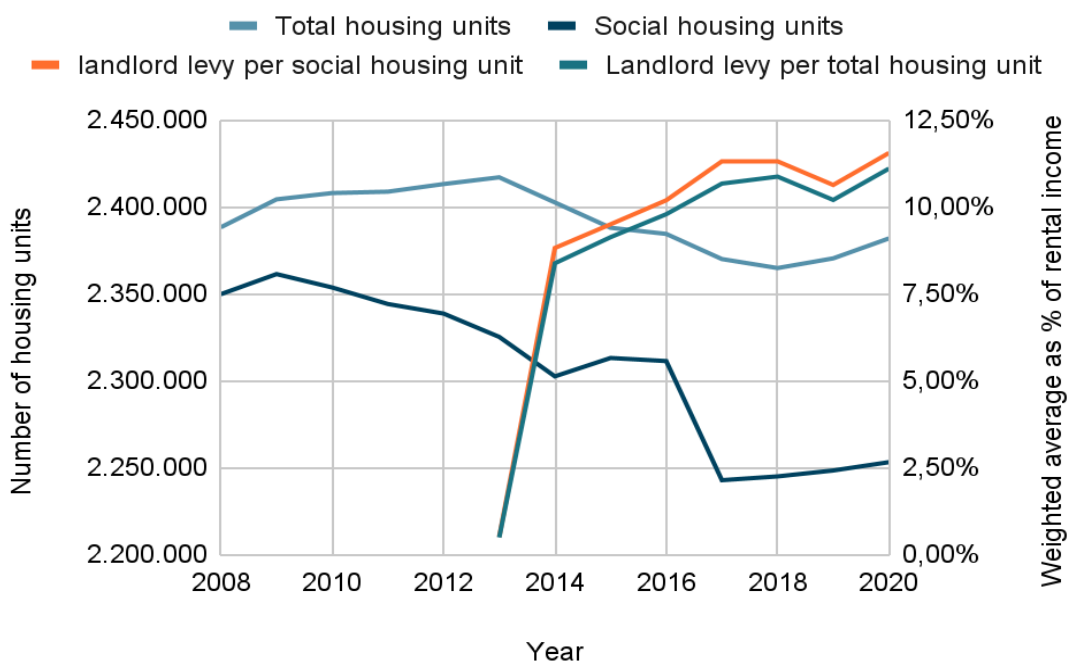
Table 5.5: Number of housing units by type and number of housing associations.

Year	Total Housing Stock	Total social housing stock	Number of housing associations
2008	2388091	2349629	430
2009	2404151	2361188	418
2010	2407758	2353481	400
2011	2408554	2343981	389
2012	2412928	2338495	380
2013	2416800	2325083	377
2014	2402355	2302405	263
2015	2387804	2312961	349
2016	2384277	2311190	335
2017	2369817	2242720	319
2018	2364651	2244898	310
2019	2370222	2248300	294
2020	2381691	2253079	286

Graph 5.3: Number of housing units by type and weighted average landlord levy in Euro per type of housing unit per year.



Graph 5.4: Number of housing units by type and weighted average landlord levy as % of rental income per year.



## 6. Empirical strategy

The descriptive analysis has indicated that the implementation of the landlord levy does coincide with changes in social housing mutation, income and expenditure. To test the significance of these effects a regression analysis will be performed on the panel dataset based on the regression analysis done by [Veenstra et al. \(2016\)](#). This results in the following basic linear panel-data model:

$$Y_{it} = \alpha_0 + \beta * V_{it} + \varphi * X_{it} + \theta_t + \mu_i + \varepsilon_{it}$$

Where  $Y_{it}$  is the dependent variable,  $V_{it}$  is the independent variable of the landlord levy per housing unit or as a percentage of rental income.  $X_{it}$  is the vector of control variables.  $\theta_t$  is the year effect or year dummy.  $\mu_i$  is the fixed effect on the housing association level.  $\varepsilon_{it}$  is the error term. Thus  $\alpha_0$ ,  $\beta$  and  $\varphi$  are the coefficients to estimate, the  $i$  is the housing association subscript and the  $t$  is the year subscript.  $\beta$  will indicate the effect of the landlord levy on the dependent variable  $Y_{it}$ .

To optimally analyse the effects of dependent variables  $V_{it}$ , this thesis uses the logarithmic version of dependent variables  $Y_{it}$  as the main indicator of significance. This is both due to problems in interpreting the relative effect when using the nominal dependent variable, and because the value of observations vary greatly between housing associations due to their size and location. This is especially the case for housing stock and housing stock mutation data. Some observations are zero, to overcome this the  $\text{Log}(x+1)$  transformation is used as standard. Besides the log, all of the same regressions are also run on the nominal version of the dependent variables. This acts either as robustness checks or is done when the log of the dependent variable is not available.

As an independent variable, two versions of the independent variable are used. Every regression includes the nominal (social or total) rental income per (social or total) housing unit per housing association. When possible, duplicate regressions are run using the (social or total) landlord levy as percentage of (social or total) rental income. As noted earlier this is done to better indicate actual relative costs.

Furthermore, both to test for long and short term effects and as robustness check, each of the regressions noted above is also both run using the full 2008 to 2020 dataset and the shortened 2010 to 2016 dataset.

Controlling variables stay mostly the same for each regression and are based on controlling variables used by Veenstra et al 2016. The regression includes year dummy variables to control for the yearly increase of variables in a year, the average value of the rental property (woz-waarde) and the size of the housing association. The WOZ value is the tax-assessed value of housing stock and is used to calculate the landlord levy. The housing association size- as noted by the number of total housing units in management- is used to control for the perceived increased efficiency of larger housing associations.

The dataset includes relatively few controlling variables. To further control for unobserved effects each regression will include a fixed effect to control for unobserved

variables. Furthermore, in each regression, standard errors will be clustered at the level of the individual housing associations. As the panel dataset covers the same housing associations over time, we can reasonably expect observations of the same variable in the same housing association to be correlated with each other ([Angrist & Pischke, 2008](#)). Both the number of housing units and the expenses and incomes of housing associations stay relatively stable. This will generate a more robust inference by correcting for the potential within-cluster correlation, heteroskedasticity, and autocorrelation.

## 6.1 Income changes

*H1 : A higher landlord levy has resulted in housing associations generating more revenue.*

To test H1, the dependent income variables are the total rental income, the social rental income and income from house sales. Total rental income and income from housing sales are noted as yearly averages per total housing unit in Euros, while the social rental income is denominated as yearly averages per social housing units in Euros. All of the controlling variables are included. As an independent variable, only the nominal landlord levy is used. This is due to nominal rental income being the dependent variable of these regressions.

Regressions 1.1 to 1.4 focus on total rental income. For 1.1 and 1.2 The dependent variable  $Y_{it}$  is the logarithmic rental income per total housing unit. For regression and 1.3 and 1.4, the  $Y_{it}$  is the nominal rental income per total housing unit. Regressions 1.2 and 1.4 only cover the 2010 to 2016 time period.

Regressions 1.5 to 1.8 focus on social rental income. For 1.5 and 1.6 The dependent variable  $Y_{it}$  is the logarithmic rental income per social housing unit. For regressions 1.7 and 1.8, the  $Y_{it}$  is the nominal rental income per social housing unit. Regressions 1.6 and 1.8 only cover the 2010 to 2016 time period.

Regression 1.9 to 1.12 focuses on income from housing sales. For 1.9 and 1.10 The dependent variable  $Y_{it}$  is the logarithm of the income from housing sales per total rental unit. For regression 1.11 and 1.12, the  $Y_{it}$  is the nominal income from housing sales per total rental unit. Regressions 1.10 and 1.12 only cover the 2010 to 2016 time period.

## 6.2. Expenditure changes

*H2: A higher landlord levy has resulted in housing associations reducing costs*

To test H2, the dependent expenditure variables personnel, maintenance and livability costs are used. As noted in the descriptive statistics, interest costs based on the data available can not be distinguished from the exogenous effects of decreasing interest rates during the period of study and, thus, is not included in the regressions. The dependent variables are noted only as yearly averages per total housing unit in Euros, as no distinction for social housing units can be made. As an independent variable, only the nominal landlord levy per total housing unit is used, as otherwise, all expenditure variables would have to be calculated as a percentage of income. As control variables both the WOZ value and the total housing stock per housing association are used. The logarithmic versions are transformed as a Log (*Mutation observation* +1) to include observations which have a zero as observation.

