MASTER THESIS

Risk Appetite of the Dutch Social Housing Sector
–
Insights from a Survey-Based Research

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Abstract

Since the 19th century, social housing has had a central position in the Dutch real estate sector. Housing associations offer accommodation for individuals and families who fall short financially. Approximately one-third of the houses in the Netherlands fall under the property of housing associations, and thus their presence is noteworthy. Since housing associations have a social incentive, they are allowed to use financial resources at favorable terms. Their operations are supervised within a binding financial framework, restricting the risks they are allowed to take. Risks can be identified as events with uncertain outcomes, and companies face them in daily activities. The mitigation of undesirable outcomes is partly dependent on the amount of risk one is willing to accept. This phenomenon is often referred to as risk appetite, and it plays an essential role in the operational efficiency of housing associations. This study aims to measure the risk appetite of housing associations using a specially designed survey. After a careful selection of respondents, in total, 145 housing associations responded to the survey. Multiple respondents from the same housing association were asked to respond, and the entire research sample consists of 203 individuals. The risk appetite of housing associations is measured over multiple time horizons, two financial ratios, and four social objectives.

The findings indicate that housing associations become less risk-averse when time horizons extend. Furthermore, they are willing to accept higher risk for the loan to value ratio (LTV) compared to the interest coverage ratio (ICR). When comparing different social objectives, housing associations take significantly more risk when considering availability-based targets. An additional result suggests that members of the advisory board accept significantly higher risk compared to the directors and managers. Finally, housing associations with a higher risk appetite for availability-based targets have a higher percentage of construction in their portfolio. Furthermore, housing associations with a higher risk appetite for affordability-based targets ask for significantly lower rents.

This thesis contributes to the literature by presenting a new and innovative technique that measures risk appetite. Consultants can use the findings of this study to understand the risk preferences of their clients. Housing associations can use these insights in the implementation of financial strategies and policies. Furthermore, the findings of this thesis have implications for regulators and managers.

Keywords: Risk appetite, preferences, survey, housing associations, social housing.

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1. Introduction

Social housing is embedded in the Dutch real estate sector for over a century and the development of housing associations[1] resulted in a unique position in the housing market. The long and rich history of housing associations is physically noticeable by their widespread presence. Approximately one-third of all dwellings[2] in the Netherlands fall under the ownership of social housing institutes (Scanlon et al., 2015). In the upcoming years, participants in the Dutch real estate sector will be facing challenges regarding sustainability compliances and shortages in supply. Housing associations play an essential role in the mitigation of these challenges, as with ownership comes responsibility. Since policymakers become more concerned about sustainability, the real estate sector will be forced to comply with new regulations, and innovation is needed to build a low-carbon future (Seyfang, 2010). Additionally, the current unsustainable pressure in the Dutch housing market asks for more construction as young professionals struggle to buy their first home (Financieel Dagblad, 2021; CBS, 2020).

The core purpose of housing associations is to provide housing opportunities for those who are unfortunate and not able to afford housing entirely by themselves (MBZK, 2015). While pursuing this social ambition, housing associations face several dilemmas in its implementation. In general, the social objectives are enlisted in four pillars that form the strategic scope of housing associations. These pillars are (1) availability, (2) affordability, (3) sustainability, and (4) quality. Housing associations are free in determining which goals to pursue as long as they focus on their initial purpose (MBZK, 2015). Dilemmas can arise in the process of deciding which targets are desirable. If housing associations aim for an affordable and sustainable supply, will this result in too few dwellings, or will their availability targets be met? The realization of goals and related policies set by housing associations are dependent on the risks they are willing to accept to achieve them.

Risk preferences have often been investigated on an individual and personal level. Additionally, research has been conducted on the effect of the risk appetite of top management on firm performance within listed companies. However, there are still industries where the mapping of risk preferences is not sufficient. An industry in which the mapping of risk appetite is not adequate is the Dutch social housing sector. Despite the extensive amount of literature on an individual level and top management level, there is a lack of literature that scrutinizes

[1] The social housing sector, housing associations, or institutes will be used interchangeably throughout this study.
[2] Dwellings, houses, and property will be used interchangeably throughout this study.

the risk appetite of housing associations. This study aims to fill this gap by analyzing the risk appetite of housing associations in the Netherlands. *Ultimately, this paper aims to measure risk appetite, identify its determinants, and analyze its effect on economic outcomes.* With a survey-based research approach, risk preferences are measured for a large sample containing 203 respondents, which are operative at 145 unique housing associations. This sample contains approximately half of all housing associations in the Netherlands. For the measurement of risk appetite, a specially designed survey is used based on the survey preference module from Falk et al. (2016).

The findings of the research suggest that there are four critical determinants of risk appetite. First, the perception of time plays an essential role in the determination of the appropriate risk appetite. In other words, when time horizons extend, housing associations become less risk-averse. Second, the job specification of individuals making the decision affects risk appetite. In the sample, the supervisory boards of housing associations have the highest risk appetite. Third, the social objectives for which the risks are taken determine how high the risk appetite is. Evidence from linear regression models indicates that housing associations are willing to accept the highest risk for availability-related targets. Fourth, the financial context surrounding housing associations is essential in the determination of risk appetite. Financial covenants influence the headroom available to housing associations and thereby also affect their willingness to take risks.

The remaining text of this paper is organized as follows. Section two provides an overview of the history and institutional context of the social housing sector. Several historical events resulted in the current regulatory framework surrounding housing associations. This regulatory framework is an essential part of the study, and therefore the historical context is elaborated on. Section three discusses the risk management of housing associations and provides context for the developed method that measures risk appetite. The fourth section discusses the research design and elaborates on the survey structure, data collection, and the method used to identify relationships in the dataset. After that, section five addresses the analysis of the initial dataset and describes the housing associations present in the sample through descriptive statistics. Furthermore, the willingness to take risks in general and the risk appetite of housing associations are presented, after which the validity of the survey is checked. In section six, an objective interpretation of the research results is presented, after which section seven provides a subjective explanation for them. Finally, section eight concludes the research with theoretical contributions, managerial implications, limitations, and suggestions forfurther research.

2. Institutional context

The following section comprehends an overview that focuses on the institutional context of the housing association sector. Because social housing in the Netherlands has a rich and long history, the first part of this review starts with the historical context. It is essential to discuss the history of the sector as events that occurred in the past significantly influenced the structure of housing associations and their vision on risk today. After discussing the historical context, literature regarding the housing act of 2015 will be discussed. The housing act changed the operations of housing associations, and a clarification of the process is worthwhile because variables used in the data analysis are easier understood after elaborating on the housing act.

2.1 History of housing associations

The first housing associations originate from the 19th century. Figure 1 below illustrates a timeline with important events in the history of social housing in the Netherlands. These events will be discussed chronologically.

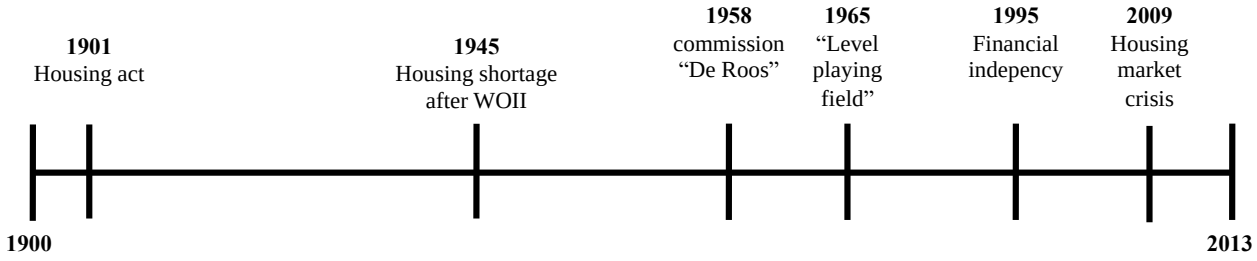

Figure 1 - Timeline of historical events. From: Parlementaire enquêtecommissie Woningcorporaties. Tweede Kamer der Staten-Generaal vergaderjaar 2014–2015, 33 606, nr. 8.

At first, housing associations were private initiatives brought to life to resolve the housing crisis and improve living conditions for the labor force (Elsinga et al., 2014). In 1901, the first housing act initiated a close relationship with the government by allowing acknowledged associations to rent at very low interest rates (Elsinga et al., 2014). Until 1940, the lending conditions of the housing act resulted in the construction of approximately 1 million houses (MBZK, 2015).

After the second world war, there was a substantial housing shortage in the Netherlands which needed an adequate solution (Elsinga et al., 2014). Surprisingly, at that time, the government reacted with a rent freeze policy that decreased incentives to invest in the drastically needed construction (Elsinga et al., 2014). The Cabinet-Drees I, which was in place

from 1948 until 1951, recognized that housing associations could play an essential role in the reconstruction. (Elsinga et al., 2014; MBZK, 2015). This view enabled the housing association to gain momentum, and their share in the housing stock increased accordingly (MBZK, 2015). The role of housing associations in the reconstruction of the Netherlands was accompanied by interference of the government (Elsinga et al., 2014). The Dutch government arranged and subdivided all the new construction projects, and the private charm of the housing associations diminished (Elsinga et al., 2014; MBZK, 2015).

The period from 1958 until 1995 was crucial in the recovery of the independent nature of the sector. After the mid-1950's the social housing sector came to be seen in a different light. As the reconstruction period of the damage from the war was advancing and coming to an end, the government initiated a commission to explore the possibilities to return to the post-war relationships between the state and the social housing sector (Faber et al., (1996). The commission, led by prof. dr. F. de Roos, delivered their report only in 1965 due to prolonged and heavy political debates about the future of housing associations (Faber et al., 1996; Elsinga et al., 2014). The report entailed the advice that housing associations and commercial investors should act at a level playing field to optimize the efficiency of the real estate sector (Elsinga et al., 2014). A series of events surrounding the Dutch housing market officially ended an era. The so-called “Besluit Beheer Sociale Huursector” (BBSH) in 1993 in combination with the “Brutering” in 1995 led to the financial independence of the sector (Faber et. al., 1996; Elsinga et. al., 2014; MBZK, 2015). The former event was a directive that specified several areas for which associations would still be held accountable with respect to reporting on their performance and achievements (Tommel, 1996). The latter was essentially the settlement of government subsidies and loans where associations were entitled to with the loans that still had to be paid back to the state (Tommel, 1996). This settlement was necessary to ultimately support financial independence.

Throughout the years after the independence, the doubt whether housing associations were professional enough to endure the financial autonomy turned into a discussion whether the housing associations were adequately using their extensive wealth (Elsinga et al., 2014). Since housing associations gained market share, and thereby financial resources, their expenditures on matters not related to the provision of housing for less wealthy people increased (MBZK, 2015). An essential aspect of the discussion was that housing associations received government aid in the form of guaranteed loans backed by the state (MBZK, 2015). The discussion was intensified by the housing crisis in 2009, triggered by the global financial crisis, set into motion by the bankruptcy of the American bank Lehman Brothers (CBS, 2018).

The unsustainable housing situation in the U.S. also sparked the debate surrounding low interest rates on real estate loans and government intervention (Foote et al., 2008). Additionally, the European Commission (hereinafter, EC) stated that only the so-called "Diensten van Algemeen Economisch Belang" (hereinafter DAEB) qualified for government aid (MBZK, 2015). DAEB are services consisting of economic activities that produce outcomes in favor of the public that would not be provided with the exclusion of state intervention (European Commission, 2011). Because housing associations in the Netherlands also performed services that did not match the definition of DEAB, government aid eventually ended up at services for which it was not intended (MBZK, 2015).

Housing associations moved into a negative spotlight through several incidents concerning excessive and unacceptable risk-taking and inappropriate remuneration practices (MBZK, 2015). Housing association "Vestia" came into significant financial troubles due to a derivate portfolio that was too big, and the derivative contracts themselves turned out to be too risky (Aedes, 2012). Housing associations use derivatives to hedge against undesirable movements in interest rates and thereby controlling their cashflows (Aedes, 2012). Altogether, the criticism from the EC and the undesirable financial situations created by specific housing associations led to multiple investigations (MBZK, 2015). In 2014, research conducted by the "Parlementaire Enquêtecommissie Woningcorporaties" critically addressed the situation of the social housing sector (MBZK, 2015). The series of events led to an amendment of the housing act, which, after 23 years, renewed the BBSH (MBZK, 2015).

2.2 Housing act

In 2015, the housing act took effect, and its implementation had significant consequences for the operations of housing associations. Their everyday housing activities, and hence their financial structures, had been criticized and were in the process of being changed. The housing act, with all its regulations and legislation, is a long and tough read. Fortunately, the ministry of the Interior and Kingdom Relations prepared an abbreviated version called "The housing act in a nutshell". In this section, the content of the housing act that has the most considerable effect on the research of this thesis is presented. Since some variables used in the data analysis are a direct result of the housing act, it is crucial to elaborate on the content.

Housing associations needed to recede to their initial purpose: constructing, renting, and managing properties for citizens with a low income or other grounds that prohibit them from finding appropriate housing (MBZK, 2015). The main business of housing associations should

comply with the DAEB as specified by the EC (European Commission, 2011; MBZK, 2015). In other words, the appropriate allocation of the housing associations' target group (low-income households) had to become the primary goal (MBZK, 2015). Low-income families were specified as households with an income lower than €34.911 (2015), and at least 80% of the social housing stock should be allocated to them (MBZK, 2015). The current boundary for low-income families is €40.024 (2021), and the allocation of social housing stock increased to at least 95% (MBZK, 2021a). Up to 2020, the asking rent of housing association properties had to be adjusted so that at least 95% of the households that qualified for rent allowance did not pay more than the deduction limit (MBZK, 2015). The deduction limit is simply the rent level up to which households still qualify for rent allowance (MBZK, 2015).

In 2020 the rent allowance system changed because previously, a slight increase in income could push a household's income above the threshold leading to a reduction in rent allowance from dozens of euros to zero (Aedes, n.d.). The current system still considers a maximum rent, called the liberalization limit, of €752,33 (MBZK, 2021a). However, the hard deduction limit changed to a method where the maximum allowed income is determined by a personal contribution that may not exceed the actual asking rent of the housing association (MBZK, 2019). The monthly personal rent contribution depends on the household's income, and if it exceeds the actual asking rent, households lose the right to receive rent allowance (MBZK, 2019). This method results in a more gradual reduction of the rent allowance when the income of households increases (MBZK, 2019).

Besides appropriately allocating social housing to those who need it most, housing associations are allowed to invest in the environment surrounding their properties as well as the sustainability of their properties (MBZK, 2015). The additional services conducted by housing associations are recognized as DAEB and must always be communicated with local municipalities (MBZK, 2015). The municipalities in which housing associations operate are distributed among 19 regions introduced by the housing act. Housing associations are allowed to have activities in the municipalities that fall under their core housing act region (MBZK, n.d.). Furthermore, housing associations are not allowed to buy or construct new dwellings in other housing act regions besides those already present in their portfolio (MBZK, 2015; MBZK, n.d.). For all their activities, housing associations are legally obligated to dismantle the DAEB-activities from the non-DAEB-activities (MBZK, 2015). The separation of the two activities originates from the above-mentioned problem that government aid was used for activities unrelated to the social goal of housing associations (MBZK, 2015).

To ensure that housing associations comply with the division of activities and all the other regulations enacted by the housing act, a national authority of housing associations (hereinafter, Aw) was founded (MBZK, 2015). From 2016 onwards, the Aw supervises the financial stability of housing associations and assesses whether they focus on their core business (Aw, 2018). Together with the "Waarborgfonds Sociale Woningbouw" (WSW), which secures the loans of housing associations and takes care of remediation, Aw worked on a vertical supervisory framework for the sector (Aw/WSW, 2020). The framework was finished when the Aw/WSW officially published financial ratios and corresponding thresholds used to supervise the financial stability of housing associations (Aedes, 2020). Since housing associations must comply with the ratios supervised by the Aw/WSW, it is essential for them to organize their risk management properly. However, how risk management is implemented in practice is not specified, and housing associations can make their own choices in the process (Ruiter & Wagensveld, 2019). Risk management is closely related to risk appetite and the following section discusses this relationship extensively.