Regression 2.1 to 2.4 focuses on personnel costs. For 2.1 and 2.2 The dependent variable  $Y_{it}$  is the logarithmic personnel costs per total housing unit. For regressions 2.3 and 2.4 the  $Y_{it}$  is the nominal personnel costs income per total housing unit. Regressions 2.2 and 2.4 only cover the 2010 to 2016 time period.

Regression 2.5 to 2.8 focuses on maintenance costs. For 2.5 and 2.6 The dependent variable  $Y_{it}$  is the logarithmic maintenance costs per total housing unit. For regression 2.7 and 2.8, the  $Y_{it}$  is the nominal maintenance costs income per total housing unit. Regressions 2.6 and 2.8 only cover the 2010 to 2016 time period.

Regression 2.9 to 2.12 focuses on livability costs. For 2.9 and 2.10 The dependent variable  $Y_{it}$  is the logarithmic livability costs per total housing unit. For regression 2.11 and 2.12, the  $Y_{it}$  is the nominal livability costs income per total housing unit. Regression 2.10 and 2.12 only cover the 2010 to 2016 time period.

### 6.3. Housing stock mutations

Two hypotheses regarding housing stock mutations have been formalised:

*H3: A higher landlord levy has resulted in less expansion of housing stock and*

*H4: A higher landlord levy has resulted in higher disinvestments in housing stock*

The housing stock expansion dependent variables selected for H3 are the yearly units of housing stock constructed and acquired by social housing associations. The housing stock disinvestment-dependent variables for H4 are the yearly units of housing stock sold and demolished. Both variables are related to the “Other mutations” dependent variable which controls for all other mutations, mostly transfers from Daeb to non-Daeb wings.

Regressions are run using both the natural logarithm and the nominal value of the dependent variables. Because some observations have zero mutations, we use a Log (*Mutation observation* +1) mutation to include these observations in our regression. These dependent variables have only been collected on social housing units and this data does not reach further than 2016. Because of this, only the 2008-2016 regressions are performed. Both the WOZ value and housing association size controlling variables are included in the regressions below.

Regressions 3.1 to 3.4 focus on social housing construction. Regression 3.1 and 3.2 use the logarithmic number of new social housing construction as a dependent variable  $Y_{it}$ , while regression 3.3 and 3.4 use the nominal number of social housing constructed. Regression 3.1 and 3.3 has as an independent variable  $V_{it}$  the nominal landlord levy per social housing unit. Regressions 3.2 and 3.4 use the landlord levy as a percentage of social housing rental income as  $V_{it}$ .

Regressions 3.5 to 3.8 focus on social housing construction. Regressions 3.5 and 3.6 use the logarithmic number of social housing acquisitions as a dependent variable  $Y_{it}$ , while regressions 3.7 and 3.8 use the nominal number of social housing acquisitions. Regression 3.5 and 3.7 has as an independent variable  $V_{it}$  the nominal landlord levy per social housing unit. Regressions 3.6 and 3.8 use the landlord levy as a percentage of social housing rental income as  $V_{it}$ .

Regressions 3.9 to 3.12 focus on social housing sales. Regression 3.9 and 3.10 use the logarithmic number of social housing sales as a dependent variable  $Y_{it}$ , while regression 3.11 and 3.12 use the nominal number of social housing sales. Regression 3.9 and 3.11 use as independent variable  $V_{it}$  the nominal landlord levy per social housing unit. Regression 3.10 and 3.12 use the landlord levy as a percentage of social housing rental income as  $V_{it}$ .

Regressions 3.13 to 3.16 focus on social housing demolition. Regression 3.13 and 3.14 use the logarithmic number of social housing sales as a dependent variable  $Y_{it}$ , while regression 3.15 and 3.16 use the nominal number of social housing sales. Regression 3.13 and 3.15 use as independent variable  $V_{it}$  the nominal landlord levy per social housing unit. Regression 3.14 and 3.16 use the landlord levy as a percentage of social housing rental income as  $V_{it}$ .

Regression 3.17 and 3.18 focus on “Other mutations”. As this variable includes positive and negative values, only the nominal variable is used as a dependent variable  $Y_{it}$ . Regression 3.17 uses as an independent variable  $V_{it}$  the nominal landlord levy per social housing unit. Regression 3.18 uses the landlord levy as a percentage of social housing rental income as  $V_{it}$ .

## 6.4. Total and social housing stock

*H5 : A higher landlord levy resulted in a decrease of housing association housing stock*

To check for the effect of the landlord levy on the total and social housing stock. As a dependent variable Logarithmic and nominal total and social housing stock is used. The landlord levy per housing unit is calculated based on total housing stock or social housing stock when appropriate. For 4.1 to 4.8 Woz value is noted for the average of total housing stock and 4.9 to 4.16 as the average of social housing stock. Note that the size of the housing association is not included as a control because this would lead to a perfect correlation with the number of housing units.

Regressions 4.1 to 4.8 focus on the number of total housing units. Regressions 4.1 to 4.4 use as dependent variable  $Y_{it}$  the logarithmic number of total housing units. Regressions 4.5 to 4.8 use as  $Y_{it}$  the nominal number of total housing units. As the independent variable  $V_{it}$  regressions 4.1, 4.2, 4.5 and 4.6 use the nominal landlord levy expenditure per total housing unit. Regressions 4.3, 4.4, 4.7 and 4.8 use the landlord levy as a percentage of total rental income as an independent variable  $V_{it}$ . Regressions 4.2, 4.4, 4.6 and 4.8 only cover the 2010 to 2016 time period.

Regressions 4.9 to 4.16 focus on the number of social housing units. Regressions 4.9 to 4.12 use as dependent variable  $Y_{it}$  the logarithmic number of social housing units. Regressions 4.13 to 4.16 used as  $Y_{it}$  the nominal number of total housing units. As the independent variable  $V_{it}$  regressions 4.9, 4.10, 4.13 and 4.14 use the nominal landlord levy expenditure per total housing unit. Regressions 4.11, 4.12, 4.15 and 4.16 use the landlord levy as a percentage of total rental income as an independent variable  $V_{it}$ . Regressions 4.10, 4.12, 4.14 and 4.16 only cover the 2010 to 2016 time period.

## 7. Regression results and interpretation

In this regression results chapter, only the regressions for which the coefficients of the landlord variables on the dependent variables were at least significant at 10% are shown and covered in detail. The full regression results of all the regressions referred to are displayed in the appendix.

### **Income changes**

*H1 : A higher landlord levy has resulted in housing associations generating more revenue.*

To test this hypothesis, regressions 1.1 to 1.12 have been run on the total rental income, the social rental income and the income from housing sales, all noted as averages per housing unit. The significant effects results are noted in Table 7.1.

To check for the effect of the landlord levy on total rental income, we have run regression 1.1 to 1.4. No significant effect of the total landlord levy on the log of total rental income was found in regressions 1.1 and 1.2. Significant effects of the total landlord levy on the nominal rental income were found in regressions 1.3 and 1.4.

Regressions 1.5 to 1.8 cover social rental income. Regression 1.5 and 1.6 note social rental income as a logarithmic variable. Only in regression 1.6 a significant effect is found in the 2010 to 2016 period. With a significance level of 5%, this coefficient of 3.99e-05 indicates that an increase of €1 on average landlord levy per social rental unit results in 0.00399% additional social rental income per social housing unit (*ceteris paribus*). Regression 1.7 and 1.8 support the validity of 1.6 by indicating that the nominal value of the social rental income has a significant coefficient of 0.210 in 2008-2020 and 0.343 in 2010-2016 on average social rental income as well.

Regressions 1.8 to 1.12 tested the effects of the total landlord levy on income from housing sales. Regressions 1.9 and 1.10 found no significant effects of the total landlord levy on the log of total housing sale income. However, 1.11 and 1.12 did show a significant coefficient of the total landlord levy on the nominal landlord levy.