3. Risk appetite

This section discusses the literature about risk appetite in the spectrum of housing associations and presents its potential determinants applicable to the sector. First, risk management of housing associations will be discussed because its context is essential for understanding risk appetite. Second, risk appetite is reviewed within broader financial context after which two specific components are identified and discussed. The risk appetite of individuals is discussed in the third part of this section and the risk appetite of businesses will be reviewed in the fourth part. Fifth, the hypotheses tested in this thesis will be formulated and explained. To visualize the hypotheses, a conceptual framework is developed which is presented accordingly.

3.1 Housing associations and risk management

Risk management is a process that is embedded throughout multiple divisions of housing associations. At its core, risk management involves all activities that maximize the value of businesses while reducing the potential costs associated with uncertain events (Dionne, 2013). The risk that housing associations face can range from unfavorable political events to many renters not paying their rent due to unexpected economic developments (Boelen & van Egeraat, 2019). Risk appetite is an expression that is often linked to the broader topic of risk management because it indicates the maximum amount of risk one is willing to accept (Ruiter

& Wagensveld, 2019). In their research, Ruiter and Wagensveld (2019) conducted a practical and theoretical assessment of risk management within the social housing sector. The practical part consists of an in-depth discussion with seven large housing associations concerning their approach towards risk management. One of the outcomes suggests that the financial ratios set by the Aw/WSW are an important part of the risk management of associations (Ruiter & Wagensveld, 2019). In this context, the risk appetite of a housing association refers to the maximum risk that is tolerated based on the financial ratios' limits (Ruiter & Wagensveld, 2019). The financial ratios introduced by the Aw/WSW aim to maintain the financial continuity of the sector by limiting housing associations to operate within a financial framework (Aw/WSW, 2020).

In total there are four ratios which the Aw/WSW uses in their assessment of financial continuity: the interest coverage ratio (ICR), the loan to value ratio (LTV), the solvency ratio, and collateral coverage ratio. Aw/WSW (2018), notes that it is critical that the assessment of the financial status reflects the social mission of housing associations. This indicates that the social objectives of associations are considered when determining financial continuity and the latter is thus connected to their business model. (Aw/WSW, 2018). The correlation between the first three ratios is that the social objectives of housing associations and ambitions in the portfolio strategy, as well as any resulting transition task and operational activities, are a given substance of the business model (Aw/WSW, 2018). Actual cash flows and solvency resulting from the business model are used in the calculation of the ICR, LTV, and solvency ratios (Aw/WSW, 2018). The fourth ratio does not take the social objectives into account and is thereby disconnected from the business model (Aw/WSW, 2018). The ratios used in this thesis, to assess a housing associations' financial risk appetite, are the ICR and LTV. The decision to concentrate on only two continuity measures is based on the finding that the LTV and solvency ratio both illustrate whether the admitted association has enough value and assets to meet its financial obligations and absorb any risks. Therefore, I selected only one of the two ratios. The Aw calculates the ICR with the following formula:

$$ICR = \frac{Operational\ Cash\ flow + Interest\ Income - Interest\ Expenses}{Interest\ Expenses - Interest\ Income\ from\ Internal\ Loans}$$

It provides information about the ability of associations to generate a sustainable cash flow to pay off interest due on outstanding debt (Aw/WSW, 2020). In general, the ICR indicates how healthy a company is, and new investors use it to assess its ability to repay their invested money

in the future (Bonazzi & Lotti, 2014). The LTV ratio, on the other hand, indicates whether housing associations can fulfill their social obligations or cope with future risks. (Aw/WSW, 2020). The formula used to calculate the LTV is as follows:

$$LTV = \frac{Nominal\ Debt}{Total\ Propery\ Value}$$

In essence, the LTV is a measure of the amount of money used to buy an asset comparative to the value of that asset (Forbes, 2020). Lenders, such as Fannie Mae in the U.S., use the LTV to estimate whether it is still possible and responsible to provide loans to companies and individuals that already have outstanding debt (Forbes, 2020).

The Aw/WSW has set the lower boundary for the ICR at 1.4 and the upper limit of the LTV at 85% (Aw/WSW, 2020). Housing associations can set internal ratios as a safety margin around the external ratios of the Aw/WSW to minimize the risk of crossing them. The risk of crossing those external ratios is a crucial aspect of this thesis. Whether housing associations use internal ratios as a cushion or use the external ratios as targets is entirely up to them.

Finance Ideas (2021) conducted an interesting study that indicates how ratios are used in the social housing sector. The survey-based study with more than 160 respondents shows that approximately 23% of the housing associations in the sample use the external ratios as targets (Finance Ideas, 2021). Furthermore, 114 and 84 of the housing associations diverge from the external ratio for the LTV and ICR, respectively (Finance Ideas, 2021). Internal ratios can decrease the probability that external ratios are crossed because they signal housing associations when certain boundaries are breached. But what happens if a housing association crosses the external ratios of the Aw/WSW?

The Aw/WSW developed an evaluation framework to identify potential risks of crossing boundaries. The standard assessment consists of three steps: (1) assessing the financial position, portfolio strategy, and governance, (2) assessing other potential risk areas, and (3) determining the judgement of the standard assessment (Aw/WSW, 2018). The Aw/WSW investigates housing association with in-depth research when material risks are identified (Aw/WSW, 2018). On the grounds of the in-depth analysis of the Aw/WSW, potential interventions and actions can be imposed (Aw/WSW, 2018). A non-exhaustive list of potential interventions contains an administrative penalty, appointing an active supervisor, filing a financial recovery plan, reclaim compensations, lose the right to receive guaranteed loans, and or filing an official public warning (Aw/WSW, 2018).

Housing associations will prevent ending up in undesirable situations like the ones above by complying with the regulatory framework. If a housing association is forced to adjust the financial policy to stay within the boundaries of the framework, it can use corrective measures to do so. Potential corrective measures can affect exploitation or investments. Correction of the ICR can be established through exploitation effecting measures like increasing rents, decreasing maintenance expenditures, or decreasing administrative expenses. The LTV can be affected through divesting measures like selling property, decreasing sustainability investments, or decreasing construction. Having internal ratios as targets might thus be seen as a saver approach since it offers opportunities to redirect financial policies if targets are missed. On the other hand, housing associations might prefer to use every resource available, thereby stretching the ratios to the maximum limit to fulfill their social objectives. Which approach is most convenient depends heavily on the financial situation, future social objectives, and the risk appetite of housing associations.

The risk appetite of housing associations can be defined by the level of risk at which associations feel comfortable (Aon, n.d.). In other words, risk appetite is the amount of risk housing association are willing to take to accomplish all their goals (Aon, n.d.; Ruiter & Wagensveld, 2019). The primary goals of housing associations, from 2021 until 2025, are determined by the Association of Dutch municipalities, the Associations of Tenants, and Aedes (umbrella association of housing associations) (MBZK, 2020). The social housing objectives for this period are availability, affordability, sustainability, and quality (of life) (MBZK, 2020). Housing associations employ their financial resources to fulfill their objectives, and the realization is largely determined by their risk appetite.

3.2 Risk appetite in financial theory

Modern financial theory places strong emphasis on risk appetite (Belghitar & Clark, 2012). The Von Neumann and Morgenstern expected utility theory, which is based on the assumption of risk aversion, resulted in the Capital Asset Pricing model in the 1960s. (Hauser & Urban, 1979; Belghitar & Clark, 2012). But risk aversion is not the only component of risk appetite. In the 1940's, Friedman and Savage (1948), already indicated that risk preferences also include risk taking behavior. Additionally, many asset pricing models have been built on the concept of risk neutrality (Cox & Ross, 1976; Belghitar & Clark, 2012). Yet, there is one important mitigator that effects practically all hypotheses in the risk appetite literature, and that is time.

People's time preference has been studied in numerous occasions and in this thesis, it also has a prominent role. A phenomenon called "hyperbolic discounting" illustrates an interesting relation between time and preferences. Hyperbolic discounting is defined by the finding that individuals apply higher discount rates over shorter time horizons and lower discount rates over longer time horizons (Laibson, 1997). Dasgupta and Maskin (2005), applied this notion to uncertain events and hazard rates. The authors suggest that human beings discount uncertain events with a smaller time window more heavily compared to potential hazards that take a longer period for they take effect. In this context, risk appetite for risks that could occur sooner is likely to be lower compared to risks that might realize further into the future. The different tastes of risk appetite as well as time preferences are an essential part of financial decisions making and studying them is a key component of financial theory.

Furthermore, the willingness to accept a risk varies, depending on the individual or association taking the risk and the goal for which the risk is being taken. In other words, setting priorities and determining which goals to pursue and which to put on hold for the time being depends on both the individuals making the decisions and the position of the housing association. Individual risk appetite has an impact on the decisions taken in name of the association, hence it is an important component of the risk appetite spectrum. The next two sections discuss the determinants of individual risk appetite as well as the importance of risk appetite on firm level.

3.3 Risk appetite of individuals

People's risk appetite has often been investigated to gain more insight into the relationship between risk-taking and economic outcomes. Whether people take on more risk in their daily activities may depend on personal characteristics. Take for example people's savings. Where one individual might be comfortable with 1.000 euro in a savings account, another might prefer a larger financial cushion of 5.000 euro to feel comfortable. While this is a simple example of the risk an individual is willing to take, the notion can be applied to numerous situations. Gaining insight into the risk attitude of individuals can reveal valuable relationships. Research suggests that certain individual characteristics are determinants of risk appetite.

Dohmen et al. (2011), find that height, gender, age, and parental background are important when explaining individual risk attitudes. Furthermore, Dohmen et al.'s (2010) empirical evidence suggests that an individual's lower cognitive ability results in higher risk aversion and a higher level of impatience. Moreover, Fellner and Maciejovsky (2007) link

individual risk to market activity and find that higher risk aversion leads to lower market activity. Additionally, Fellner and Maciejovsky (2007) find that females are more risk-averse compared to males. The findings regarding the determinants of individual risk attitude can be extended to more detailed personal domains. Weber, Blais, and Betz (2002) analyzed risk-taking behavior among men and women and found that women are less likely to engage in risk-taking behavior within several domains, among which financial domains. Risk appetite and its effect on financial decision making will influence financial outcomes on an individual level but also on business level. Individuals impact financial decision-making, but the position of the firm and how much risk the business can accept also plays an essential role. The amount of risk a business is willing to accept can be identified as risk appetite on business level.

3.4 Risk appetite of businesses

Risk-taking behavior in financial decision-making can have significant consequences for businesses. Greater risk-taking of management might lead to higher profits but could also result in substantial losses. The risk-taking behavior of management within businesses can be described as taking on opportunities that have uncertain outcomes (Eshima & Anderson, 2017). Research was conducted on the relationship between managers' risk appetite and firm performance. Belghitar and Clark (2012) found evidence that the risk preference of a CEO has a significant impact on firm volatility and financial results. These findings suggest that the specific job function might also be an important determinant of risk-taking on business level. Although the literature that investigates the direct relationship between occupation and financial risk appetite is scarce, some research can be found. Nicholson et al. (2005), found that the type as well as the level of the job has a significant effect on risk appetite. Working in the financial sector or having a human resource related job results in lower reported risk appetite compared to other jobs (Nicholson et al., 2005). Furthermore, job level is negatively related to risk appetite indicating that people with higher functions tend to make less risky decisions (Nicholson et al., 2005).

Besides the decision maker's occupation, characteristics of the firm in whose name the choices are made may influence risk appetite. Khlif and Hussainey (2014), investigate the relationship between firm characteristics and risk reporting practices. The authors argue that a higher degree of risk disclosure signals legitimacy of internal risk control to the market which simultaneously reduces litigation risk (Khlif & Hussainey, 2014). Their findings suggest that the size of firms and the region in which they operate have a significant effect on risk reporting

(Khlif & Hussainey, 2014). A higher degree of risk disclosure can be seen as a more risk averse approach as a lower level of uncertainty is accepted and the control of risk is assessed internally. This view is shared by Heinle and Smith (2017), who indicate that risk disclosure indeed decreases the amount of uncertainty surrounding firms and thereby reduces their cost of capital. In this scenario, size and location can be identified as essential firm characteristics when determining the risk appetite at business level. Furthermore, how businesses handle potential risks they face is determined by their risk appetite. Currently, environmental risk is an example of a threat for companies and their business models. Companies are more concerned about their environmental footprint as investors become more aware of the greenness of companies they invest in (Bolton & Kacperczyk, 2020). Additionally, companies face litigation risk as their social impact is often scrutinized and firms that abstain from social norms are penalized by investors (Hong & Kacperczyk, 2009). These exogenous forms of risk influence the behavior of businesses as they should mitigate them. Whether firm mitigate risks is, again, dependent on risk appetite and which risks are identified as most material depends on the type of risk as well as on the goals of the business.

Gaining more insight into the risk appetite of individuals as well as businesses is an essential part of financial theory because risk appetite forms the basis of many strategic decisions. The literature above allows for the formulation of potential hypotheses as the relationships can be generalized and applied to the Dutch social housing sector. The next section will provide an outline of the hypotheses examined in this thesis, as well as argumentation for them.

3.5 Hypotheses

The findings of the literature discussed reveal interesting relationships and potential determinants of risk appetite. Although these findings apply to companies in a more general form, housing associations might be subject to the same notions. To investigate the risk appetite of housing associations and illustrate the hypotheses identified, a conceptual framework is developed. Figure 2 below depicts the relationships that will be tested.

The first relationship that will be tested is illustrated by *H*1 in the Figure. The literature suggests that occupation has a significant influence on the amount of risk that is accepted (Nicholson et al., 2005; Belghitar and Clark, 2012). Nicholson et al. (2005), found that the risk appetite of people with different occupations is positively related to working in smaller organizations and negatively related to the level of the job.

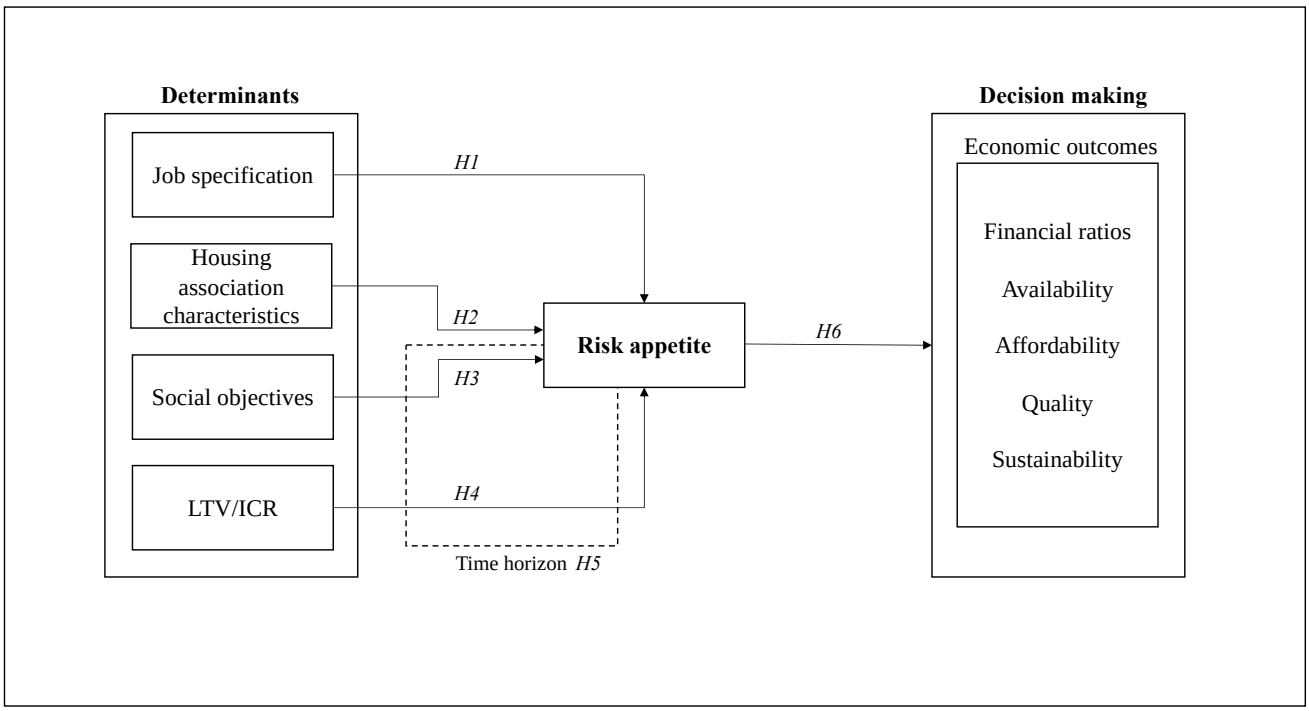

Figure 2 - Conceptual framework

Furthermore, the authors indicate that people who were involved in business start-ups earlier in their career have a higher risk appetite. These results might indicate that directors of housing associations have a lower risk appetite because the level of their job is higher compared to other functions. However, there is no research that investigates the direct relation between occupations within the social housing sector and risk appetite. Therefore, *H*1 is formulated as a non-directional hypothesis as the expected relationship between occupation and risk appetite is unspecified in the literature.

*H*1*: There is a relationship between job specification and the risk appetite of housing associations.*

The second relationships suggest that the characteristics of housing associations determine the risk appetite of the business. Housing association characteristics can range from size to the region in which they operate. Characteristics that will be used in this thesis are the size of associations, the housing act regions, and the tension of the housing market in which they operate. There are mixed findings in the literature that suggest that size and region are positively, negatively, or not related to risk appetite (Khlif & Hussainey, 2014; Hill & Short, 2009). However, no research has been conducted on the tension of the housing market and its

relation to risk appetite. Taking into consideration the ambiguous findings for the effect of size and region and the lack of literature regarding the tension in the housing market, the second hypothesis is formulated as a non-directional hypothesis.

*H*2: *There is a relationship between housing association characteristics and risk appetite*.

The third relationship illustrates a connection between the social goals of housing associations and their risk appetite. The line of thought behind this hypothesis is that housing associations face dilemmas in fulfilling their social objectives. Which objectives they pursue determines which dilemmas they will face and thereby influences the risk appetite as every dilemma asks for different approaches and different decisions. Whether housing associations prioritize availability, affordability, quality (of life), or sustainability, the objectives chosen affects their risk appetite because different approaches are required to achieve these goals. *H*3 is formulated as a non-directional hypothesis as no research exists that examines this context.

*H*3*: There is a relationship between the social goals of the housing associations and their risk appetite.*

The fourth hypothesis indicates that risk appetite depends on the LTV or ICR. As discussed in section 2.3, housing associations can influence the LTV and ICR through several actions. The risk appetite of housing associations regarding the external financial ratios of the Aw/WSW might be affected by the specific ratio that is at stake. The ease of implementing corrective measures depends on the ratio and it thereby influences the risk a housing association is willing to accept. Therefore, H4 can be formulated as an expected relationship between the financial ratios and housing associations' risk appetite. H4 is expressed as a non-directional hypothesis as the direction of the relationship is unclear.

*H*4: *There is a relationship between the financial ratios (LTV and ICR) and the risk appetite of housing associations*.

Additionally, time preferences influence decision making and whether housing associations have greater risk appetite when time horizons are extended is an essential topic in this thesis. Findings in the literature suggest that people discount risks which shorter time windows more heavily (Laibson, 1997; Dasgupta and Maskin, 2005). Therefore, the relationship tested in this

thesis is expected to be positive in the sense that housing associations increase their willingness to accept risk as time horizons increase. The influence of time is analyzed for the social goals and financial ratios as these are the foundation of the risk appetite measurements in the survey.

*H*5: *There is a positive relationship between time horizons and risk appetite.*

The last relationship is related to the third and fourth hypotheses in the sense that the risk appetite of the housing associations in turn also effects the economic outcomes of the social objectives. Take for example availability. Risk-taking behavior indicates that a housing association is willing to accept financial risk to ensure that new development projects are completed regardless of the circumstances. Of course, this is an illustrative and abstract example, but it rationalizes the idea that risk appetite of housing associations influences the ultimate realization of the social objectives that they pursue. Furthermore, risk appetite might determine whether housing associations have internal rations at all or use the external ratios as targets.

*H*6: *Risk appetite of housing associations effects the economic outcomes of their activities.*

A fundamental aspect of the hypothesis testing in this thesis is the research design. Developing frameworks to gain insight in the risk appetite of individuals and associations can reveal interesting relationships and might even avoid failures (Deloitte, 2014). However, measuring risk appetite in a sector where academic literature regarding the topic is scarce, is not straightforward. Individual risk appetite has been investigated with the use of well tested frameworks, but to my knowledge, there is no statistically verified framework that evaluates the risk appetite of housing associations. The next section discusses how risk appetite will be measured using a specially designed survey. Furthermore, the data collection process will be clarified, and the procedure of the statistical analysis will be elaborated on before turning to the description of the dataset.

4. Research design

The backbone of every study is the research design, as its outcomes establish the eventual data on which the hypotheses will be tested. The backbone of this thesis is a specially designed survey that aims to measure the risk appetite of a substantial part of the social housing sector.

The survey that is developed for this thesis consists of two components. These components measure risk appetite on the two levels discussed in the literature overview. The first part measures risk on an individual level as individuals working for housing associations make the decisions. The second part measures risk at the housing association level. This section will discuss both components of the survey and the techniques on which they are based.

4.1 Survey

Survey techniques that make individual characteristics measurable have been developed for different traits. The preference survey module constructed by Falk et al. (2016) is a widely used instrument for measuring risk and social preferences via surveys. Since the focus of this thesis is risk appetite, only the streamlined risk preference module will be discussed. Falk et al. (2016) created a streamlined version of their preference modules to make the implementation more time-efficient. The survey used for this thesis implemented the streamlined version for convenience as the second component of the survey was already time-consuming. The reduction of explanatory power when using the streamlined version is negligible (Falk et al., 2016).

Risk-taking behavior on an individual level is measured through a selection of, in total, six questions. A complete overview of the survey can be found in Appendix F. Falk et al. (2016) first ask the respondent to indicate how willing or unwilling one is to take a risk in general, using every number on a scale from 0 to 10. Subsequently, respondents are asked to take part in an imaginary lottery. Five lottery questions are represented to the respondent, each following question depending on the choice made in the previous question. Appendix A shows the staircase procedure of potential lottery choices. Falk et al. (2016) constructed this staircase where every question asks the respondent to choose between a sure payment or participating in a lottery with a 50/50 chance of winning nothing or winning a specified amount. The first question of their sequence is as follows:

"*What would you prefer: a 50 percent chance of winning 300 Euro when at the same time there is 50 percent chance of winning nothing, or would you rather have the amount of 160 Euro as a sure payment?*"

The risk appetite of an individual is determined by keeping the payment of the lottery constant but changing the sure payment after every choice (Falk et al., 2016). As illustrated in the

staircase, every respondent reaches the end of the staircase, where the ending node depends on the choices made. The ending node, also called "switching row," indicates the level of the risk appetite of the respondent as it is determined by the moment one switches from the lottery to the sure payment (Falk et al., 2016). The survey questions were tested in two experiments with 409 respondents. The ultimate selection of survey questions is based on Ordinary Least Squares (OLS) regressions that identified the preferred survey item for each preference based on the R^2 (Falk et al., 2016). The correlation between experimental measurements and their projected values from the OLS analysis indicates the quality of the survey questions, and the risk appetite survey model wields high explanatory power (Falk et al., 2016). Holt and Laury (2002) suggest that implementing experimental lottery-based surveys yields better results when real-life payments are drawn to reward a random set of respondents. However, due to the scope of this research and limited financial resources, this option is not considered.

The second component of the survey aims to measure the risk appetite of housing associations. Developing a technique that measures the risk appetite of housing associations asks for an abstract approach because the entire spectrum of risk is comprehensive. Since risk appetite is measured on a large scale across the whole social housing sector, a common area of risk was identified to ensure that every housing association recognizes the scenario drawn. Consequently, the focus has been placed on financial risks appetite, as explained in section 2.3 of this thesis. The central question of this component is as follows:

"*Imagine that your housing association can meet all of its availability/affordability/quality (of life)/sustainability targets. What probability do you accept of exceeding the external ratio for the LTV/ICR in 2025/2030/2050?*"

The question is asked repeatedly in the survey in such a manner that every question contains only one social goal (availability, affordability, quality (of life) or sustainability), one ratio (LTV or ICR), and one time window (2025, 2030, or 2050). In total, 24 different combinations were provided to the respondents. This way, the risk appetite of housing associations can be measured for every social objective, financial ratio, and three different time horizons.

The questions used to quantify risk appetite at the housing association level were developed with the support of industry experts from Finance Ideas and inspiration from Falk et al. (2016). The survey questions needed to affiliate with Falk et al. (2016) to make the whole survey coherent. When studying the lottery questions more thoroughly, a trade-off can be identified between a certain event and an uncertain outcome. The line of thought here is that

risk appetite is measured in a way where respondents identify themselves how high they value the certainty of the sure payment. The higher the value of the sure payment in comparison to the lottery, the higher the risk appetite. In other words, respondents have a higher boundary before they are tempted to choose certainty over uncertainty. The higher this threshold is, the greater one's risk appetite and the more risk-taking a respondent is.

The survey questions that measure risk appetite on housing association level follow the same reasoning. For this level, another trade-off is presented to the respondent only in this case, the certain event is held constant. Respondents indicate how much risk they are willing to take by stating the probability they accept of exceeding the external ratios of the Aw/WSW while fulfilling all their objectives on a specified topic. A probability of 100% in this situation indicates that a respondent is willing to exceed the external ratios with certainty, and face the accompanying consequences, to fulfill all its social objectives on the topic. An important note here is that the breach of the external ratios is projected to happen in 2025, 2030, or 2050 and not immediately. Aw/WSW collects the multi-year budgets from housing associations to assesses whether they meet their requirements. Notably, the assessment of the financial budget considers the current financial ratios and a five-year forecast (Aw/WSW, 2018). An in-depth analysis will be started if the ratios of a housing association are projected to exceed the external ratios in any situation in these five years (Aw/WSW, 2018). The survey questions present scenarios where external ratios are exceeded within (2025) and outside (2030, 2050) this assessment period.

The reasoning behind this structure is threefold. Firstly, a housing association cannot exceed the external ratios immediately since assessing the ratios is an ongoing process. A breach of one of the ratios would have been identified earlier, and the corresponding housing association would already be in an unstable financial situation. Therefore, asking what probability it accepts of exceeding the external ratios when it already surpasses them would not make sense. Secondly, the year 2025 is set as a starting point as this equals the assessment period of Aw/WSW. If the financial ratios exceed the external ratios somewhere at the end of this period, housing associations will be investigated, and their financial policy must be adjusted to get the ratios within the mandatory range. However, the intervention and sanctions will not be devastating (yet). Thirdly, when extending the period to 2030 or 2050, the adjustment capabilities for projected excesses of the ratios will grow, and the risk appetite might change. In this light, the desirable probabilities are asked for both the LTV and ICR. As these ratios differ in how they are calculated and the action needed to relevel them diverge, the risk appetite of housing associations might be different for the two. Conclusively, because

housing associations are supervised by the Aw/WSW via this structure, it is considered when measuring the risk appetite.

Altogether, the above-mentioned question measures risk appetite by quantifying the ultimate probability a housing association is willing to accept, considering the consequences for every different time window and the social objectives for which the risk is taken. This way, risk appetite can be measured on a large scale since every housing association recognizes the scenario and can estimate the consequences if the uncertain event does happen. The probability indicated by the respondent is thereby a direct measure of how much risk the housing association is willing to accept and thus reveals their risk appetite.

4.2 Sample selection and data collection

After the development of the survey questions, the sample of respondents had to be specified to ensure that the correct individuals received the request to respond to the survey. This process has been supported by Finance Ideas, as their professional network and close ties with the social housing sector made the sample selection possible. It is essential for the results of this thesis that those who received the survey understood the topics that were covered. Finance Ideas' database supported the selection of employees of housing associations based on their function. The database also included the email of those individuals and their names and surname, making it possible to approach them directly.

The final selection of individuals that were included in the mailing list was based on job specifications. These include people from the management team, supervisory board, directors, audit and control managers, risk managers, project managers, and other occupations with managerial or financial responsibilities. For the data collection, a survey tool called SurveyMonkey was used. Access to the tool was made possible via the subscription of Finance Ideas. SurveyMonkey offers many tools to edit and personalize surveys and analyze the data collected with statistical tests. Respondents had the opportunity to respond to the survey for approximately four weeks before it was closed. An introductory email, including the link to the survey, was sent on the 29th of April 2021. The email was sent to 946 individuals that complied with the descriptions above. A reminder was sent on the 19th of May, after which the survey was closed for respondents on the 28th of May.

In total, 266 housing associations are members of Aedes (Aedes, 2021). According to Aedes (2021), this includes almost every housing association in the Netherlands. It is possible that multiple individuals with different occupations from the same housing association received

the invitation for the survey. 288 people responded to the survey and after cleaning the dataset, 203 respondents, working at 145 housing associations, remained. The 85 respondents had to be removed from the dataset because they did not finish the entire survey.

The output of the survey included answers to all the questions included in appendix F. For the collection of other variables, the Aedes Benchmark was used for which authorized access was granted by Aedes on special request. The Aedes benchmark includes numerous variables for all housing associations that are members of Aedes and are willing to share the requested data. Aedes validates the data, aggregates it into one interactive dashboard, and analyzes it for the use of housing associations and other stakeholders (Aedes, 2019). In total, 58 variables were selected from the benchmark to examine the hypotheses.

4.3 Multiple linear regression

Multiple linear regression analyses are performed to analyze the data output from the survey and the data collected from the source mentioned above. Multiple linear regression models are widely used in quantitative research to reveal relationships between dependent and multiple independent variables. As described by Eberly (2007), multiple linear regression models represent the simultaneous relationships between various variables and a single continuous outcome. Since the multiple linear regression models are extensions of simple linear regression models, they have the same underlying assumptions (Eberly, 2007). Multivariate regression analysis assumptions consist of: (1) normality, (2) linearity, (3) no or little multicollinearity, and (4) homoscedasticity (Uyanık & Güler, 2013). The normality assumption indicates that the distribution of sample means for the variables should follow an approximately normal distribution (Eberly, 2007). The linearity assumption assumes that the relationship between a predictor variable and an outcome variable can be described by a linear relationship (Eberly, 2007). The third assumption, multicollinearity, assumes that there is no or little relationship between the independent variables. In other words, the explanatory variables should be independent of one another (Eberly, 2007; Uyanık & Güler, 2013). The fourth and last, homoscedasticity assumption assumes a constant variance of residuals across all values of the independent variable (Eberly, 2007).

It is essential to check the assumptions underlying multiple linear regression to avoid type I and type II errors and increase the accuracy of estimates (Osborne & Waters, 2002). The following section discusses an analysis of the dataset.

5. Data analysis

This data analysis section describes the data collected with the survey and other variables used in the hypothesis testing. First, the descriptive statistics of the housing associations in the sample will be discussed. Second, the general willingness to take risks of respondents in the sample will be examined. Third, the risk appetite of housing associations will be presented, after which the validity of the survey technique will be analyzed.

5.1 Descriptive statistics

Describing data helps with better understanding how datasets are built and makes it possible to identify potential relationships. Descriptive statistics are an essential part of data analysis and are often illustrated through histograms, measures of central tendency, or correlation tables. Figure 3 below contains four histograms that describe the characteristics of the housing associations in the sample as well as the job specifications of respondents.