Concluding, Hypothesis H1 is only to be accepted for social rental income in the period 2010 to 2016. A one €1,- increase of the landlord levy per social housing unit, leads to an average increase of 0.00399% increase in social rental income per social housing unit. There are significant effects of the landlord levy on nominal total rental income and of housing sale income, but they are discarded as they did not have a significant effect on their logarithmic dependent variable.



Table 7.1 Rental income regressions. Controlling variables and year dummies are visible in the appendix.

VARIABLES	(1.3) Total rental income	(1.4) Total rental income	(1.6) Log of social rental income	(1.7) Social rental income	(1.8) Social rental income	(1.11) Housing sale income	(1.12) Housing sale income
Landlord levy per total housing unit.	<b>0.245***</b> (0.0911)	<b>0.507***</b> (0.179)				<b>0.321**</b> (0.142)	<b>0.296**</b> (0.134)
Landlord levy per social housing unit.			<b>3.99e-05**</b> (1.91e-05)	<b>0.210**</b> (0.0877)	<b>0.343***</b> (0.125)		
Years	2008-2020	2010-2016	2010-2016	2008-2020	2010-2016	2011-2020	2011-2016
Constant	4,170*** (205.4)	4,041*** (532.4)	8,589*** (0.0692)	4,497*** (280.2)	5,051*** (196.8)	444.9* (253.4)	983.1*** (291.5)
Observations	3,983	2,258	2,258	3,983	2,258	3,098	2,249
R-squared	0.684	0.464	0.226	0.648	0.400	0.054	0.125
Number of housing associations	430	400	400	430	400	400	400

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Costs changes

*H2 : A higher landlord levy has resulted in housing associations reducing costs*

This thesis hypothesised, in contrast to our economic model, but following the literature review, that housing associations would reduce their costs in reaction to additional costs of the landlord levy. To test this regressions 2.1 to 2.12 were run on personnel costs, maintenance costs and liveability costs. After running these regressions, no significant positive or negative effects of the landlord levy per total housing unit on any of the cost variables were found. These cost variables were both tested as nominal and as logarithmic dependent variables for a longer 2008-2020 and shorter 2010-2016 dataset, with still no regression resulting in a significant coefficient.

Concluding, hypothesis 2 is rejected. No significant effect of a higher landlord levy on the three cost variables we have selected was found.

## Housing stock mutations

*H3 : A higher landlord levy has resulted in less expansion of housing stock*

*H4 : A higher landlord levy has resulted in higher disinvestments in housing stock*

To test these hypotheses both the nominal landlord levy and the landlord levy as a percentage of social rental income, were regressed on both the logarithmic and nominal variations of the dependent mutation variables. Due to the limited observations of these dependent variables only the 2008 to 2016 time period was regressed. The significant results obtained are presented in Table 7.2.

To test hypothesis 3, the number of new social housing units constructed and acquired per social housing associations were used as dependent variables. These were run in regression 3.1 to 3.8. Regression 3.1 to 3.4 performed 4 regressions based on the number of new housing units constructed. None of the regressions found a significant effect of the landlord levy. Regressions 3.4 to 3.8 focussed on social housing acquisitions. Only regression 3.6 found a significant effect. At a significance level of 5%, regression 3.6 finds a

positive coefficient of for the landlord levy as percentage of total rental income 0.0374 on the nominal number of social housing aquired. This means that a 1 percentage point increase in landlord levy as percentage of total rental income is associated with a 3.74% increase in the average yearly number of social housing units acquired(*ceteris paribus*). However as the nominal landlord levy and the nominal housing units regressions did not have significant coefficients, The results must be interpreted with caution.

To test hypothesis 4, regressions 3.9 to 3.12 were run on the number of social housing units sold and 3.13 to 3.16 on the number of social housing units demolished. Regressions 3.9 and 3.10 indicate a significant coefficient of both the nominal landlord levy and landlord levy as percentage of social rent on the log number of total social housing sales. In Regression 3.9, the coefficient for the nominal landlord levy per total housing unit is positive and statistically significant at the 5% level, with a value of 0.000687. Interpreted, this means that a €1 increase in the average landlord levy per social housing unit is associated with a 0.0687% increase in the average yearly number of social housing units sold (*ceteris paribus*). Similarly, Regression 3.10 reveals a significant effect, at the 5% level, of a 3.25% increase for every 1 percentage point rise in landlord levy relative to rental income (*ceteris paribus*). Regression 3.11 and 3.12 acted as robustness checks for 3.9 and 3.10 by using a nominal dependent variable, however the coefficients of both landlord variables were not significant. This indicates that the effects of 3.9 and 3.10 might not be as significant as hoped. Regression 3.13 to 3.16 on the number of housing units demolished find no significant coefficients, and thus are ignored.

Finally, the number of 'Other social mutations' is also regressed, but only as a nominal variable due to the inability to be transformed into a logarithmic variable. In regression 3.17, the coefficient of the landlord levy per social housing unit is -0.0677, with a significance level of 1%. This indicates that a €1 increase in the nominal landlord levy per social housing unit is associated with a decrease of 0.0677 units in 'Other social mutations' (*ceteris paribus*). Similarly, Regression 3.18 shows a significant effect, also at the 1% level, of -4.122 units in 'Other social mutations' for each percentage point increase in the landlord levy relative to social rental income.

Concluding, Hypothesis 3 can be rejected. In fact, regression 3.6 indicates that the landlord levy has a significant positive effect on the number of aquisitions. A 1 percentage point increase in landlord levy as percentage of total rental income is associated with a 3.74% increase in the average yearly number of social housing units acquired(*ceteris paribus*). At an average landlord levy as percentage of total rental income of 10%, regression 3.6 indicates a 37.4% increase in the number of housing units due to the landlord levy. However none of the other 3.1 to 3.8 regressions showed significant results. An overall positive effect on housing expansion thus is probably not significant.

For hypothesis 4 there is a stronger indication to accept the hypothesis that the landlord levy leads to a higher disinvestment in housing stock, due to increased housing sales. Regression 3.9 indicates that a €1,- increase in the average landlord levy per social housing unit is associated with a 0.0687% increase in the average yearly number of social housing units sold. Regression 3.10, with a coefficient of 0.0325 at 5% significance level, indicates that 3.25% increase for every 1 percentage point rise in landlord levy relative to rental income. Still these results have to be interpreted cautiously as there was no effect for the nominal negative mutation dependent variables. The significant coefficients of regression 3.17 and 3.18 indicate at a 1% significance level significant effects of both forms of the social rental variables on the nominal number of "Other social mutations". However, as the other social housing mutations are mostly related to administrative reshuffling resulting from the

Daeb-Non Daeb split, it is hard to isolate this endogenous effect from the effect of the landlord levy. Still the landlord levy leading to more negative other social housing stock mutations, does support the choice to accept hypothesis 4.

Table 7.2. Housing mutations regressions. Controlling variables and year dummies are visible in the appendix.

VARIABLES	(3.6) Log of social housing acquisition	(3.9) Log of social housing sales	(3.10) Log of social housing sales	(3.17) Other social mutations	(3.18) Other social mutations
Landlord levy per social housing unit.		<b>0.000687**</b>		<b>-0.0677***</b>	
		(0.000284)		(0.0219)	
Landlord levy as a percentage of social rental income	<b>0.0374**</b>		<b>0.0325**</b>		<b>-4.122***</b>
	(0.0187)		(0.0151)		(1.463)
Years	2008-2016	2008-2016	2008-2016	2008-2016	2008-2016
Constant	0.184 (0.379)	2.270*** (0.262)	2.300*** (0.273)	84.29* (48.81)	83.31* (49.17)
Observations	3,106	3,106	3,106	3,106	3,106
R-squared	0.044	0.042	0.041	0.039	0.039
Number of housing associations	430	430	430	430	430

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### Total housing stock changes.

*H5 : A higher landlord levy resulted in a decrease of housing association housing stock*

The final hypothesis is that the landlord levy has had a significant direct impact on the total housing stock.

Regressions 4.1 to 4.8 checked for the effect of both forms of the landlord levy on total housing stock and 4.9 to 4.16 on social housing stock. The significant results are displayed in Table 7.3. Regressions 4.1 to 4.8 barely find a significant effect of the landlord levy on the total housing stock. Only the nominal landlord levy per total housing has a significant effect on both the nominal and log of total housing stock, but only in the years 2010-2016, Regression 4.2 indicates that when the landlord levy per total housing unit increases by €1, the number of housing units per housing association decreases on average by 0.00588% (ceteris paribus). Regression 4.6 indicates that when the landlord levy per total housing unit increases by €1, the number of housing units per housing association decreases on average by 0.531 housing units (ceteris paribus). However, these coefficients of 4.2 and 4.6 are only significant at a level of 10%, which is generally not deemed significant enough in economics. All other regressions which include longer periods or the landlord levy relative to income do not have significant coefficients. Thus these results are discarded.

Regression 4.9 to 4.16 regresses the landlord levy per social housing unit on the number of social housing units, and finds significant effects which are noted in Table 7.4. Using the log of social rental units as the dependent variable, regression 4.10 and 4.12 found significant effects of both the nominal landlord levy and the landlord relative to income at a significant level of 5%, however only in the shorter 2010 to 2016 time period. The coefficient of regression 4.10 indicates a 0.0000625% decrease of social housing stock per additional €1 social rental income (ceteris paribus). The coefficient of regression 4.12 indicates a 0.336% decrease in social housing stock per additional percentage point of landlord levy relative to social rental income (ceteris paribus). Analysing the nominal number

of social rental units, regression 4.14 indicates with a significance level of 5% that a €1 increase of the nominal landlord levy per social housing, is associated with a decrease of 0.581 housing units per average housing association (*ceteris paribus*). Regressions 4.15 covering 2008-2020 and 4.16 covering 2010-2016 indicate how a one percentage point increase of the landlord as a percentage point of social rental income, is related to a decrease of 35.02 and 28.3 social housing units for an average housing association. However the significance level is only 10%.

Concluding, hypothesis 5 can be partly accepted using the regression results noted above. The effect of the landlord levy on social housing stock in the 2010 to 2016 period are significant. The robustness checks find significant effects as well. The effect of the landlord levy on total housing stock is barely significant and does not repeat when doing robustness checks.

Table 7.3

VARIABLES	(4.2) Log of total housing units	(4.6) Total housing units
Landlord levy per total housing unit.	<b>-5.88e-05*</b> (3.26e-05)	<b>-0.531*</b> (0.278)
Year Constant	2010-2016 7.947*** (0.105)	2010-2016 6,499*** (610.2)
Observations	2,258	2,258
R-squared	0.028	0.015
Number of housing associations	400	400

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 7.4

VARIABLES	(4.10) Log of social housing units	4.12) Log of social housing units	(4.14) Social housing units	(4.15) Social housing units	(4.16) Social housing units
Landlord levy per social housing unit.	<b>-6.25e-05**</b> (2.94e-05)		<b>-0.581**</b> (0.286)		
Landlord levy as a percentage of social rental income		<b>-0.00366**</b> (0.00171)		<b>-35.02*</b> (20.38)	<b>-28.51*</b> (15.71)
Year Constant	2010-2016 7.852*** (0.0236)	2010-2016 7.852*** (0.0233)	2010-2016 6,086*** (124.0)	2008-2020 6,489*** (453.5)	2010-2016 6,068*** (124.1)
Observations	2,258	2,258	2,258	3,996	2,258
R-squared	0.028	0.029	0.009	0.022	0.008
Number of housing associations	400	400	400	430	400

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 8. Discussion

### **The total significant effects of the landlord levy on housing associations.**

The five hypotheses discussed and answered chapter 7, all lead to one main research question: “What was the effect of the landlord levy on the functioning of housing associations, in particular their housing supply?” Using only the significant results from the regression analysis, the landlord levy was found to have significant effects on:

1. An increase in the social rental income from 2010 to 2016.
2. An increase in the number of social housing units sold between from 2008 to 2016.
3. A decrease in the total number of social housing units again from 2010 to 2016.

To get a better feel for the scale of these effects, which are noted in chapter 7, we can multiply them by the average height of the landlord levy variables in 2015. When assuming an average nominal landlord levy of €600,- and 10% relative to income in the landlord levy results in 2.4% increase in the average yearly social rental income, a 41.2% or 32.5% increase in the number of social housing units sold per year, and .75% or 3.6% less social housing units per average housing association. As the number of housing associations is declining every year, this effect is even greater at a nominal national level.

Other significant effects on interesting dependent variables were found, but due to these variables being either nominal instead of logarithmic variables or the effects not remaining significant under robustness checks, they were discarded. In these results the landlord levy had a positive effect on the nominal total rent and housing sales income, a positive effect on the log of the number social housing acquisition, a negative effect on the nominal number units of “other social mutation” and a negative effect on the total housing stock. A final interesting implication to consider, is that the one significant effect found of the landlord levy on social housing acquisitions was similar in size to the effect of social housing sales. This may indicate that there was a general spike in the number of housing transactions between housing associations, instead of a large spike in disinvestments through sales.

Two versions of the landlord levy were used, a nominal one in €, and a relative one as percentage of rental income. The relative landlord levy did generate some more significant effects which were generally smaller. Its inclusion was useful to conclude that many of ‘the total housing based dependent variables’ were not significant.

### **Interpreting insignificant effects.**

The main surprise of the regression results: The total lack of significant effects of the landlord on any of the expenditure variables, effects which were expected based on the literature review. No matter which regression version was run, no significant effects were found. This is possible due to the fact that these cost variables had to be calculated as averages per total housing income. It can be speculated that any possible operating costs reductions were not represented in the data due to the DAEB non-DAEB split leaving housing associations with relatively more social housing units who may have larger associated costs compared to liberalised rental units.

Total housing stock variables were generally not found to be significant. Dependent variables based on total housing stock were questionable in general, as there is a endogenous effects of housing law and the DAEB/non-DAEB, which reduces the number of

liberalised rental units managed by housing associations, negatively impacting only the total number of total housing units, not social housing units.

The results indicate that the main effects were generally only significant in the shorter time period. This may indicate that housing associations reacted quickly to the implementation of the landlord levy and that its shock effect was mostly temporary. Both the relative costs of the landlord levy and the further operations of housing associations remained largely stable in the second half of the 2010's.

### **Limitations.**

While the research done offers valuable insights into the effects of the landlord levy on housing associations, it is essential to acknowledge the limitations of this research.

#### *Data:*

As noted in chapter 5.1, the dVi data which is used to generate the dataset of this thesis, goes through large changes during the period covered. To have the same variables over the entire time period, many variables had to be combined by hand. Due to this there is no guarantee that variables (especially social rental variables) are truly correct over the years.

An additional problem is that the dataset does not distinguish between different kinds of housing unit types. The total/social housing unit variable includes independent housing units, individual rooms, units in nursing homes etc. No information regarding the quality, amenities, size or location of housing units is included.

The merging of housing associations also generated a level of change, especially for housing stock variables, which are hard to compensate for when interpreting the results. Expenditure income probably were less influenced by these mergers as averages stayed similar, but for these estimates no significant effects were found.

This thesis had rather limited controlling variables, as the dataset was mostly generated before the method was set in stone. The irrelevance of the large number of financial controlling variables collected was recognised too late to still collect many controlling variables on housing stock characteristics.

There have been no distinctions made for regional differences. This was not possible due to data only being available on the location of the head office, not the actual housing stock. A dummy was generated per province, but proved to be totally multicollinear with the fixed effect of each housing association, and thus not usable.

#### *Exogenous effects:*

As named over and over again in this thesis, a main limitation of the regression was the complexity controlling for the effects of the 2015 housing law, especially on the longer period. The year controlling variables may have corrected for some of these effects.

Financial changes in allowable debt levels over this period, together with the reduction of interest rates, probably greatly impacted the level of housing stock. The data did not cover both the legislative changes, or the changes in debt levels of housing associations.

### **Academic implications.**

During the literature review, shortcomings in previous literature on the topic of the landlord levy's effects provided three new research perspectives to fill these gaps. These were expanding the timeframe to between 2008 and 2020, taking social housing stock instead of total housing stock as unit/variable and using expenditure relative to income as control variable for additional income possibilities.