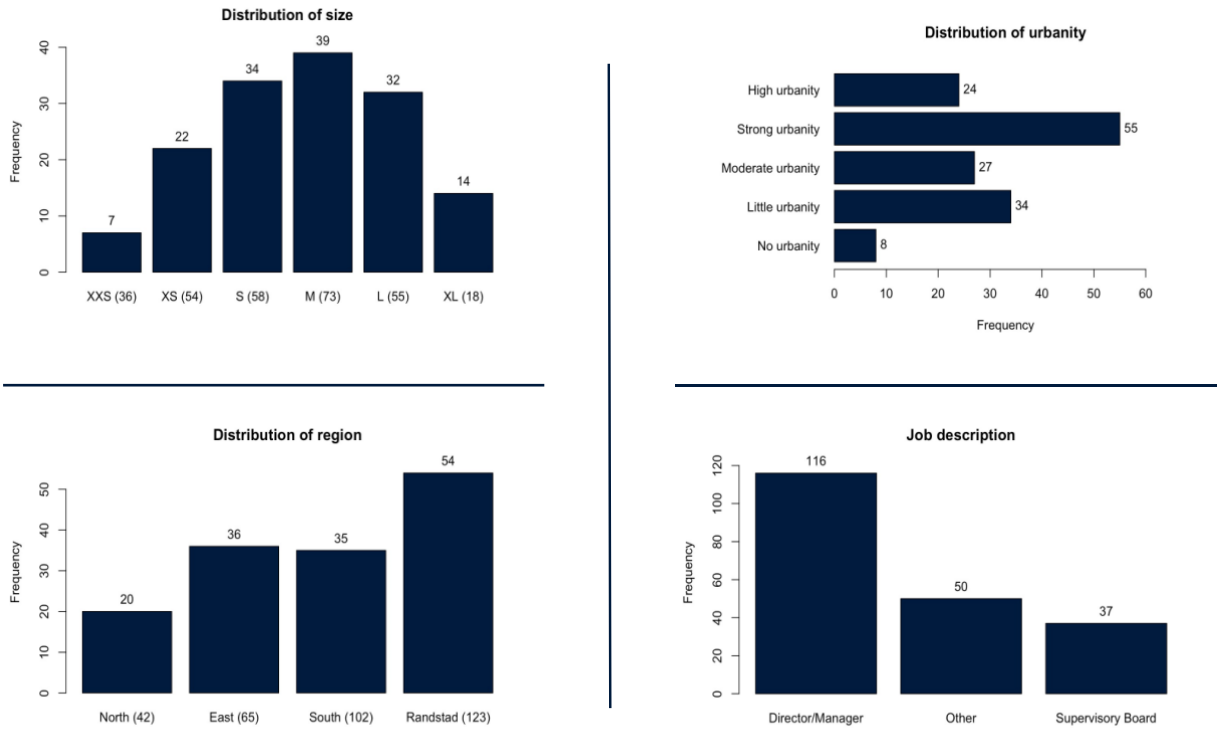

Figure 3 - Characteristics of respondents and housing associations

Important to note here is that, for the description of housing association characteristics, all unique housing associations are taken as reference. As mentioned above, it is possible that individuals with different occupations within a housing association responded to the survey.

Therefore, these would appear multiple times in the descriptive statistics below if all respondents are considered.

In total, 145 unique housing associations responded to the survey. The distribution of their size and region is illustrated in the upper and lower left quadrant of the Figure. On the x-axis of both Figures, the total amount of housing associations is shown to compare the amount present in the sample to the total amount present in the Netherlands, or that specific region. For the distribution of regions, a subdivision has been made to cluster housing associations from a particular area. Appendix E shows which housing act regions are clustered in this subdivision and the corresponding number of housing associations per cluster. Appendix E also provides information about the categories used to divide housing associations into size categories. For these categories, the official distribution of Aedes is used.

Within the sample, 14 XL (more than 25.000 rental units) housing associations are present. Remarkably, this means that almost all XL housing associations in the Netherlands (18) responded to the survey. Furthermore, the presence of housing associations originated in the Randstad, which roughly includes the provinces Noord-Holland, Zuid-Holland, Utrecht, and Flevoland, is high. This relates to the notion that the urbanity of areas in which housing associations operate is strong or high for more than half of the sample. Besides the physical characteristics of housing associations in the sample, the job functions of the respondents show that most respondents have director or management team related jobs. Furthermore, 37 members of the supervisory boards of housing associations responded to the survey. Although this is the smallest group, it is of reasonable size considering that the response rate of supervisors in the mailing list is more than 15%. The supervisory boards were harder to approach since their contact information was not always up to date.

Table 1 below describes the variables used throughout the data analysis section and provides a better picture of their values. Housing associations have an average of 9.917 rental units within the sample, corresponding to an M-size housing association. These 145 housing associations ask an average rent for their DAEB properties of 544 euros, approximately 70% of the maximum amount they are allowed to ask. Interesting is that the internal ratios indicated by the respondents are, on average, 1,52 for the ICR and 74% for the LTV. These results are very close to the findings of Finance Ideas (2021), who found that the average internal ratios 1,5 and 76%, respectively. Furthermore, housing associations are developing new construction projects of approximately 1% of their total stock, and their overall score of perceived living quality is 6.08.

Descriptive statistics

Variable	*N*	*Missings (%)*	*Mean*	*SD*
Number of rental units	145	0	9.917	12.065
Average rent price 2019 (DAEB)	145	0	€544	€28.22
Rent / maximum rent allowed	145	0	0.69	0.10
CF operating activities (total)	145	0	€11.396.349	€15.169.990
Long-term debt (total)	145	0	€348.367.793	€503.605.388
Internal ratio (ICR)	145	0	1.52	0.23
Internal ratio (LTV)	145	0	74%	12.65%
New construction units (DAEB)	145	0	661	873
Development construction (% of stock)	145	0	0.01	0.01
Perceived living quality 2020	145	0	6.08	2.46

Table 1 - Descriptive statistics of housing association variables

5.2 Willingness to take risks in general

This section describes the willingness to take risks in general of the individuals that responded to the survey. Figure 4 below shows the results of the general risk question. The bars indicate the fraction of people that related themselves to that risk level.

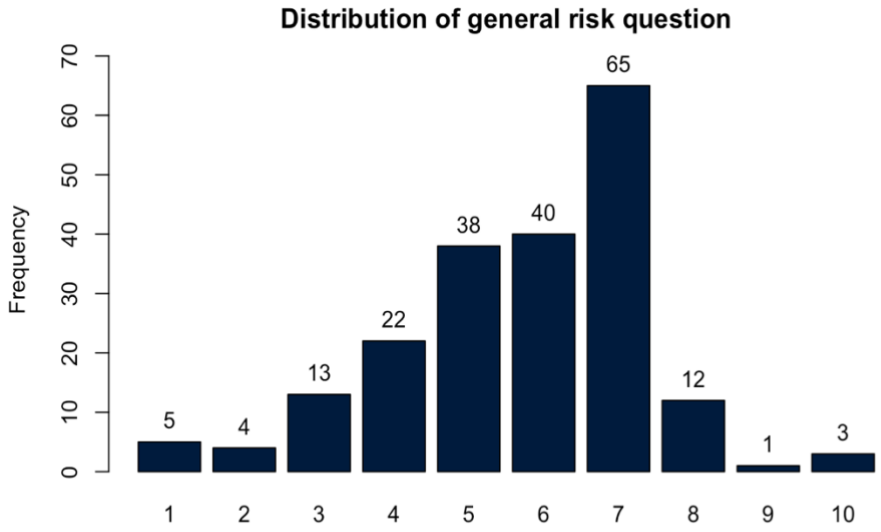

Figure 4 - General risk willingness to take risks

The figure illustrates a central tendency as many answers are situated around the middle values, and accordingly, the median response is 6. Only small proportions of the respondents indicate that they are very willing or unwilling to take risks. Interesting to note is that no respondent indicated a score of 0, although this was an option. Dohmen et al. (2011), analyzed the same willingness to take risk in a larger sample of approximately 22.000 individuals in Germany. Their findings indicate significant heterogeneity in the general willingness to take risks where the median response is 5, and around 7% of the respondents choose 0 (Dohmen et al., 2011). Compared to these findings, I document that, respondents from housing associations in the sample are less risk averse and willing to take more risks in general. This finding complements the findings of Falk et al. (2018), who documented that people from Germany are more risk averse in general compared to Dutch people. Dutch individuals have a higher risk appetite compared to the world mean and even the highest risk appetite within Europe (Falk et al., 2018). The observation in Figure 4 can be explained by the fact that Dutch people, and thus housing associations employees, are willing to accept more risks in general.

Besides answering the general risk question, the respondents were asked to participate in the imaginary lottery. Figure 5 below shows the distribution of switching rows as discussed in section 3.1. The choices of safe options vary across the sample, but most respondents tend to have a relatively risk-neutral pathway. The median switching row is 13, which equals a safe option value of 130 euros.

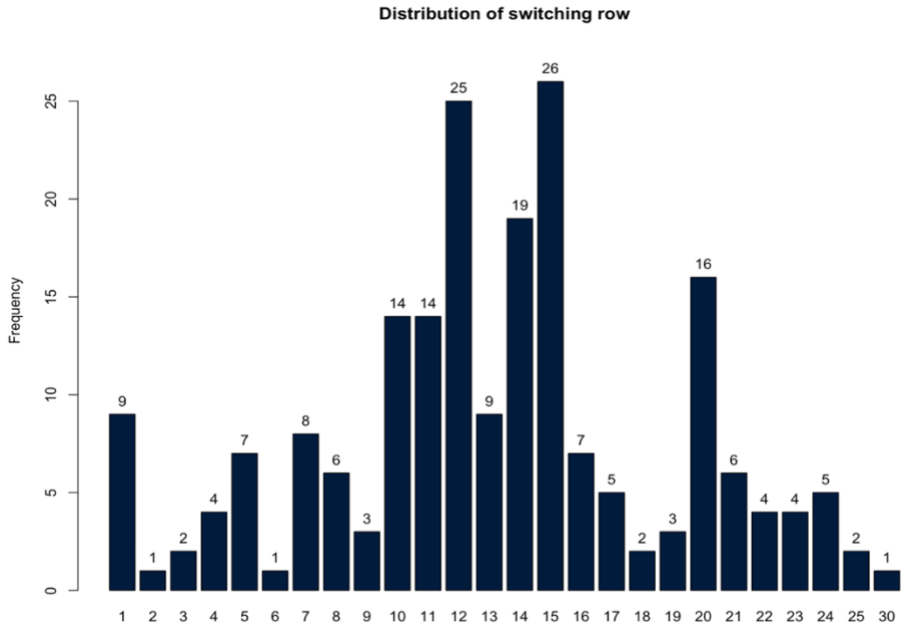

Figure 5 - Switching rows of lottery choices

The risk-neutral path would refer to a switching row of 15 as in those choices, the respondent always picks the option with the highest expected payoff. This would turn out in choosing the safe option initially and going for the lottery every subsequent time. Figure 5 does show that the risk-neutral pathway has the highest frequency. Furthermore, it is interesting that nine respondents were very risk-averse and selected the safe option every time. On the contrary, no respondent went for the lottery every time as there was no respondent with switching row 32 in the sample. The findings from the two Figures above show a tendency toward risk neutrality, as most responses are centered around the median values. Testing whether both figures are normally distributed, using the Shapiro-Wilk normality test, results in a rejection of normality for the general risk question.

When further analyzing the distribution with a skewness test, the findings show that especially the general risk question has a negative skew (-0.56). This indicates that the distribution is skewed to the left, meaning that the mean value is lower than the median, and people tend slightly more to risk-taking than to risk-averse behavior. Although rejected at a 5% level, the risk-taking behavior in the lottery is more normally distributed, and the skewness test results in a slightly negative value of -0.04. Therefore, the lottery results suggest that most respondents are indeed more risk-neutral when participating in the lottery. The following section continues with investigating the results of the survey by analyzing the risk appetite of housing associations.

5.3 The risk appetite of housing associations

The risk appetite of housing associations is measured in the survey on multiple levels. First, it is measured with respect to the LTV and ICR. Furthermore, the periods 2025, 2030, and 2030 add additional levels to the measurements. Moreover, all four social goals are included in the survey questions so that, in total, 24 percentages map the risk appetite of housing associations. Table 2 below shows the output from the 24 survey questions.

The percentages in the Table represent the average probability of crossing the external ratios that are accepted if all objectives were to be met. The most interesting notions are that, on average, housing associations take more risk for the LTV ratio compared to the ICR ratio and for availability compared to the other social objectives. Another finding that arises from the Table is that when the periods extend, the risk appetite of housing associations rises, indicating that risks that might materialize within a shorter time window are discounted more heavily.

			Risk appetite ICR		Risk appetite LTV	
Variable	*N*	*Missings (%)*	*Mean*	*SD*	*Mean*	*SD*
Availability 2025	203	0	0.20	0.25	0.26	0.27
Affordability 2025	203	0	0.17	0.23	0.20	0.23
Quality 2025	203	0	0.16	0.23	0.18	0.22
Sustainability 2025	203	0	0.16	0.22	0.19	0.25
Availability 2030	203	0	0.29	0.26	0.36	0.27
Affordability 2030	203	0	0.25	0.25	0.30	0.26
Quality 2030	203	0	0.23	0.24	0.28	0.25
Sustainability 2030	203	0	0.24	0.24	0.29	0.26
Availability 2050	203	0	0.42	0.30	0.51	0.30
Affordability 2050	203	0	0.38	0.30	0.44	0.30
Quality 2050	203	0	0.36	0.29	0.42	0.30
Sustainability 2050	203	0	0.37	0.30	0.44	0.31

Table 2 - Risk appetite output from the survey

For the shorter time horizons, the average accepted probabilities fluctuate between 16% and 36%. When considering the potential penalties of crossing external ratios, together with the fact that crossing them is often seen as a “no-go zone”, these probabilities are quite substantial. For example, for availability objectives in 2025 (LTV), a one in four probability of crossing the ratios is accepted on average. When further looking at the values in Table 2 it is striking that in 2050 (LTV), on average, a 51% chance of crossing the external ratios is accepted for availability objectives. Although there is no benchmark for these probabilities, the expectations of potential outcomes formed through discussion with field experts deviate from the results found in this study. A clustering of probabilities between 0% and 10% was expected since housing associations would do whatever they can to avoid crossing the boundaries in any time horizon. The results suggest that, for the realization of social objectives, housing associations are willing to accept a substantive risk. In line with the findings from Figure 4, I document that these results indicate that respondents in the sample have a tendency towards risk-taking behavior. The implications of these findings will be further discussed in section 8.

Before testing the hypotheses, the validity of the survey results above will be tested. The following section provides regression models to analyze the predictive power of the survey.

5.4 Survey validity

The survey output and the way it measures risk is the core of this thesis. Before turning to any regression analysis and corresponding hypotheses testing, it is essential and interesting to investigate the validity of the survey. Dohmen et al. (2011) follow this reasoning by testing the validity of the lottery survey module via linear regression analysis. They do so by regressing the values of the general risk question on the value of the switching row or the safe option of the lottery. This way, the predictive power of the general risk can be established by analyzing whether people are indeed willing to take the risk in the lottery (Dohmen et al., 2011).

The regression output in Table 3 below shows the results for the validity of the general risk question for this sample. Indeed, the general question that asks how much risk people are willing to take in general is significantly and positively related to the risk-taking behavior in the lottery.

	Dependent variable:
	Value of the safe option
General risk question	7.721^{***}
	(2.283)
Constant	83.122^{***}
	(13.608)
Observations	203
R^2	0.054
Adjusted R^2	0.049
Residual Std. Error	55.232 (df = 201)
F Statistic	11.440^{***} (df = 1; 201)
Note:	$^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

Table 3 – Regression output validity risk-taking behavior

In fact, a one-point increase in the general risk question would lead to a 7,721 euro increase in the value of the safe option in the lottery. This means that, on average, an extremely risk-averse person (score 0) is willing to accept approximately 77 euros less to choose the safe option compared to an extremely risk-loving person (score 10). Important to note is that the explanatory power indicated by the R^2 is only 5%. This results from the fact that the dataset does not allow from adding control variables for personal traits such as gender, height, age, etc., which are included by Dohmen et al. (2011).