- The lengthening of the timeframe, from between 2010 and 2014 ([Veenstra et al. \(2016\)](#)), to between 2008 and 2020, did not result in any noteworthy changes in results. Only during the period from 2010 to 2016, significant effects of the landlord levy on housing associations could be found. It thus seems that the longer period was not needed. The effects of the landlord levy apparently stabilised after implementation in 2013.
- Taking social housing stock in comparison to total housing stock as unit does give new insights. With social housing units, significant effects of the landlord levy were found. In contrast, variables based on total housing units were rarely significantly influenced by the landlord levy. As noted in the literature review, this may be due to the 2015 housing law.
- When using expenditure relative to rental income as a control variable for additional income possibilities, somewhat more significant effects were found. Not including landlord levy relative to rental income would not have changed the outcomes of this research.

This thesis mainly aims to build on the research done by [Veenstra et al. \(2016\)](#), as this is the only statistical analysis on this topic until now. Regarding the discussion on the effects of the landlord levy, this thesis found indeed many of the effects also found by Veenstra et al. such as decline in income, sales and total housing stock. Future academic inquiries on the topic of the landlord levy's effects might include more variables which control for debt levels and interest costs. As mentioned, one of the limitations was the lack of financial variables. The largest relative and nominal cost reduction during this period were the interest costs. It is crucial to know which part of this decrease was the result from a reduction in debt level of only a lower interest rate. For example, if only the interest rate reduces, potentially much of the costs of the landlord levy may have been covered by this reduction in interest rates taking place at the same moment. If so, the effect of the landlord levy would have been much larger.

### **Policy implications**

The results of this thesis are relevant from a policy perspective as the Netherlands is currently experiencing a large deficit of social housing units. The results support the findings of earlier research, by showing that the landlord levy has increased the sale of social housing units and decreased the total social housing stock per average housing associations. However, as the landlord levy itself has been repealed in 2023, this thesis shows us that its effect has indeed resulted in lower social housing stock, mostly through sales. The repeal of the landlord levy will probably result in social housing stock increasing again. Operations wise, the results show how additional costs, such as the landlord levy, do not act as incentives to substantially reduce relative expenditures, as they were not significantly impacted by the landlord levy.

## 9. Conclusion

Altogether, this thesis analyses the effects the implementation of the landlord levy has had on Dutch housing associations. The landlord levy has been the subject of a significant academic and political debate since its implementation in 2013. Literature pleading in favour of the landlord levy, argues that the necessary financial gain of the landlord levy could not have been covered by other means. Rents did not increase enough and costs could not be reduced enough. This resulted in less social housing expansion and more disinvestments. However, analyses from the Ministry of Internal Affairs show numerous alternatives for housing associations, including debt financing.

This thesis is based mainly on the research done by [Veenstra et al. \(2016\)](#). This paper investigates a possible statistically significant effect of the landlord levy on financial and operational outcomes. It is, until now, the only research that uses statistical methods including regressions and linear models, in contrast to the cost-benefit analysis and descriptive statistical analyses from other existing literature. However, Veenstra et al. focus only on the short timeframe between 2010 and 2014. This thesis aims to build on the literature already available on this topic, and fill in its gaps via three new research aims; expanding the timeframe to between 2008 and 2020, taking social housing stock instead of total housing stock as unit/variable and using expenditure relative to rental income as control variable for additional income possibilities. Five hypotheses were formulated in order to systematically analyse the effects the landlord levy has had on housing associations. In short, they can be shared under one main research question: “What has the effect of the landlord levy on the functioning of housing associations, in particular their housing supply?”

To test the five hypotheses, data based on dVi, data on income, some cost variables, housing stock mutation and total housing stock of every Dutch housing association was collected. Each housing association was treated as a single observation per year. With this data collection, various linear panel data regressions were run, many of which were significant. The main noteworthy and significant results are: a €1,- increase of the landlord levy paid per social housing unit means an increase of ‘social rental income’ by 0.00399%, a €1,- increase in the average landlord levy per social housing unit is associated with a 0.0687% increase in the average yearly number of social housing units sold and an increase of ‘the average yearly number of social housing units sold’ by 0.0687% and a decrease of ‘the total number of social housing stock’ by 0.336%. These effects all are only significant for the period 2010 to 2016 and only on social housing related variables.

The results indicate that the landlord levy has a significant positive short-term effect on social rental income, social housing sales and a negative impact on total social rental stock. These effects generally support existing literature, which conclude that while income did rise, through disinvestments less social rental stock for housing associations remained. Major surprises were the lack of significant effects on any of the cost variables. The lack of these expected findings may be explained by the fact that total housing stock variables were often not significantly affected by the landlord levy. Cost variables could only be calculated as the average total variable. The unexpected lack of significant impact on new housing construction, as was noted by [Aedes \(2019\)](#), can also be explained by Aedes using total housing construction, while this thesis only uses social housing construction.

Some complications experienced during the data analysis were changes in the dVi over the years. This created difficulty in data generation, limiting the number of possible



choices for data sets and variables. For instance, data on debt variables were in the end not collected.

Future research might focus more on the effect of the 2015 housing law and the impact of debt and specifically interest rates on housing associations. The impact both developments have had shines through much of the research done during this paper and makes many of the results harder to interpret. Interest level changes may have been a significant influence by exogenously decreasing costs by a level comparable to the landlord levy.

# 10: Appendix

## Regression results

### 1.1-1.4 Total rental income

VARIABLES	(1.1) Log of total rental income	(1.2) Log of total rental income	(1.3) Total rental income	(1.4) Total rental income
Landlord levy per total housing unit.	9.62e-06 (1.27e-05)	2.41e-05 (2.33e-05)	<b>0.245***</b> (0.0911)	<b>0.507***</b> (0.179)
Average WOZ-value total housing stock.	4.56e-07*** (1.41e-07)	-6.71e-07 (1.13e-06)	0.00407*** (0.00129)	0.00722** (0.00347)
Average WOZ-value social housing stock.				
Housing units under management	-3.53e-08 (9.33e-07)	-2.91e-06 (2.72e-06)	-0.00176 (0.00596)	-0.0128 (0.0104)
2009	-0.0217 (0.0219)		-11.14 (31.16)	
2010	0.0512*** (0.0109)		312.1*** (19.03)	
2011	0.0664*** (0.0192)	0.0116 (0.0202)	462.5*** (52.05)	163.8*** (58.60)
2012	0.103*** (0.0112)	0.0421*** (0.0126)	589.2*** (20.92)	310.3*** (30.85)
2013	0.150*** (0.0117)	0.0794*** (0.0227)	853.0*** (28.43)	597.7*** (54.60)
2014	0.201*** (0.0141)	0.118*** (0.0227)	1,064*** (57.34)	702.7*** (40.96)
2015	0.235*** (0.0141)	0.157*** (0.0175)	1,252*** (60.50)	868.3*** (49.24)
2018	0.291*** (0.0161)		1,582*** (97.03)	
2019	0.303*** (0.0148)		1,645*** (67.18)	
2020	0.322*** (0.0159)		1,739*** (85.51)	
Constant	8.406*** (0.0257)	8.656*** (0.194)	4,170*** (205.4)	4,041*** (532.4)
Observations	3,983	2,258	3,983	2,258
R-squared	0.400	0.258	0.684	0.464
Number of housing associations	430	400	430	400

Robust standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### 1.5-1.8 social rental income

VARIABLES	(1.5) Log of social rental income	(1.6) Log of social rental income	(1.7) Social rental income	(1.8) Social rental income
Landlord levy per social housing unit.	7.90e-06	<b>3.99e-05**</b>	<b>0.210**</b>	<b>0.343***</b>
Average WOZ-value social housing stock.	(1.19e-05) 1.74e-07	(1.91e-05) -2.46e-07	(0.0877) 0.00207	(0.125) 0.00100
Housing units under management	(1.66e-07) -2.19e-07	(3.59e-07) -3.02e-06	(0.00173) -0.00232	(0.00124) -0.0144
2009.Jaar	(9.40e-07) -0.0212 (0.0218)	(2.50e-06)	(0.00577) -8.054 (30.93)	(0.0116)
2010.Jaar	0.0508*** (0.0109)		309.4*** (19.11)	
2011.Jaar	0.0650*** (0.0193)	0.0132 (0.0172)	452.4*** (51.31)	140.9*** (52.58)
2012.Jaar	0.0885*** (0.0113)	0.0340*** (0.00569)	505.4*** (25.43)	187.5*** (21.91)
2013.Jaar	0.132*** (0.0121)	0.0734*** (0.00991)	743.7*** (37.29)	416.2*** (29.34)
2014.Jaar	0.179*** (0.0144)	0.103*** (0.0178)	933.3*** (65.71)	535.8*** (57.71)
2015.Jaar	0.215*** (0.0146)	0.139*** (0.0175)	1,136*** (69.68)	739.9*** (58.07)
2018.Jaar	0.273*** (0.0163)		1,482*** (98.72)	
2019.Jaar	0.291*** (0.0147)		1,574*** (63.36)	
2020.Jaar	0.319*** (0.0156)		1,743*** (77.30)	
Constant	8.452*** (0.0296)	8.589*** (0.0692)	4,497*** (280.2)	5,051*** (196.8)
Observations	3,983	2,258	3,983	2,258
R-squared	0.374	0.226	0.648	0.400
Number of housing associations	430	400	430	400

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### 1.9-1.12 Housing sales income

VARIABLES	(1.9) Log of housing sale income	(1.10) Log of housing sale income	(1.11) Housing sale income	(1.12) Housing sale income
Landlord levy per total housing unit.	0.000283	0.000964	<b>0.321**</b>	<b>0.296**</b>
Average WOZ-value total housing stock.	(0.000371) -2.15e-07	(0.000635) -1.43e-05**	(0.142) -0.00199	(0.134) -0.00578***
Housing units under management	(2.86e-06) -1.72e-05	(6.01e-06) 1.21e-05	(0.00178) -0.0205	(0.00180) -0.00925**
2009.Jaar	(2.22e-05)	(1.67e-05)	(0.0141)	(0.00453)
2010.Jaar				
2011.Jaar	4.332*** (0.136)	4.242*** (0.139)	346.3*** (32.22)	330.8*** (31.96)
2012.Jaar	4.559*** (0.137)	4.379*** (0.150)	334.4*** (44.06)	295.5*** (47.99)
2013.Jaar	4.567*** (0.140)	4.247*** (0.162)	311.3*** (44.48)	240.0*** (39.39)
2014.Jaar	4.741*** (0.216)	4.046*** (0.328)	262.7*** (92.51)	183.5*** (69.20)
2015.Jaar	4.755*** (0.241)	4.074*** (0.361)	219.5** (94.15)	157.0** (75.39)
2018.Jaar	5.267*** (0.306)		817.5*** (214.8)	
2019.Jaar	5.556*** (0.278)		758.7*** (98.23)	
2020.Jaar	3.844*** (0.311)		-19.00 (114.7)	
Constant	0.218 (0.490)	2.245** (0.973)	444.9* (253.4)	983.1*** (291.5)
Observations	2,935	2,110	3,098	2,249
R-squared	0.570	0.633	0.054	0.125
Number of housing associations	400	400	400	400

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 2.1-2.4 Personnel costs

VARIABLES	(2.1) Log of personnel costs	(2.2) Log of personnel costs	(2.3) Personnel costs	(2.4) Personnel costs
Landlord levy per total housing unit.	-7.87e-05 (0.000258)	-2.01e-05 (0.000287)	-0.0531 (0.0440)	-0.0305 (0.0490)
Average WOZ-value total housing stock.	-1.21e-06 (1.56e-06)	-2.03e-06 (3.91e-06)	-0.000379 (0.000286)	-0.00141 (0.000937)
Housing units under management	-5.96e-06 (7.47e-06)	-6.83e-06** (3.28e-06)	-0.00493** (0.00215)	-0.00567*** (0.00197)
2009.Jaar	0.0464 (0.0303)		10.62* (6.151)	
2010.Jaar	0.0705* (0.0388)		27.87*** (6.498)	
2011.Jaar	0.103** (0.0435)	0.0307 (0.0201)	43.07*** (7.183)	12.41** (5.159)
2012.Jaar	0.0950** (0.0471)	0.0176 (0.0419)	44.12*** (8.938)	7.124 (12.02)
2013.Jaar	0.158** (0.0679)	0.0721 (0.0860)	52.77*** (13.40)	6.217 (22.59)
2014.Jaar	0.0254 (0.166)	-0.0925 (0.179)	37.20 (29.55)	-24.91 (34.33)
2015.Jaar	0.00740 (0.169)	-0.116 (0.174)	16.08 (30.12)	-44.15 (32.47)
2018.Jaar	0.241 (0.200)		63.22* (36.47)	
2019.Jaar	0.287 (0.181)		100.1*** (33.24)	
2020.Jaar	0.341* (0.175)		118.6*** (35.60)	
Constant	6.133*** (0.261)	6.252*** (0.624)	694.3*** (48.24)	882.0*** (147.9)
Observations	3,972	2,258	3,972	2,258
R-squared	0.020	0.016	0.050	0.063
Number of housing associations	430	400	430	400

Robust standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 2.5-2.8 Maintenance costs.

VARIABLES	(2.5) Log of maintenance costs	(2.6) Log of maintenance costs	(2.7) Maintenance costs	(2.8) Maintenance costs
Landlord levy per total housing unit.	1.46e-05 (7.89e-05)	-2.68e-05 (0.000113)	-0.00522 (0.112)	0.0234 (0.212)
Average WOZ-value total housing stock.	9.37e-07** (4.76e-07)	2.03e-06 (1.29e-06)	0.00204** (0.000910)	0.00567 (0.00377)
Housing units under management	3.10e-06 (3.50e-06)	-4.99e-06 (4.92e-06)	0.00181 (0.00584)	-0.00759 (0.00702)
2009.Jaar	-0.0122 (0.0172)		-5.186 (35.73)	
2010.Jaar	-0.0925*** (0.0196)		-120.5*** (33.83)	
2011.Jaar	-0.0492** (0.0202)	0.0511*** (0.0173)	-75.37** (33.35)	65.37** (31.60)
2012.Jaar	-0.115*** (0.0219)	-0.00614 (0.0231)	-153.1*** (35.48)	14.00 (49.79)
2013.Jaar	-0.128*** (0.0261)	-0.00702 (0.0320)	-148.5*** (40.84)	50.42 (70.54)
2014.Jaar	-0.140*** (0.0509)	0.00668 (0.0636)	-167.3** (72.15)	40.23 (101.1)
2015.Jaar	-0.0835 (0.0558)	0.0615 (0.0673)	-88.66 (77.50)	103.4 (101.4)
2018.Jaar	0.239*** (0.0656)		418.1*** (91.57)	
2019.Jaar	0.284*** (0.0647)		495.0*** (94.50)	
2020.Jaar	0.105 (0.0696)		162.5 (101.0)	
Constant	7.063*** (0.0832)	6.839*** (0.209)	1,131*** (153.8)	477.3 (600.3)
Observations	3,981	2,258	3,983	2,258
R-squared	0.225	0.022	0.197	0.022
Number of housing associations	430	400	430	400

Robust standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 2.9-2.12 Livability costs

VARIABLES	(2.9) Log of livability costs	(2.10) Log of livability costs	(2.11) Livability costs	(2.12) Livability costs
Landlord levy per total housing unit.	0.000224	0.000439	0.0109	0.0251
Average WOZ-value total housing stock.	(0.000297) -1.42e-06	(0.000292) 6.00e-07	(0.0128) -0.000219**	(0.0157) -0.000239
Housing units under management	(1.92e-06) 8.72e-06	(3.12e-06) 1.86e-06	(9.47e-05) 0.00133	(0.000161) 0.000659
2009	(1.34e-05) 0.187***	(1.90e-05)	(0.00114) 2.175	(0.00130)
2010	(0.0504) 0.183***		(3.415) 0.407	
2011	(0.0562) 0.172***	0.000162	(4.213) -2.693	-3.041
2012	(0.0603) -0.533***	(0.0401) -0.694***	(4.337) -39.16***	(2.227) -39.50***
2013	(0.0847) -0.121	(0.0768) -0.276***	(4.613) -18.48***	(3.520) -19.49***
2014	(0.0835) -0.851***	(0.0824) -1.095***	(5.500) -58.13***	(4.788) -65.85***
2015	(0.190) -0.799***	(0.166) -1.069***	(8.713) -54.75***	(8.814) -63.78***
2018	(0.205) -0.0427	(0.186)	(9.536) -18.43	(10.54)
2019	(0.247) 0.129		(11.40) -6.957	
2020	(0.224) 0.148		(11.15) -0.585	
Constant	(0.234) 3.816***	(0.519) 3.671***	(12.36) 108.0***	(17.81) 115.2***
Observations	3,964	2,258	3,965	2,258
R-squared	0.150	0.188	0.131	0.185
Number of housing associations	430	400	430	400