The same technique can be applied to check the validity of the survey questions that measure risk appetite on housing association level. Table 4 below shows the regression outputs where the dependent variables are all 24 questions that measure the risk appetite of housing associations, and the independent variable is the general risk question.

The three panels, A, B and C, of Table 4 show the validity of risk-taking behavior for the survey questions that measure risk appetite for the LTV and ICR, grouped by the different time horizons. The coefficients for the LTV in all three panels are significant at a 10% level, with several being significant at a 5% and some even at a 1% level. The validity of the risk appetite for the ICR is less significant, and not all coefficients show a significant relationship. Especially for the risk appetite in 2025 and 2030, there seems to be little or no significant coefficients. However, for the longest time horizon 2050, all coefficients are significant.

Panel A

	Dependent variable:							
	Availability LTV 2025	Affordability LTV 2025	Quality LTV 2025	Sustainability LTV 2025	Availability ICR 2025	Affordability ICR 2025	Quality ICR 2025	Sustainability ICR 2025
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
General risk question	0.026**	0.021**	0.024***	0.018*	0.017*	0.014	0.020**	0.011
	(0.011)	(0.009)	(0.009)	(0.010)	(0.010)	(0.009)	(0.009)	(0.009)
Constant	0.109*	0.073	0.048	0.090	0.105*	0.087	0.047	0.101*
	(0.065)	(0.056)	(0.053)	(0.060)	(0.060)	(0.056)	(0.055)	(0.055)
Observations	203	203	203	203	203	203	203	203
R^2	0.028	0.025	0.034	0.016	0.014	0.011	0.023	0.007
Adjusted R^2	0.023	0.020	0.029	0.011	0.009	0.006	0.018	0.002
Residual Std. Error (df = 201)	0.262	0.229	0.217	0.244	0.245	0.228	0.224	0.224
F Statistic (df = 1; 201)	5.774**	5.151**	7.094***	3.238*	2.918*	2.238	4.684**	1.438

Note: The table continues on the next page

Panel B

	Dependent variable:							
	Availability LTV 2030	Affordability LTV 2030	Quality LTV 2030	Sustainability LTV 2030	Availability ICR 2030	Affordability ICR 2030	Quality ICR 2030	Sustainability ICR 2030
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
General risk question	0.023**	0.021**	0.024**	0.022**	0.016	0.015	0.018*	0.012
	(0.011)	(0.011)	(0.010)	(0.010)	(0.011)	(0.010)	(0.010)	(0.010)
Constant	0.231***	0.178***	0.147**	0.165***	0.195***	0.161***	0.131**	0.165***
	(0.067)	(0.064)	(0.060)	(0.062)	(0.064)	(0.061)	(0.059)	(0.058)
Observations	203	203	203	203	203	203	203	203
R^2	0.021	0.019	0.027	0.021	0.011	0.011	0.016	0.008
Adjusted R^2	0.016	0.015	0.022	0.016	0.006	0.006	0.011	0.003
Residual Std. Error (df = 201)	0.271	0.259	0.244	0.253	0.262	0.248	0.238	0.236
F Statistic (df = 1; 201)	4.222**	3.973**	5.492**	4.326**	2.146	2.197	3.339*	1.588

Panel C

	Dependent variable:							
	Availability LTV 2050	Affordability LTV 2050	Quality LTV 2050	Sustainability LTV 2050	Availability ICR 2050	Affordability ICR 2050	Quality ICR 2050	Sustainability ICR 2050
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
General risk question	0.029**	0.032***	0.038***	0.035***	0.023*	0.025**	0.030**	0.027**
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Constant	0.346***	0.255***	0.202***	0.245***	0.281***	0.234***	0.188***	0.217***
	(0.073)	(0.073)	(0.072)	(0.074)	(0.074)	(0.073)	(0.072)	(0.073)
Observations	203	203	203	203	203	203	203	203
R^2	0.027	0.034	0.047	0.038	0.018	0.021	0.029	0.024
Adjusted R^2	0.022	0.029	0.043	0.033	0.013	0.016	0.024	0.019
Residual Std. Error (df = 201)	0.298	0.295	0.292	0.301	0.299	0.297	0.291	0.296
F Statistic (df = 1; 201)	5.545**	7.065***	9.997***	7.866***	3.586*	4.234**	6.012**	4.860**

Note: *p<0.1; **p<0.05; ***p<0.01

Table 4 - Regression output for checking the validity of the risk appetite measurement

The findings from the regressions show that the survey questions developed to measure risk appetite on association level do indeed measure a risk preference. The insignificant relationships for the ICR in 2025 and 2030 can be partially explained by the fact that respondents indicated in the comments that the LTV is the ratio for which they are willing to take the most risk. Therefore, the relationship with the general risk questions might be more robust for the LTV compared to the ICR.

6. Results

In this section, the results from the multiple linear regression models are presented. The outline of this section will follow the structure of the conceptual framework discussed in section 2.5. After the multiple linear regression models are presented for each of the hypotheses, the assumptions underlying the regressions are addressed in a separate section. First, the results for the effects of job specification and housing association characteristics on risk appetite are presented. Second, the social objectives will be investigated, after which the effects of the two ratios, LTV and ICR, on risk appetite are discussed. Finally, the risk appetite of housing associations will be linked to social-economic outcomes.

6.1 The effect of housing association and job characteristics on risk appetite

The first two relationships indicated in the conceptual framework are the effects of occupation and housing association characteristics on risk appetite. Literature can be found where job specification has an influence on the risk appetite of employees. However, the direction of the relationship often depends on the type of job and sector. Furthermore, literature suggests that firm size has a negative effect on risk-taking behavior. Additionally, in earlier research, the region in which firms operate is also identified as a determinant of risk appetite (Khlif & Hussainey, 2014). The three housing association characteristics used in the analysis are size, region, and tension in the housing market. These characteristics have been selected from the Aedes benchmark since they provide information about the conditions under which housing associations operate. These could have a significant effect on how housing associations are coping with risks as they form the internal and external surroundings. For the analysis of $H1$ and $H2$, linear regression outputs are provided in Table 5.

Table 5 indicates the results for the regression models with four categorical independent variables and several dependent variables for the average risk appetite. Before calculating the averages, Cronbach's Alpha was calculated for all the survey questions to test the internal consistency of the measurements. The Cronbach Alpha for all the risk appetite questions on housing association level is 0,98, which means that the internal consistency is almost perfect. In other words, the scale reliability of the survey is high (Taber, 2018). Therefore, averages can be calculated without influencing the consistency of the concept measured.

The results suggest that being part of the supervisory board positively influences risk appetite, especially for the short run and compared to the reference group (directors and management team). These findings are significant at a 5% or 1% level.

	Dependent variable:					
	LTV 2025 (1)	LTV 2030 (2)	LTV 2050 (3)	ICR 2025 (4)	ICR 2030 (5)	ICR 2050 (6)
Other Jobs	-0.017	-0.029	-0.024	-0.011	-0.040	-0.013
	(0.039)	(0.045)	(0.052)	(0.039)	(0.042)	(0.052)
Supervisory Board	0.133***	0.066	-0.031	0.148***	0.106**	0.035
	(0.042)	(0.048)	(0.055)	(0.041)	(0.045)	(0.056)
Size M	-0.006	-0.040	-0.079	-0.004	-0.036	-0.091
	(0.045)	(0.051)	(0.060)	(0.045)	(0.049)	(0.060)
Size S	0.051	0.018	0.004	0.028	-0.027	-0.076
	(0.048)	(0.054)	(0.063)	(0.047)	(0.051)	(0.064)
Size XL	0.109*	0.071	0.030	0.126**	0.074	0.017
	(0.065)	(0.073)	(0.085)	(0.064)	(0.069)	(0.086)
Size XS	0.018	-0.020	-0.045	0.032	-0.023	-0.045
	(0.052)	(0.058)	(0.068)	(0.051)	(0.055)	(0.069)
Size XXS	0.180*	0.069	-0.048	0.099	-0.027	-0.124
	(0.092)	(0.104)	(0.121)	(0.090)	(0.098)	(0.122)
North	0.022	0.009	-0.029	0.028	0.002	-0.038
	(0.059)	(0.067)	(0.078)	(0.058)	(0.064)	(0.079)
Randstad	-0.083*	-0.031	0.068	-0.038	-0.005	0.081
	(0.049)	(0.056)	(0.065)	(0.048)	(0.053)	(0.065)
South	0.048	0.017	0.033	0.042	0.051	0.047
	(0.046)	(0.052)	(0.060)	(0.045)	(0.049)	(0.061)
Tense housing market	0.047	0.051	0.012	0.016	-0.003	-0.053
	(0.043)	(0.048)	(0.056)	(0.042)	(0.046)	(0.057)
Very tense housing market	0.072	0.014	-0.138*	-0.014	-0.067	-0.178**
	(0.061)	(0.069)	(0.080)	(0.060)	(0.065)	(0.081)
Constant	0.136**	0.282***	0.484***	0.117**	0.257***	0.452***
	(0.053)	(0.060)	(0.070)	(0.052)	(0.057)	(0.071)
Observations	203	203	203	203	203	203
R^2	0.114	0.039	0.045	0.109	0.070	0.049
Adjusted R^2	0.058	-0.022	-0.015	0.052	0.011	-0.011
Residual Std. Error (df = 190)	0.219	0.247	0.288	0.215	0.234	0.291
F Statistic (df = 12; 190)	2.031**	0.642	0.753	1.927**	1.192	0.810
Note:						*p<0.1; **p<0.05; ***p<0.01

Table 5 - Regression output for the effect of job specification and housing characteristics on risk appetite

Interestingly, there is no significant difference between the other group and the directors or management team. This notion was further analyzed by putting the other group as a reference. The alteration does not change the outcome that there is only a significant difference between the risk appetite of the advisory board members and directors or management teams.

Overall, the findings indicate that there is a relationship between occupation and risk appetite. More precisely, the advisory board members have a higher risk appetite compared to the directors and members of the management team in 2025 for the LTV and 2025 and 2030 for the ICR. However, with the knowledge that there are only 37 respondents in the board of advisory group, the relationship might be biased. Additionally, the relatively small group would not be a perfect representation when being compared to the larger group of directors and management team.

To address this concern, the advisory board respondents are matched with directors and management team members from the same housing association. This way, a direct comparison can be established to check whether the findings in Table 5 are robust. Table 6 below shows the results of this direct comparison. The results indicate that even after matching with respect to the housing associations, the board of advisors has a significantly higher risk appetite in the short run. The relationship is significant at a 5% level for both the LTV and ICR in 2025. Therefore, the results indicate that there is evidence for *H*1, and there is an effect of job specification on risk appetite in the short run. However, no relationship can be found for the medium to long run.

	Dependent variable:					
	LTV 2025	LTV 2030	LTV 2050	ICR 2025	ICR 2030	ICR 2050
	(1)	(2)	(3)	(4)	(5)	(6)
Supervisory board	0.201**	0.135	-0.045	0.172**	0.142	0.077
	(0.074)	(0.081)	(0.111)	(0.083)	(0.084)	(0.103)
Constant	0.108**	0.234***	0.459***	0.108*	0.180***	0.307***
	(0.053)	(0.057)	(0.079)	(0.059)	(0.059)	(0.073)
Observations	30	30	30	30	30	30
R^2	0.206	0.090	0.006	0.132	0.092	0.019
Adjusted R^2	0.177	0.057	-0.030	0.101	0.060	-0.016
Residual Std. Error (df = 28)	0.204	0.222	0.305	0.229	0.230	0.283
F Statistic (df = 1; 28)	7.255**	2.758	0.167	4.255**	2.849	0.553
Note:						*p<0.1; **p<0.05; ***p<0.01

Table 6 - Regression output for the effect of job specification on risk appetite matched.

The remaining regression results in Table 5, for the analysis of the characteristics and their effect on risk appetite, unexpectedly show that almost none of the housing associations characteristics (*H*2) in the sample influence the risk appetite measured. The housing act regions have been presented in the subdivided format since the table would be too long otherwise. However, this does not affect the notion that none of the housing act regions had a positive or negative significant effect on risk appetite. An exception is that XL associations seem to accept more risk in the short run compared to L size associations. Additionally, housing associations in very tense markets accept lower risk in the long run compared to associations in low-tension housing markets.

Since the housing act regions and the tension in the housing market might be strongly correlated, it is crucial to check whether any collinearity exists before adding them as control variables to the regression in section 6.5. Cramer's V is used to investigate whether there is any collinearity between the two categorical variables. A Cramer's V of 0,537 indicates that there is strong collinearity between region and tension in the housing market. Therefore, only the housing act region is included as a control variable in section 6.5. The decision to choose the housing act region is based on the influence of municipalities on the activities of housing associations. Municipalities can interfere with operational activities and thereby limit housing associations in their decisiveness.

6.2 The effect of social objectives on risk appetite

The third relationship in the conceptual framework suggests that the risk appetite of housing associations is affected by the social goal for which the risks are taken. Each social goal has its own objectives and related policies, which results in different approaches undertaken to reach the goal. Therefore, the relationship between social objectives and risk appetite seems logical from a theoretical perspective, although the exact direction of the relationship is unclear.

Whether housing associations prefer to accept more risk for availability, affordability, quality, or sustainability has not been studied in this context. To analyze the relationship indicated by *H*3, the average risk appetite for every social goal is calculated with respect to the two financial ratios and three periods. Table 7 below shows the regression output where the social goals are coded as the categorical independent variable. The coefficients must be interpreted with respect to the reference group, which is affordability. The results indicate that the risk appetite of housing associations is higher for availability. This relationship is the strongest for the LTV and significant at a 1% level for all time periods for this ratio. For the

ICR, housing associations' risk appetite is also higher for availability in 2025 2030, but the relationship is marginally significant (10% level).

The results suggest that there is indeed evidence that the risk appetite of housing associations is affected by the goal for which the risk is taken (*H*3). However, the relationship is practically present for risk appetite for the LTV and not necessarily for the ICR. Furthermore, the regression output indicates that risk appetite is only significantly different for availability compared to affordability. For the other goals, there seems to be no significant difference. Compared to affordability, housing associations accept 6,6%, 7,5%, and 8,4% more risk for availability, on average, in 2025, 2030, and 2050 respectively.

	Dependent variable:					
	LTV 2025	LTV 2030	LTV 2050	ICR 2025	ICR 2030	ICR 2050
	(1)	(2)	(3)	(4)	(5)	(6)
Availability	0.066***	0.075***	0.084***	0.043*	0.045*	0.039
	(0.023)	(0.025)	(0.030)	(0.022)	(0.023)	(0.030)
Quality	-0.012	-0.008	-0.012	-0.004	-0.006	-0.019
	(0.023)	(0.025)	(0.030)	(0.022)	(0.023)	(0.030)
Sustainability	-0.006	-0.004	0.019	-0.005	-0.013	-0.004
	(0.023)	(0.025)	(0.030)	(0.022)	(0.023)	(0.030)
Constant	0.173***	0.269***	0.426***	0.146***	0.227***	0.371***
	(0.016)	(0.017)	(0.021)	(0.015)	(0.017)	(0.021)
Observations	812	812	812	812	812	812
R^2	0.019	0.019	0.015	0.008	0.009	0.005
Adjusted R^2	0.015	0.015	0.012	0.004	0.006	0.001
Residual Std. Error (df = 808)	0.227	0.248	0.298	0.221	0.236	0.301
F Statistic (df = 3; 808)	5.150***	5.179***	4.183***	2.194*	2.538*	1.399
Note:						*p<0.1; **p<0.05; ***p<0.01

Table 7 - Regression output for the effect of social objectives on risk appetite

The reason for the significant difference in risk appetite for availability objectives can be found in the priorities of housing associations. At the end of the survey, housing associations were asked to prioritize the social goals from most important to least important, using a score from one to four. Figure 6 below shows the results from the survey question, indicating that availability is the most important objective for housing associations in the sample with an average score of 1,6. The runner-up is affordability with an average score of 2 and quality and sustainability score the lowest with a score of 3,1 and 3,3 on average, respectively. Overall, there is partial evidence for *H*3 as there is a relationship between risk-taking and social objectives. However, this relationship seems to be moderated by the financial ratios since the results are highly significant for the LTV but marginally significant or insignificant for the ICR.