Robust standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### 3.1-3.4 Social housing construction

VARIABLES	(3.1) Log of social housing construction	(3.2) Log of social housing construction	(3.3) Social housing construction	(3.4) Social housing construction
Landlord levy per social housing unit.	0.000101 (0.000472)		-0.00949 (0.0273)	
Landlord levy as a percentage of social rental income		0.0289 (0.0251)		0.309 (1.406)
Average WOZ-value social housing stock.	2.46e-06*** (8.64e-07)	2.72e-06*** (9.42e-07)	3.95e-05 (3.71e-05)	5.07e-05 (3.59e-05)
Housing units under management	7.51e-05 (4.91e-05)	7.57e-05 (4.91e-05)	0.00911* (0.00531)	0.00913* (0.00532)
2009	0.0668 (0.0944)	0.0663 (0.0944)	2.073 (3.848)	2.053 (3.846)
2010	-0.0627 (0.108)	-0.0625 (0.108)	-2.944 (4.334)	-2.936 (4.336)
2011	-0.139 (0.110)	-0.138 (0.110)	-4.518 (4.934)	-4.472 (4.931)
2012	0.0677 (0.118)	0.0705 (0.118)	2.770 (5.190)	2.893 (5.190)
2013	0.249** (0.120)	0.242** (0.120)	15.81*** (5.891)	15.61*** (5.913)
2014	-0.260 (0.272)	-0.457* (0.260)	-8.683 (16.55)	-15.96 (15.66)
2015	-0.270 (0.301)	-0.481* (0.281)	-12.32 (18.59)	-20.38 (16.83)
Constant	1.548*** (0.327)	1.502*** (0.334)	-10.17 (31.39)	-12.14 (31.53)
Observations	3,106	3,106	3,106	3,106
R-squared	0.015	0.015	0.042	0.042
Number of housing associations	430	430	430	430

Robust standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



### 3.5-3.8 Social housing acquisition

VARIABLES	(3.5) Log of social housing acquisition	(3.6) Log of social housing acquisition	(3.7) Social housing acquisition	(3.8) Social housing acquisition
Landlord levy per social housing unit.	0.000518 (0.000346)		0.00487 (0.0755)	
Landlord levy as a percentage of social rental income		<b>0.0374**</b> (0.0187)		1.248 (3.324)
Average WOZ-value social housing stock.	4.37e-06** (1.96e-06)	4.40e-06** (1.94e-06)	0.000315*** (9.52e-05)	0.000326*** (8.16e-05)
Housing units under management	2.25e-05 (3.26e-05)	2.26e-05 (3.27e-05)	0.0109 (0.00952)	0.0109 (0.00955)
2009	0.119 (0.0892)	0.119 (0.0892)	-5.176 (21.25)	-5.196 (21.24)
2010	-0.180** (0.0855)	-0.180** (0.0855)	-35.64** (17.56)	-35.63** (17.56)
2011	-0.401*** (0.0970)	-0.401*** (0.0970)	-47.34*** (17.87)	-47.30*** (17.88)
2012	-0.404*** (0.0985)	-0.403*** (0.0984)	-47.31*** (17.30)	-47.19*** (17.32)
2013	-0.456*** (0.107)	-0.460*** (0.106)	-37.89** (18.62)	-38.18** (18.70)
2014	-0.699*** (0.207)	-0.763*** (0.199)	-47.99 (44.96)	-56.23 (38.26)
2015	-0.612*** (0.224)	-0.671*** (0.209)	-30.41 (61.43)	-39.23 (50.91)
Constant	0.189 (0.380)	0.184 (0.379)	-59.97 (56.62)	-61.87 (58.45)
Observations	3,106	3,106	3,106	3,106
R-squared	0.044	0.044	0.012	0.013
Number of housing associations	430	430	430	430

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### 3.9-3.12 Social housing sales

VARIABLES	(3.9) Log of social housing sales	(3.10) Log of social housing sales	(3.11) Social housing sales	(3.12) Social housing sales
Landlord levy per social housing unit.	<b>0.000687**</b> (0.000284)		-0.0371 (0.0548)	
Landlord levy as a percentage of social rental income		<b>0.0325**</b> (0.0151)		-3.997 (4.911)
Average WOZ-value social housing stock.	-1.44e-06 (1.33e-06)	-1.61e-06 (1.41e-06)	4.76e-05 (9.56e-05)	3.05e-05 (8.68e-05)
Housing units under management	2.25e-05 (2.52e-05)	2.22e-05 (2.52e-05)	-0.0188 (0.0166)	-0.0189 (0.0166)
2009	-0.000163 (0.0494)	0.000134 (0.0494)	-0.153 (5.213)	-0.121 (5.223)
2010	0.160*** (0.0540)	0.160*** (0.0540)	4.181 (7.702)	4.172 (7.694)
2011	0.206*** (0.0609)	0.205*** (0.0610)	8.509 (9.728)	8.442 (9.676)
2012	0.229*** (0.0663)	0.227*** (0.0665)	6.383 (11.43)	6.199 (11.28)
2013	0.246*** (0.0738)	0.245*** (0.0747)	26.11 (21.03)	26.77 (21.67)
2014	0.00627 (0.156)	0.0663 (0.150)	49.57 (55.48)	65.44 (70.87)
2015	-0.0787 (0.179)	-0.000156 (0.166)	50.26 (61.38)	66.71 (76.99)
Constant	2.270*** (0.262)	2.300*** (0.273)	145.6 (90.04)	148.7 (92.12)
Observations	3,106	3,106	3,106	3,106
R-squared	0.042	0.041	0.016	0.016
Number of housing associations	430	430	430	430

Robust standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### 3.9-3.12 Social housing demolition

VARIABLES	(3.13) Log of social housing demolition	(3.14) Log of social housing demolition	(3.15) Social housing demolition	(3.16) Social housing demolition
Landlord levy per social housing unit.	-9.18e-05 (0.000408)		-0.00474 (0.0185)	
Landlord levy as a percentage of social rental income		0.00134 (0.0220)		-0.0842 (1.021)
Average WOZ-value social housing stock.	3.62e-06*** (1.01e-06)	3.71e-06*** (1.03e-06)	8.15e-05** (3.59e-05)	8.43e-05** (3.61e-05)
Housing units under management	4.51e-05 (3.03e-05)	4.53e-05 (3.04e-05)	0.00166 (0.00158)	0.00166 (0.00158)
2009.Jaar	0.0415 (0.101)	0.0414 (0.101)	-0.606 (4.352)	-0.611 (4.352)
2010.Jaar	-0.103 (0.102)	-0.103 (0.102)	-5.483 (4.760)	-5.481 (4.760)
2011.Jaar	-0.132 (0.105)	-0.132 (0.105)	-6.959 (4.389)	-6.947 (4.392)
2012.Jaar	-0.0454 (0.103)	-0.0444 (0.102)	-9.968** (4.119)	-9.937** (4.117)
2013.Jaar	-0.0895 (0.105)	-0.0910 (0.105)	-11.30** (4.682)	-11.33** (4.694)
2014.Jaar	-0.0907 (0.246)	-0.147 (0.238)	-8.654 (11.38)	-10.26 (11.08)
2015.Jaar	-0.0828 (0.265)	-0.146 (0.248)	-7.301 (11.02)	-9.131 (10.12)
Constant	0.674** (0.264)	0.658** (0.266)	14.83 (12.81)	14.34 (12.87)
Observations	3,106	3,106	3,106	3,106
R-squared	0.007	0.007	0.008	0.008
Number of housing associations	430	430	430	430

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### 3.3-3.14 Other social housing mutations

VARIABLES	(3.17) Other social mutations	(3.18) Other social mutations
Landlord levy per social housing unit.	<b>-0.0677***</b> (0.0219)	
Landlord levy as a percentage of social rental income		<b>-4.122***</b> (1.463)
Average WOZ-value social housing stock.	-2.36e-05 (6.39e-05)	-1.77e-05 (6.38e-05)
Housing units under management	-0.0148* (0.00884)	-0.0148* (0.00884)
2009	3.023 (3.348)	3.013 (3.349)
2010	-5.626 (5.350)	-5.619 (5.346)
2011	-6.728 (7.338)	-6.699 (7.329)
2012	-4.301 (5.302)	-4.231 (5.279)
2013	<b>-26.63***</b> (8.584)	<b>-26.30***</b> (8.564)
2014	14.93 (12.87)	16.88 (14.04)
2015	51.01** (21.08)	51.78** (23.42)
Constant	84.29* (48.81)	83.31* (49.17)
Observations	3,106	3,106
R-squared	0.039	0.039
Number of housing associations	430	430

Robust standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

#### 4.1-4.8 Total housing stock

##### 4.1-4.8 Total housing stock

VARIABLES	(4.1) Log of total housing units	(4.2) Log of total housing units	(4.3) Log of total housing units	(4.4) Log of total housing units	(4.5) Total housing units	(4.6) Total housing units	(4.7) Total housing units	(4.8) Total housing units
Landlord levy per total housing unit.	4.29e-05 (3.67e-05)	<b>-5.88e-05*</b> (3.26e-05)	0.00298	-0.00292	-0.206 (0.372)	<b>-0.531*</b> (0.278)	-9.122	-23.61
Landlord levy as a percentage of total rental income			(0.00199)	(0.00179)			(18.38)	(14.48)
Average WOZ-value total housing stock.	-6.29e-07**	-5.72e-07	-6.27e-07**	-5.52e-07	-0.000913	-0.00175	-0.00107	-0.00143
2009	(2.88e-07) 0.0281*** (0.00661)	(6.51e-07) 0.00703 (0.0100)	(2.83e-07) 0.0281*** (0.00661)	(6.54e-07) 0.00704 (0.0100)	(0.00352) 141.5*** (40.69)	(0.00352) 141.7*** (40.67)	(0.00341) 141.7*** (40.67)	(0.00348)
2010	0.0445*** (0.00945)	0.0446*** (0.00945)	0.0446*** (0.00945)	0.0446*** (0.00945)	304.3*** (67.79)	304.3*** (67.79)	304.1*** (67.82)	132.2
2011	0.0537*** (0.0115)	0.00862 (0.00703)	0.0537*** (0.0115)	0.00869 (0.00704)	443.4*** (115.6)	131.0 (89.23)	442.6*** (115.4)	(89.36)
2012	0.0535*** (0.0124)	0.00872 (0.0100)	0.0536*** (0.0124)	0.00892 (0.0100)	499.6*** (129.1)	178.7* (108.0)	497.9*** (128.3)	181.8*
2013	0.0495*** (0.0134)	0.00816 (0.0127)	0.0495*** (0.0133)	0.00836 (0.0127)	522.1*** (152.3)	202.1 (138.5)	517.9*** (150.0)	205.0
2014	0.0311 (0.0225)	0.0368** (0.0161)	0.0273 (0.0208)	0.0329** (0.0148)	648.4** (276.2)	470.3* (246.9)	619.4** (249.5)	414.2*
2015	0.0466** (0.0237)	0.0574*** (0.0165)	0.0432** (0.0214)	0.0519*** (0.0149)	690.0** (295.6)	530.4** (261.2)	655.7** (261.5)	457.6*
2018	0.0674** (0.0272)	0.0649*** (0.0225)	0.0649*** (0.0225)	0.0649*** (0.0225)	833.6** (329.3)	778.6*** (329.3)	778.6*** (329.3)	(250.3)
2019	0.0948*** (0.0273)	0.0948*** (0.0273)	0.0930*** (0.0226)	0.0930*** (0.0226)	959.2*** (308.2)	905.8*** (308.2)	905.8*** (308.2)	
2020	0.118*** (0.0313)	0.118*** (0.0313)	0.118*** (0.0313)	0.118*** (0.0313)	1,065*** (326.7)	1,013*** (326.7)	1,013*** (326.7)	
Constant	7.983*** (0.0487)	7.947*** (0.105)	7.972*** (0.0480)	7.944*** (0.106)	6,288*** (606.5)	6,499*** (610.2)	6,298*** (589.7)	6,448*** (604.8)
Observations	3,983	2,258	3,996	2,258	3,983	2,258	3,996	2,258
R-squared	0.088	0.028	0.088	0.028	0.047	0.015	0.047	0.014
Number of housing associations	430	400	430	400	430	400	430	400

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

#### 4.9-4.16 Social housing stock

VARIABLES	Log of social housing units	Log of social housing units	Log of social housing units	Log of social housing units	Social housing units	Social housing units	Social housing units	Social housing units
Landlord levy per social housing unit.	2.56e-06 (3.55e-05)	<b>-6.25e-05**</b> (2.94e-05)	0.000487	<b>-0.00366**</b>	-0.631 (0.392)	<b>-0.581**</b> (0.286)	<b>-35.02*</b> (20.38) -0.00290	<b>-28.51*</b> (15.71) 5.05e-05
Landlord levy as a percentage of social rental income								
Average WOZ-value social housing stock.	-9.21e-08	1.88e-08	-1.10e-07	2.44e-08	-0.00282	-5.80e-05		
2009	(2.22e-07) 0.0273*** (0.00660)	(1.47e-07) 0.00582 (0.00660)	(2.24e-07) 0.0273*** (0.00660)	(1.45e-07) 0.00171 2.44e-08	(0.00257) 132.5*** (40.03)	(0.000468) 132.6*** (40.05)	(0.00258) 132.6*** (40.05)	(0.000454) 132.6*** (40.05)
2010	0.0433*** (0.00938)	0.0433*** (0.00938)	0.0453*** (0.00938)	0.0194*** (0.0125)	258.1*** (62.79)	258.0*** (62.79)	258.0*** (62.79)	258.0*** (62.79)
2011	0.0565*** (0.0113)	0.0108* (0.00582)	0.0564*** (0.0113)	0.0108* (0.00582)	361.1*** (113.5)	108.5 (81.60)	360.7*** (113.4)	108.9 (81.65)
2012	0.0594*** (0.0120)	0.0145** (0.00662)	0.0592*** (0.0120)	0.0145** (0.00662)	375.6*** (124.4)	139.3 (87.09)	374.7*** (124.2)	140.5 (87.31)
2013	0.0611*** (0.0125)	0.0192*** (0.00663)	0.0606*** (0.0125)	0.0194*** (0.00665)	346.7*** (140.9)	132.5 (94.36)	345.2*** (140.1)	132.8 (94.43)
2014	0.0640*** (0.0216)	0.0536*** (0.0165)	0.0603*** (0.0209)	0.0541*** (0.0169)	642.7*** (265.9)	415.9** (205.7)	627.5*** (245.7)	373.4* (200.6)
2015	0.0797*** (0.0229)	0.0719*** (0.0174)	0.0761*** (0.0215)	0.0712*** (0.0173)	778.2*** (281.8)	537.5** (229.2)	750.1*** (233.6)	480.1** (220.9)
2018	0.0988*** (0.0270)		0.0939*** (0.0233)		869.1*** (325.2)		796.8*** (269.0)	
2019	0.119*** (0.0272)		0.115*** (0.0233)		987.0*** (311.1)		909.7*** (254.7)	
2020	0.134*** (0.0305)		0.130*** (0.0254)		1,117*** (340.5)		1,026*** (271.1)	
Constant	7.896*** (0.0379)	7.852*** (0.0236)	7.889*** (0.0383)	7.852*** (0.0233)	6,492*** (452.7)	6,086*** (124.0)	6,489*** (433.5)	6,068*** (124.1)
Observations	3,983	2,258	3,996	2,258	3,983	2,258	3,996	2,258
R-squared	0.084	0.028	0.083	0.029	0.022	0.009	0.022	0.008
Number of housing associations	430	400	430	400	430	400	430	400

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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