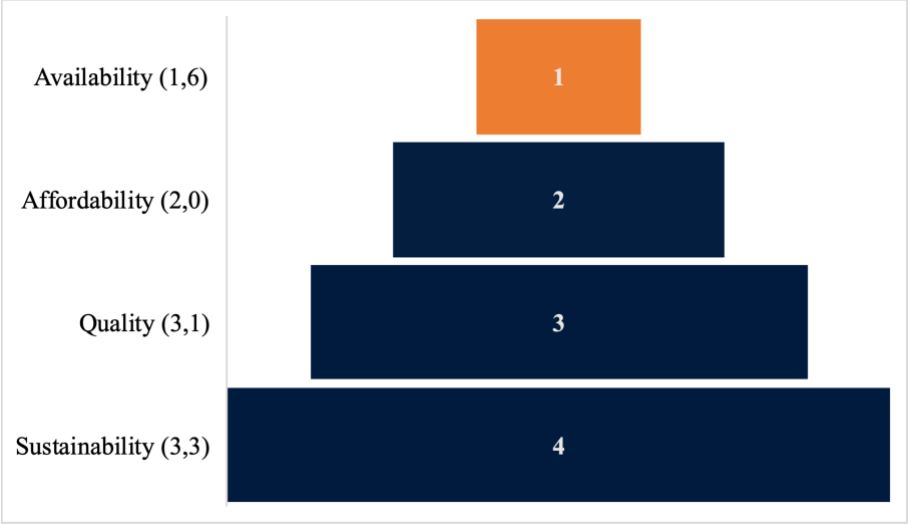

Figure 6 - Ranking of social objectives

6.3 Financial ratios and risk appetite

The following hypothesis, *H*4, indicates that financial ratios influence risk appetite. Previous findings of this thesis indeed suggest that housing associations have a different risk preference for the two ratios. To see whether this relationship is also statistically significant, a regression analysis has been conducted. Table 8 below shows the results of the regression where the financial ratios have been coded as a categorical independent variable and the corresponding average risk appetite over time as dependent variables.

	Dependent variable:		
	Risk appetite 2025	Risk appetite 2030	Risk appetite 2050
	(1)	(2)	(3)
LTV	0.034	0.058**	0.074***
	(0.022)	(0.024)	(0.028)
Constant	0.173***	0.251***	0.382***
	(0.015)	(0.017)	(0.020)
Observations	412	412	412
R^2	0.006	0.015	0.017
Adjusted R^2	0.004	0.012	0.014
Residual Std. Error (df = 410)	0.222	0.239	0.287
F Statistic (df = 1; 410)	2.473	6.103**	6.957***
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 8 - Regression output for the effect of financial ratios on risk appetite

As expected, the risk appetite for the LTV is higher compared to the ICR and significant at a 5% and 1% level for 2030 and 2050, respectively. These findings suggest that for these two periods, the risk appetite of housing associations is 5,8% and 7,4% higher, on average, for the LTV. This is also visible in Figure 7 below, where the difference between the two lines in 2030 and 2050 is approximately equal to these percentages.

Interesting to note is that, in the short run, housing associations accept more risk on the LTV, but this positive coefficient is not significant. Therefore, there is evidence for *H*4, but the effect is only significant in the medium and long run. Nevertheless, financial ratios do affect the risk appetite of housing associations, as the results indicate that a higher risk acceptance exists for the LTV when compared to the ICR.

6.4 The effect of time on risk appetite

The relationship in the conceptual framework indicated by the dashed line corresponds to the effect of time on risk appetite. The literature suggests that the risk perception of individuals can be influenced by the time it takes for the risk to materialize (Dasgupta & Maskin, 2005). Figure 7 below illustrates this notion by comparing the average risk appetite over time for the two financial ratios. The graph clearly shows that housing associations in the sample accepted more risk for both ratios when the time horizons are extended.

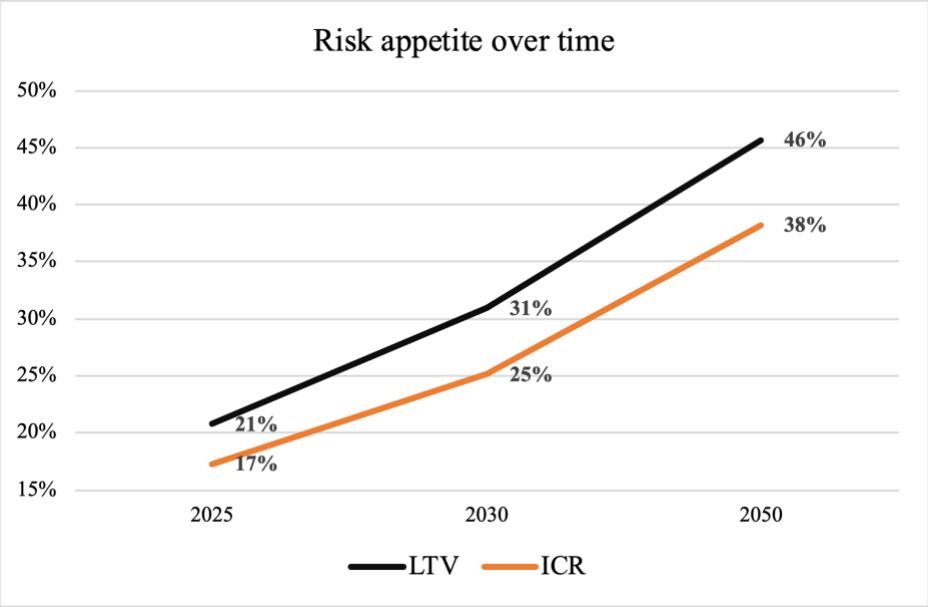

Figure 7 - Risk appetite over time for the LTV and ICR

The upward sloping lines in figure 7 indicate a positive relationship between risk appetite and time. In the conceptual framework, time is expected to have a positive effect on the social objectives and the financial ratios. It is possible to analyze whether this is true by running linear regressions with time as the independent variable and the average risk appetite for the financial ratios and social objectives as dependent variables.

Table 9 below shows the output of six regression models, each with one independent variable to investigate the effect of time on the subjects mentioned. The dataset was adjusted to facilitate the regression. This was done by calculating the average risk appetite for the LTV and ICR and all social goals over the periods. The alteration in the dataset leads to the outcome that, in total, 609 observations are present in the regression. This stems from the fact that for every respondent (203), three periods were used. The results from the regression analysis indicate that time has a positive and significant effect on risk appetite for the LTV, ICR, and all social objectives.

	Dependent variable:					
	Risk appetite (LTV)	Risk appetite (ICR)	Availability	Affordability	Quality	Sustainability
	(1)	(2)	(3)	(4)	(5)	(6)
Time (2030)	0.100***	0.076***	0.093***	0.092***	0.085***	0.083***
	(0.025)	(0.025)	(0.026)	(0.025)	(0.024)	(0.025)
Time (2050)	0.246***	0.206***	0.233***	0.228***	0.215***	0.229***
	(0.025)	(0.025)	(0.026)	(0.025)	(0.024)	(0.025)
Constant	0.208***	0.174***	0.231***	0.182***	0.173***	0.179***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.017)	(0.018)
Observations	609	609	609	609	609	609
R^2	0.138	0.104	0.118	0.121	0.114	0.125
Adjusted R^2	0.135	0.101	0.116	0.119	0.111	0.122
Residual Std. Error (df = 606)	0.253	0.250	0.261	0.252	0.247	0.251
F Statistic (df = 2; 606)	48.475***	35.103***	40.702***	41.876***	38.977***	43.089***
Note:						*p<0.1; **p<0.05; ***p<0.01

Table 9 - Regression output for the effect of time horizons on risk appetite

The independent variable time is coded as a categorical dummy variable with three levels so that the regression output illustrates the coefficient with respect to the reference level, in this case, 2025. This way, the interpretation of the coefficients allows for direct analysis of the effect of extending time periods on risk appetite.

The results indicate that, with respect to 2025, the risk appetite for both time periods 2030 and 2050 is higher at a 1% significance level. The coefficient should be interpreted as the mean difference in the dependent variable if there is a one-unit increase in the independent variable. The effect of extending from 2025 to 2030 results in an average increase in risk appetite with values between 7,6% and 10%. Extending from 2025 to 2050 would result in an even more considerable increase with values between 20,6% to 24,6% on average. Overall, these findings suggest that there is strong evidence for *H*5 since time positively and significantly influences the risk appetite of housing associations.

6.5 The effect of risk appetite on economic outcomes

For the sixth hypothesis, several multiple linear regression models have been used to investigate potential relationships. Control variables have been added for the size of housing associations, their housing act region, and the priorities of the social objectives to minimize the chance that any other variables not included in the model affect the relationship. The line of

thought behind adding the prioritization of social objectives is that it captures the importance that housing associations appoint to the objective. If housing associations think that affordability is, for example, highly important, they might already structure their risk appetite based on this objective.

First, the effect of risk appetite on financial ratios is analyzed to see whether housing associations with a higher risk appetite might set, for example, internal ratios closer to the external ratios or do not even set them at all. Table 10 below indicates that there is no significant relationship between the average risk appetite for the LTV and ICR for all three periods and the space housing associations maintain between internal and external ratios. This finding will be discussed in more depth in the discussion section.

	Dependent variable:					
	Difference internal LTV and benchmark			Difference internal ICR and benchmark		
	(1)	(2)	(3)	(4)	(5)	(6)
LTV 2025	-1.717					
	(4.809)					
LTV 2030		-5.162				
		(4.273)				
LTV 2050			-4.122			
			(3.649)			
ICR 2025				-0.039		
				(0.077)		
ICR 2030					-0.036	
					(0.071)	
ICR 2050						-0.039
						(0.058)
Constant	-8.955	-8.450	-6.506	0.061	0.066	0.084
	(9.893)	(9.860)	(10.081)	(0.157)	(0.158)	(0.162)
Observations	203	203	203	203	203	203
R^2	0.158	0.164	0.163	0.159	0.159	0.160
Adjusted R^2	0.033	0.040	0.039	0.035	0.035	0.036
Residual Std. Error (df = 178)	13.980	13.927	13.934	0.222	0.222	0.222
F Statistic (df = 24; 178)	1.266	1.327	1.318	1.279	1.279	1.288

Note: The regression models include control variables for size and region. The full model is included in appendix B.

$^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

Table 10 - Regression output for the effect of risk appetite on internal ratios

Additional regression models have been developed to see whether risk appetite influences the outcomes of social objectives. The scope of this section is limited to the regression analysis and findings for availability and affordability objectives. For quality and sustainability, no significant relations have been found. Therefore, these regression outputs are not included, but the finding that no significant relationships exist for the variables tested is elaborated on in the discussion section.

Table 11 below shows the results for regression models with risk appetite for availability as an independent variable and development construction as a percentage of total housing stock as the dependent variable.

	Dependent variable:					
	Development construction (% of stock)					
	(1)	(2)	(3)	(4)	(5)	(6)
Availability LTV 2025	0.004**					
	(0.002)					
Availability LTV 2030		0.002				
		(0.002)				
Availability LTV 2050			0.00002			
			(0.002)			
Availability ICR 2025				0.004*		
				(0.002)		
Availability ICR 2030					0.003	
					(0.002)	
Availability ICR 2050						0.00005
						(0.002)
Constant	0.009*	0.009	0.009	0.008	0.008	0.009
	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.006)
Observations	203	203	203	203	203	203
R^2	0.212	0.199	0.193	0.206	0.200	0.193
Adjusted R^2	0.090	0.076	0.068	0.083	0.077	0.068
Residual Std. Error (df = 177)	0.007	0.008	0.008	0.007	0.007	0.008
F Statistic (df = 25; 177)	1.741**	1.612**	1.549*	1.681**	1.623**	1.549*

Note: The regression models include control variables for size, region, and priority of availability. The full model is included in appendix C.

*p<0.1; **p<0.05; ***p<0.01

Table 11 - Regression output for the effect of availability risk appetite on % construction

The findings suggest that housing associations that accept higher risk in the short run for both the LTV and ICR have more construction as a percentage of their total housing stock. More precisely, housing associations that would accept a 100% chance of crossing external ratios when all objectives for availability are realized in 2025 have 0,4% more construction compared to housing associations that accept a 0% chance of crossing external ratios. This seems like a small percentage, but when considering that the average of development construction as a percentage of total housing stock in the sample is 1%, is it quite substantial.

Table 12 below shows the same regressions, but this time, risk appetite for affordability is included, and the dependent variable is the rent asked by housing associations as a percentage of the maximum rent they are allowed to ask.

	Dependent variable:					
	Rent / maximum rent allowed					
	(1)	(2)	(3)	(4)	(5)	(6)
Affordability LTV 2025	-0.054*					
	(0.028)					
Affordability LTV 2030		-0.049**				
		(0.024)				
Affordability LTV 2050			-0.045**			
			(0.021)			
Affordability ICR 2025				-0.051*		
				(0.028)		
Affordability ICR 2030					-0.044*	
					(0.025)	
Affordability ICR 2050						-0.031
						(0.021)
Constant	0.739***	0.746***	0.566***	0.744***	0.752***	0.761***
	(0.060)	(0.060)	(0.062	(0.060)	(0.061)	(0.063)
Observations	203	203	203	203	203	203
R^2	0.242	0.242	0.243	0.244	0.241	0.234
Adjusted R^2	0.125	0.125	0.126	0.127	0.124	0.116
Residual Std. Error (df = 177)	0.082	0.082	0.082	0.082	0.082	0.082
F Statistic (df = 25; 177)	2.066***	2.073***	2.076***	2.092***	2.058***	1.984***

Note: The regression models include control variables for size, region, and priority of affordability. The full model is included in Appendix D.

*p<0.1; **p<0.05; ***p<0.01

Table 12 – Regression output for the effect of affordability risk appetite on rent ratio

The coefficients show that for the LTV in all periods and for the ICR up to 2050, the relationships are negative and significant at 5% and 10% levels. The same notion can be applied to these coefficients to find the difference between risk-averse and risk-taking housing associations. Accepting a 100% chance of crossing external ratios in 2025 for the LTV would indicate that the asking rent as a percentage of the maximum rent allowed is 5,4% lower compared to housing associations that accept a 0% chance.

Altogether, the findings from table 11 and 12 above indicate that housing associations that accept more risk on availability and affordability act on these objectives in practice. Although the availability relationships are marginally significant and only present in the short run, the finding that risk appetite measured in the sample also relates to real-life actions is very interesting. Since housing associations that accept more risk on availability (affordability) have a higher (lower) percentage of construction (maximum rent), there is some evidence that risk appetite affects the economic outcomes of the social objectives. Therefore, there is partial evidence for *H*6, although no relationships can be found between risk appetite and financial ratios, quality, and sustainability.

6.6 Regression assumptions

The four assumptions underlying the multiple linear regression analysis in the previous section are essential to elaborate on. Normality, linearity, multicollinearity, and homoscedasticity form the most critical assumptions that will be checked in this section. A data analysis tool in R, called "GVLMA," makes it possible to check the normality, linearity, and homoscedasticity assumptions for regressions with one code. When applying this code to the regression analysis, it formulates whether global stat (linearity), skewness, kurtosis (normality), link function (continuous dependent variable), and heteroscedasticity are present. In case all hypotheses regarding the assumptions are met, the output indicates “assumption satisfied”. For checking multicollinearity of the independent variables, Variance Inflation Factors (VIF) are used. When testing the regression analysis above, the findings suggest that often the normality and linearity assumptions are not met. The explanation for this observation is twofold.

First, the risk appetite variables have values from 0-100% and are often not normally distributed. This originates from the fact that housing associations have diverse responses with respect to the risk appetite questions. Housing associations that have a high-risk appetite indicate this with a high probability of crossing external ratios, while housing associations that are risk-averse might even indicate a probability of 0%. The normality test indicates these values as outliers and rejects the null hypothesis that normality is present, although the rest of

the data might, in fact, be normally distributed. However, treating these values as outliers would not be appropriate as respondents often indicate in the comments that the decision to use such high or low probabilities actually stems from their risk appetite.

Second, the linearity assumption is often influenced by the fact that multiple categorical variables are used in the regression models. Since the values of categorical variables are clustered around the different categories, the linearity assumption is not met. However, this does not mean that there is no meaningful relationship between the categorical variable and an independent variable.

The homoscedasticity assumption is met for the regression used in the results sections. For multicollinearity, it is essential that the control variables for size, region, and priority of social objectives are not interrelated. To analyze whether any multicollinearity exists in the models, VIF measures are calculated. These results indicate that the VIF scores vary between 1 and 4 depending on the variable. Although the precise cutoff point for VIF scores is hard to establish, these values would often be indicated as acceptable (Hair, 2009). Overall, the findings from analyzing the multiple linear regression assumptions suggest that some assumptions are violated, although there are reasonable explanations. Furthermore, most are satisfied. The violation of assumptions is in itself not disastrous, but it does mean that the coefficients above must be interpreted with caution. The following section will discuss the results in detail and elaborate on meaningful insights. A subjective interpretation of the results will be provided before continuing to the conclusion.

7. Discussion

The results for testing the hypotheses reveal interesting findings for the determination of risk appetite as well as its effect on economic outcomes. The previous section provides an objective presentation of the results from the multiple linear regression models. However, these results are only meaningful when interpreted carefully. This discussion section subjectively interprets the results from the analyses and aims to put these findings into the appropriate context. The discussion will follow the same structure as the results section.

Job specification (H1)

When comparing the risk appetite for the different job specifications, it turns out that the advisory board has the highest risk appetite. This finding was robust for matching the advisory board with directors and members of the management team from the same housing association.

Interestingly, no significant difference between the respondents in the "other" group and directors or management team members were identified. When looking closer at the relationship between the different occupation levels, it stands out that the supervisory board is authorized to oversee the other two groups. Directors and the management team, together with other functions like projects leaders or financial controllers, have more operational responsibilities that are closely connected to the daily businesses of housing associations. This crucial difference can be an explanation for the diversion in risk appetite. Potentially, directors and the management team experience the risk of crossing external ratios in a different way because the matter is, in essence, more closely related to their actions.

An important note here is that the results are only significant in the short run. This indicates that the advisory board takes more risk in 2025, which is just at the end of the assessment period of Aw/WSW. Although this is difficult to explain, the results might be influenced by the type of supervisory board members that responded to the survey. Because supervisory boards consist of many different members with diverse backgrounds, it can be the case that the sample includes members with an unparalleled view of risk appetite. There might even be a bias in the perception of sanctions when crossing external ratios in the short run that causes the risk appetite of the supervisory board to be significantly higher.

Housing association characteristics (H2)

Unexpectedly, no significant relationships have been found for housing association characteristics in the determination of risk appetite. Although for size and region, some evidence was present in the literature, these characteristics do not seem to influence the risk appetite of housing associations. When reflecting on this finding, a potential explanation can be found in the fact that, even though housing associations might differ in size or region, their core purpose is essentially the same. Furthermore, the financial framework imposed by the Aw/WSW is also identical for all housing associations. Their aim is to provide affordable housing for those who are not in the position to find accommodation otherwise. This purpose should be executed with the financial resources available but always with careful consideration of the external ratios.

Although size might influence the effectiveness and easiness of implementing adjustment policies, taking unmanageably high risks can still lead to sanctions. These sanctions and interventions are equal for every housing association and across all regions. Therefore, the way housing associations structure their risk management and determine the overall risk appetite is not inevitably a function of the characteristics.

Social objectives (H3)

As already touched upon in the results section, the risk appetite of housing associations is higher for availability-related objectives, which can be partly explained by the fact that housing associations rank this goal as the most important. The relationship is highly significant for all periods for the LTV ratio. When looking at the calculation of the LTV, it is possible to identify a connection with availability. Since the LTV is determined by the debt level of housing associations, it can be influenced by selling off or buying property, which in turn affects the housing (availability) that associations can provide. The relationship between availability and risk appetite is less significant for the ICR. Although the notion above can be applied to the ICR, the effect is smaller. Restructuring the property portfolio and thereby change debt levels can affect the ICR through interest expenses. However, these adjustments would have an indirect effect, while the effect on the LTV is more direct. This might be an explanation for the stronger relationship between risk appetite for availability objectives and the LTV.

The fact that risk appetite for quality and sustainability is not significantly less compared to affordability can also be explained by the ranking of social objectives in Figure 6. Noticeably, quality and sustainability rank almost the same, on average, indicating that their importance is essentially similar for housing associations. Correspondingly, housing associations do not apply significantly different weights to those objectives as they are subordinated to affordability and availability.

Financial ratios (H4)

The interpretation of the results regarding risk appetite for the financial ratios is connected to the previous reasoning. A higher risk appetite for the LTV in 2030 and 2050 might originate from the preference for adjustment policies. Adjustments that need to be made to affect the ICR are more often linked to actions that affect the renters. Examples mentioned are increasing rents, decreasing maintenance expenditures, or decreasing administrative expenses. Although effective, these policies directly influence the individuals that are renting from the housing association. Since their satisfaction is often an important goal for housing associations, these buttons are preferably not pushed regularly. As indicated, the LTV can be affected through divesting measures like selling property, decreasing sustainability investments, or decreasing construction. Since these measures affect the business itself but not the renters directly, they have fewer consequences in terms of satisfaction from external parties.

The overall impression in the comments is that, indeed, housing associations prefer to make adjustments that influence the LTV compared to the ICR. An important reason for this

impression is that housing associations pursue a sustainable cash flow from operating activities in the short and medium term. A quote from a respondent perfectly contributes to this discussion:

"Cash flows are a very important steering tool within our corporation, and therefore less risk is accepted relative to LTV."

The notion was found in the comment section various times, and it further strengthens the explanation of why housing associations accept more risk for the LTV.

Time (H5)

In the results section, I identified time as an essential mediator in the determination of the risk appetite of housing associations. Housing associations' risk appetite increases over time for the financial ratios as well as for every social objective. I, therefore, conclude that there is evidence that time has a positive influence on risk appetite, and the first hypothesis is confirmed. Housing associations are assessed on their financial continuity by the Aw/WSW to evaluate whether they operate within the specified framework. When the potential risk of crossing these predetermined boundaries exists, housing associations potentially lose the right to receive secured loans or receive other sanctions. The fact that the assessment period includes a five-year period already places the finding into a broader context.

Housing associations can implement adjustment policies if the financial ratios are at risk of crossing the external ratios in any period outside of the assessment horizon. The corresponding risk appetite can thus be higher for any period after the five initial years because housing associations still have possibilities to restructure their finances and channel the ratios back within the boundaries before the assessment period catches up. In other words, if the current financial situation of a housing association leads to a projected breach of external ratios in 10 years, the housing association still has five years to restructure the situation. As this projected breach of external ratios extends to longer time horizons, the possibilities to redirect become greater, and thus their risk appetite can rise. This notion covers the essential line of reasoning why risk appetite increases over time. Respondents elaborated on their choices in the comment section, where several verbalized this notion as follows:

"The longer the period, the more uncertain the course of the financial position and, consequently, the possibilities of avoiding any exceedances of external ratios grows."

Other respondents indicated that a potential exceedance of external ratios within five years is unacceptable, and therefore their risk appetite is very low. These thoughts further enhance my finding that time is an essential determinant for housing associations' risk appetite.

Economic outcomes (H6)

Since one of the main topics of this thesis is the probability of crossing external ratios, an analysis of the effect of risk appetite on setting internal ratios as a cushion was conducted. However, no relationship seems to exist in the sample between risk appetite and the implementation of a safety margin. Since the technique that measures risk appetite is closely related to the behavior of housing associations regarding these external ratios, it is surprising that no significant effect can be found. This indicates that risk appetite is not necessarily a determinant in whether housing associations set internal boundaries or not, at least in this sample. A potential explanation can be found in the dataset. When looking at the responses to the questions about what internal ratio housing associations use for the ICR, more than half of them indicate they use the external ratio as a target. Furthermore, respondents from the same housing association indicated different internal ratios for the LTV and ICR. This finding, although quite odd, suggests that the knowledge regarding internal policies is not always entirely accurate. Therefore, the results might be influenced and non-representative of the true relation between risk appetite and the usage of internal ratios.

Two additional findings suggest that there is a relationship between risk appetite regarding social objectives and economic outcomes related to them. Although marginally significant, there is partial evidence that housing associations with a higher risk appetite for availability and affordability do indeed structure their operation in the short run to fulfill this objective. Especially for affordability, housing associations ask a lower rent as a percentage of the maximum rent allowed when their risk appetite increases. For quality and sustainability, several variables have been tested, but no significant relationships have been discovered. Examples of variables used are the living quality score, energy index, projected construction of dwellings with energy label C or higher, improvement expenditures, and sustainability investment expenditures. A reason for the fact that there are no significant results might, again, originate from the finding that the differences in risk appetite for quality and sustainability are not significantly different and both objectives are almost equally prioritized. Respondents might have taken this into account when responding to the survey as they focused on the risk appetite of their top priorities: availability and affordability.

8. Conclusion

Risk appetite plays a central role in the structure of operational activities of housing associations in the Netherlands. Whether housing associations pursue specific goals, start new construction projects, invest in the sustainability of properties, or increase their rents, starts at their risk preference. The risk appetite determines how much risk is accepted, and the external ratios imposed by the Aw/WSW form a financial boundary that should not be crossed. This study is the first to examine the risk appetite of Dutch housing associations quantitatively by developing a survey technique that makes risk appetite measurable.

The findings of the research are fivefold. First, time is an essential determinant of risk appetite as housing associations discount risks with a shorter time window more heavily. Second, on average, the supervisory boards have a higher risk appetite than directors and management team members. Third, housing associations have a significantly higher risk appetite for availability. Fourth, housing associations accept more risk for the LTV than the ICR since the adjustment policies for the former are preferred. Fifth, housing associations that accept more risk in the short run for availability have more construction as a percentage of total stock. Furthermore, the housing associations that have a higher risk appetite for affordability ask for significantly lower rents.

This concluding section will precede with the theoretical contributions of this study. After that, the managerial implications are discussed to put the findings in a practical perspective. Finally, the limitations of the research are presented, and suggestions for further research will be drawn.

8.1 Theoretical contribution

The theoretical contribution of research is often seen as the added value of the study to the existing literature. Academic literature that examines the risk appetite of housing associations is scarce. However, risk preferences, in general, have often been investigated for numerous individual traits and sectors. This research contributes to the theoretical context of risk preferences literature as well as the academic literature regarding social housing. Since a unique survey-based approach is used to identify risk preferences, this thesis adds to the existing literature by extending the potential techniques that measure social preferences. The method can be applied to different industries if an industry-wide and commonly acknowledged type of risk can be identified.

The main theoretical contribution to the risk preference literature and survey-based research is thus that it offers a new survey design that measures risk preferences on a business level. An example could be modifying the survey to financial covenants used in financial agreements and loan contracts. This way, the survey technique can measure companies' risk appetite in a wide array of industries. Furthermore, it adds to the literature by using an existing technique that measures individual risk preferences but tests it on a new sector, thereby gaining innovative insights.

Since this is the first study investigating the risk appetite of housing associations on a large scale, it offers a benchmark and starting point for additional research in the sector. Risk appetite offers a field of reference as it indicates how far a housing association is willing to go to fulfill its objectives. This is an essential contribution of the research as risk appetite gets more explicit and tangible when measurable. Furthermore, the insights of this research are novel as the discussion surrounding the importance of risk appetite has only just been initiated.

8.2 Managerial implications

The insights of this thesis are essential to discuss since they provide interesting managerial implications. As the risk appetite of housing associations will gain momentum in the coming years, managers can use the insights from this research to benchmark themselves and start the internal discussion about the topic. Risk appetite can still be an unfamiliar topic for housing associations, and this thesis provides a perspective of how risk appetite can be mapped. Managers and directors, supervisory boards, or other employees can ask themselves questions about their risk appetite and reflect on the matter. Managers can further use the survey technique and interview employees internally to map out the risk preferences across different functions.

Risk appetite can be used in a broader context when determining financial policies or setting target ratios. Additionally, consultants can use the results for interviewing their clients and figuring out whether they feel related to the findings of this study. By discussing the relatedness to the topics, consultants can target the exact risk appetite of their clients and consequently give more tailored advice.

Additional implications for the regulation of the sector can be found in the results of this study. The results show that respondents in the sample tend towards risk-taking behavior. Respondents accept relatively high risks in general and housing associations are willing to accept a substantial risk to realize social objectives. These findings have significant

implications for regulatory authorities such as the Aw/WSW and supervisory boards. The fact that housing associations have a significant risk appetite towards the external ratios alters the view that crossing them is a no-go zone. The Aw/WSW needs to observe the notion that housing associations are willing to accept the risk of crossing the ratios when they can fulfill their social objectives. This finding has implications for the regulatory framework as it addresses its efficacy and potential alterations of the penalties could lead to higher efficiency. Housing associations might serve their purpose more effectively when their risk appetite better matches the regulatory framework.

Further implications of this study result from the finding that several employees from the same housing association indicated different risk appetite measures and internal ratios for the LTV and ICR. These notions have significant implications for managers and directors since the awareness about the subject is occasionally inadequate and incoherent. Directors and managers are responsible for ensuring that employees with decision-making authority have the same vision and understanding of the financial targets set. Deviation in the willingness to accept risks and implementation of internal ratios could lead to unnecessary confusion and thereby operational inefficiencies. Directors and managers can therefore use the findings from this thesis to determine their risk appetite and ensure the knowledge of the subject is spread across the association. Furthermore, supervisory boards should be knowledgeable and consider the risk appetite of housing associations when assessing its goals and internal targets. In this sense, this study's most important practical and managerial implication is that, hopefully, these results trigger the debate and improve the knowledge about these subjects.

8.3 Limitations and suggestions for further research

Although important implications can be identified, there are limitations to what the insights of this research can offer. The fact that this is the first research investigating risk appetite in the social housing sector can be recognized as an important implication. However, it is also one of the main limitations as no other research could serve as a benchmark. I deliberately measured risk appetite on an abstract level since the survey had to apply to an entire sector. The setup had to be made from scratch and everything, including the survey technique, took several weeks to develop. Therefore, the survey technique cannot be labeled as flawless, and it must be improved by trial and error. Furthermore, risk appetite is an extensive topic, and including everything there is to it in one survey is not possible. It is thus perfectly feasible that some factors that influence risk appetite are not measured in the survey technique. This does,

unfortunately, influence the precision and explanatory power of the risk appetite measurement. Other survey-based studies include personal traits like gender, age, or height of respondents as control variables because these are often indicated as essential determinants of social preferences. These personal traits have not been included in the survey because respondents can be more reluctant to respond when questions get too personal. This would have been a great addition to the research as the results would be more precise.

Another limitation is the availability of current LTV and ICR ratios for housing associations in the sample. When this research was conducted, only the LTV and ICR ratios were available for 2018 and 2019, respectively. These numbers do not contain any relevant information about the current ratios, as housing associations could have altered numerous things that influenced the ratios in the meantime. The current LTV and ICR ratios would have improved the research as they could have been used as control variables and independent variables in regressions.

The final limitation is that the findings in this research depend on the initial measurement of risk appetite. Because, as mentioned, this measurement cannot be seen as flawless, the results must be considered with caution. Although there is evidence that the survey questions measure a social risk preference, the findings from the regression can deviate from reality.

With these limitations in mind, suggestions for further research can be made. First, researchers can extend this research by improving the survey technique or adjusting it to fit other sector specifications. Second, new research about risk appetite can be conducted. More specifically, an in-depth analysis of the determinants of the risk appetite of housing associations would contribute significantly to the overall literature. This would also affect the accuracy of risk appetite measurements and thereby considerably improve available survey techniques. Eventually, a risk appetite benchmark could be established in which a yearly survey measures risk appetite across the entire sector. Further research could also extend the analysis of the effect of risk appetite on financial performance or investigate whether sustainability will play a more central role in the future. Additionally, the effect of the housing shortage on risk appetite is an exciting field as housing associations will play a crucial role in developing new dwellings in the near future.

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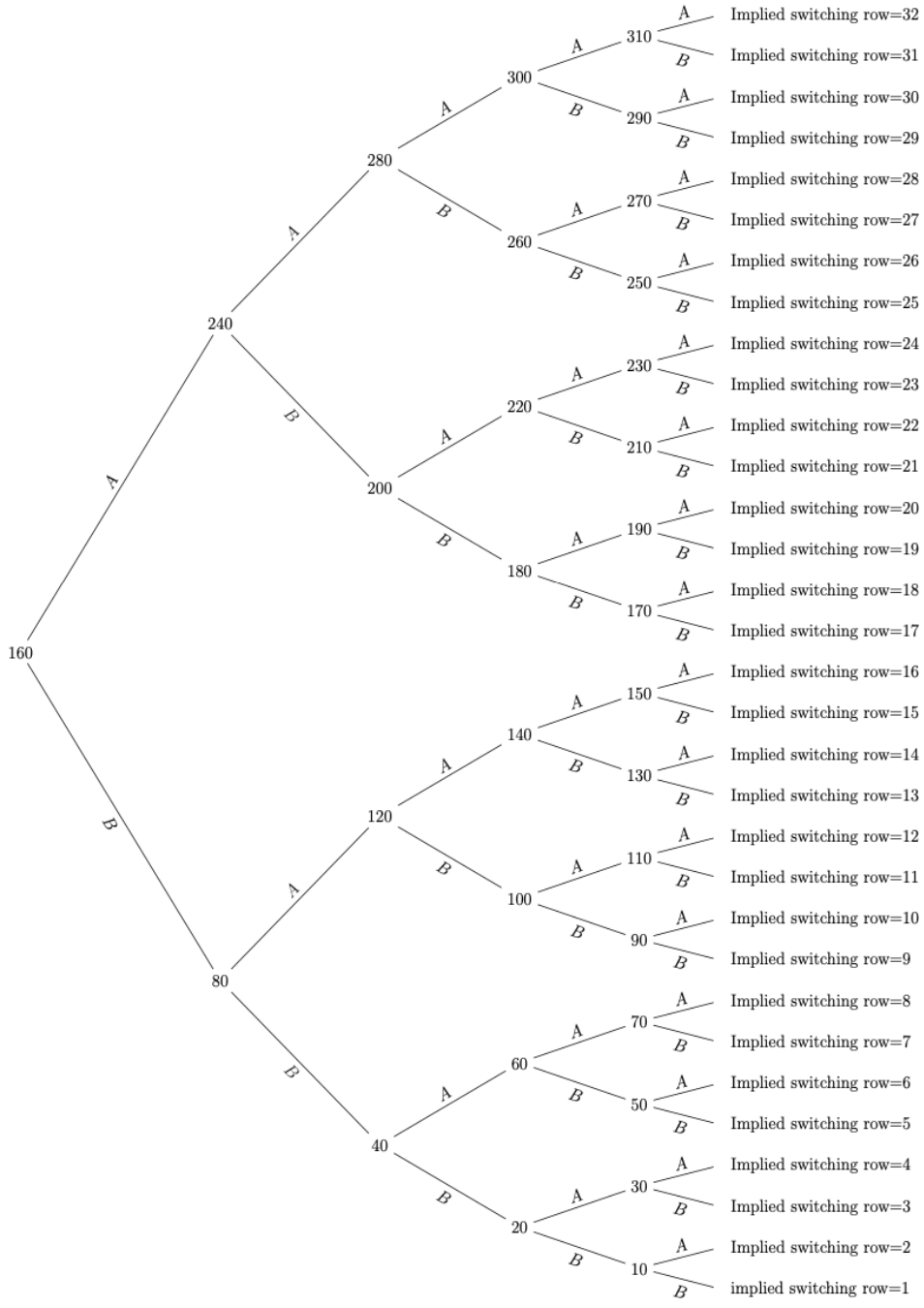
10. Appendix

Appendix A – Staircase lottery



Appendix B – Regression risk appetite and internal ratios

	Dependent variable:					
	Difference internal LTV and benchmark			Difference internal ICR and benchmark		
	(1)	(2)	(3)	(4)	(5)	(6)
LTV 2025	-1.717					
	(4.809)					
LTV 2030		-5.162				
		(4.273)				
LTV 2050			-4.122			
			(3.649)			
ICR 2025				-0.039		
				(0.077)		
ICR 2030					-0.036	
					(0.071)	
ICR 2050						-0.039
						(0.058)
Size of association M	3.085	2.922	2.754	0.019	0.018	0.016
	(3.029)	(3.020)	(3.033)	(0.048)	(0.048)	(0.048)
Size of association S	7.115**	7.286**	7.057**	0.028	0.025	0.023
	(3.271)	(3.238)	(3.229)	(0.052)	(0.051)	(0.052)
Size of association XL	-0.128	0.070	-0.276	0.034	0.031	0.029
	(4.413)	(4.375)	(4.365)	(0.070)	(0.070)	(0.070)
Size of association XS	-0.744	-0.760	-0.982	-0.077	-0.080	-0.082
	(3.733)	(3.715)	(3.720)	(0.059)	(0.059)	(0.059)
Size of association XXS	7.386	7.412	7.000	0.135	0.132	0.129
	(6.225)	(6.174)	(6.175)	(0.098)	(0.098)	(0.098)
Arnhem Nijmegen	13.618	14.206	12.797	0.044	0.043	0.033
	(9.509)	(9.426)	(9.397)	(0.150)	(0.150)	(0.150)
Drechtsteden Hoekse Waard	17.901*	18.719*	17.092	0.039	0.041	0.030
	(10.571)	(10.524)	(10.489)	(0.167)	(0.167)	(0.167)
Food Valley	14.784	15.382	14.283	0.162	0.162	0.152
	(10.034)	(9.995)	(9.977)	(0.159)	(0.159)	(0.160)
Fryslân	20.446*	20.562*	19.164*	0.249	0.247	0.235
	(11.018)	(10.977)	(11.037)	(0.175)	(0.176)	(0.177)
Groningen Drenthe	13.925	14.709	13.383	0.042	0.041	0.033
	(10.452)	(10.411)	(10.376)	(0.165)	(0.165)	(0.166)
Haaglanden Midden-Holland Rotterdam	15.650*	16.147*	15.198*	0.014	0.016	0.010
	(9.100)	(9.070)	(9.061)	(0.144)	(0.144)	(0.144)
Holland Rijnland	20.761**	20.975**	19.982**	0.039	0.039	0.030
	(9.478)	(9.440)	(9.458)	(0.150)	(0.150)	(0.151)
Limburg	21.113**	22.094**	20.516**	0.036	0.034	0.024

	(10.475)	(10.397)	(10.324)	(0.165)	(0.165)	(0.164)
Metropoolregio Amsterdam	15.862*	16.358*	15.714*	0.023	0.023	0.017
	(9.220)	(9.189)	(9.177)	(0.146)	(0.146)	(0.147)
Metropoolregio Eindhoven	17.585*	17.935*	16.955*	0.027	0.029	0.020
	(10.295)	(10.251)	(10.253)	(0.163)	(0.163)	(0.163)
Noord-Holland Noord	29.848***	30.705***	28.606***	0.349**	0.346**	0.332**
	(10.582)	(10.476)	(10.426)	(0.166)	(0.166)	(0.166)
Noordoost Brabant	13.861	13.580	12.062	0.062	0.060	0.046
	(13.981)	(13.927)	(14.014)	(0.222)	(0.222)	(0.224)
Oost Nederland	15.704	16.564	15.178	0.042	0.042	0.036
	(10.687)	(10.652)	(10.613)	(0.169)	(0.169)	(0.169)
U16	7.642	8.844	7.610	0.128	0.127	0.120
	(9.768)	(9.736)	(9.648)	(0.154)	(0.154)	(0.154)
West-Brabant en Hart van Brabant	18.684*	19.086*	17.610*	0.138	0.136	0.125
	(10.192)	(10.104)	(10.101)	(0.161)	(0.161)	(0.161)
Woongaard	17.252*	17.439*	16.632*	0.068	0.069	0.062
	(9.910)	(9.833)	(9.830)	(0.157)	(0.156)	(0.157)
Zeeland	22.963*	24.034**	22.655*	0.073	0.074	0.066
	(11.957)	(11.919)	(11.862)	(0.189)	(0.189)	(0.189)
Zwolle - Stedendriehoek	14.230	14.538	13.218	0.092	0.092	0.082
	(9.329)	(9.290)	(9.317)	(0.148)	(0.148)	(0.149)
Constant	-8.955	-8.450	-6.506	0.061	0.066	0.084
	(9.893)	(9.860)	(10.081)	(0.157)	(0.158)	(0.162)
Observations	203	203	203	203	203	203
R^2	0.158	0.164	0.163	0.159	0.159	0.160
Adjusted R^2	0.033	0.040	0.039	0.035	0.035	0.036
Residual Std. Error (df = 178)	13.980	13.927	13.934	0.222	0.222	0.222
F Statistic (df = 24; 178)	1.266	1.327	1.318	1.279	1.279	1.288

Note: *p<0.1; **p<0.05; ***p<0.01

Appendix C – Regression effect of availability risk appetite on % construction

	Dependent variable:					
	Development construction (% of stock)					
	(1)	(2)	(3)	(4)	(5)	(6)
Availability. LTV 2025	0.004**					
	(0.002)					
Availability. LTV 2030		0.002				
		(0.002)				
Availability. LTV 2050			0.00002			
			(0.002)			
Availability. ICR 2025				0.004*		
				(0.002)		
Availability. ICR 2030					0.003	
					(0.002)	
Availability. ICR 2050						0.00005
						(0.002)
Size of association M	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Size of association S	0.002	0.002	0.002	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Size of association XL	-0.002	-0.002	-0.002	-0.003	-0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Size of association XS	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Size of association XXS	-0.006*	-0.005	-0.006	-0.006*	-0.005	-0.006
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Arnhem Nijmegen	-0.006	-0.006	-0.005	-0.005	-0.005	-0.005
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Drechtsteden Hoekse Waard	-0.008	-0.008	-0.007	-0.007	-0.007	-0.007
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Food Valley	-0.003	-0.003	-0.003	-0.002	-0.002	-0.003
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Fryslân	-0.005	-0.004	-0.004	-0.004	-0.004	-0.004
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Groningen Drenthe	-0.002	-0.002	-0.001	-0.001	-0.001	-0.001
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Haaglanden Midden-Holland Rotterdam	-0.0002	0.0001	0.0005	0.001	0.0004	0.0005
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Holland Rijnland	-0.007	-0.007	-0.007	-0.007	-0.007	-0.007
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Limburg	-0.007	-0.006	-0.006	-0.006	-0.006	-0.006
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)

Metropoolregio Amsterdam	-0.001	-0.001	-0.0003	-0.00002	0.00001	-0.0002
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Metropoolregio Eindhoven	0.008	0.008	0.008	0.009	0.008	0.008
	(0.005)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)
Noord-Holland Noord	-0.003	-0.002	-0.001	-0.002	-0.001	-0.001
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Noordoost Brabant	0.001	0.001	0.002	0.002	0.002	0.002
	(0.007)	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)
Oost Nederland	-0.006	-0.006	-0.006	-0.005	-0.005	-0.006
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
U16	-0.006	-0.005	-0.004	-0.005	-0.004	-0.004
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
West-Brabant en Hart van Brabant	-0.003	-0.003	-0.002	-0.002	-0.002	-0.002
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Woongaard	-0.006	-0.005	-0.005	-0.005	-0.005	-0.005
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Zeeland	-0.005	-0.004	-0.004	-0.003	-0.004	-0.004
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Zwolle - Stedendriehoek	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Availability	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	0.009*	0.009	0.009	0.008	0.008	0.009
	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.006)
Observations	203	203	203	203	203	203
R^2	0.212	0.199	0.193	0.206	0.200	0.193
Adjusted R^2	0.090	0.076	0.068	0.083	0.077	0.068
Residual Std. Error (df = 177)	0.007	0.008	0.008	0.007	0.007	0.008
F Statistic (df = 25; 177)	1.741**	1.612**	1.549*	1.681**	1.623**	1.549*
Note:						*p<0.1; **p<0.05; ***p<0.01

Appendix D – Regression affordability rent as percentage maximum rent allowed

	Dependent variable:					
	Rent / maximum rent allowed					
	(1)	(2)	(3)	(4)	(5)	(6)
Affordability. LTV 2025	-0.054*					
	(0.028)					
Affordability. LTV 2030		-0.048**				
		(0.024)				
Affordability. LTV 2050			-0.042**			
			(0.021)			
Affordability. ICR 2025				-0.058**		
				(0.028)		
Affordability. ICR 2030					-0.048*	
					(0.025)	
Affordability. ICR 2050						-0.030
						(0.021)
Size of association M	0.019	0.018	0.015	0.021	0.019	0.017
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
Size of association S	-0.008	-0.009	-0.011	-0.008	-0.012	-0.015
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Size of association XL	0.055**	0.053**	0.049*	0.060**	0.055**	0.051*
	(0.026)	(0.026)	(0.026)	(0.027)	(0.026)	(0.026)
Size of association XS	-0.006	-0.007	-0.010	-0.003	-0.007	-0.010
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
Size of association XXS	-0.112***	-0.115***	-0.119***	-0.113***	-0.118***	-0.121***
	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)
Arnhem Nijmegen	0.025	0.020	0.007	0.019	0.017	0.007
	(0.056)	(0.055)	(0.055)	(0.055)	(0.055)	(0.056)
Drechtsteden Hoekse Waard	0.011	0.009	-0.005	0.004	0.004	-0.004
	(0.062)	(0.062)	(0.062)	(0.061)	(0.062)	(0.062)
Food Valley	-0.010	-0.010	-0.018	-0.020	-0.020	-0.026
	(0.059)	(0.059)	(0.059)	(0.059)	(0.059)	(0.060)
Fryslân	-0.082	-0.082	-0.100	-0.088	-0.092	-0.097
	(0.065)	(0.065)	(0.066)	(0.065)	(0.065)	(0.066)
Groningen Drenthe	-0.056	-0.056	-0.068	-0.063	-0.064	-0.070
	(0.061)	(0.061)	(0.061)	(0.061)	(0.061)	(0.061)
Haaglanden Midden-Holland Rotterdam	-0.029	-0.029	-0.036	-0.036	-0.033	-0.036
	(0.053)	(0.053)	(0.053)	(0.053)	(0.053)	(0.054)
Holland Rijnland	0.032	0.031	0.022	0.026	0.027	0.022
	(0.056)	(0.056)	(0.056)	(0.056)	(0.056)	(0.056)
Limburg	0.019	0.016	0.002	0.015	0.009	-0.00004
	(0.061)	(0.061)	(0.061)	(0.061)	(0.061)	(0.061)

Metropoolregio Amsterdam	0.007	0.007	0.003	-0.002	-0.002	-0.004
	(0.054)	(0.054)	(0.054)	(0.054)	(0.054)	(0.055)
Metropoolregio Eindhoven	-0.081	-0.083	-0.092	-0.088	-0.085	-0.092
	(0.060)	(0.060)	(0.060)	(0.060)	(0.060)	(0.061)
Noord-Holland Noord	-0.065	-0.069	-0.087	-0.070	-0.076	-0.087
	(0.061)	(0.061)	(0.061)	(0.061)	(0.061)	(0.062)
Noordoost Brabant	-0.010	-0.015	-0.029	-0.020	-0.021	-0.028
	(0.082)	(0.082)	(0.082)	(0.082)	(0.082)	(0.083)
Oost Nederland	-0.029	-0.030	-0.043	-0.038	-0.038	-0.043
	(0.063)	(0.063)	(0.063)	(0.062)	(0.063)	(0.063)
U16	-0.011	-0.009	-0.018	-0.020	-0.021	-0.027
	(0.057)	(0.057)	(0.057)	(0.057)	(0.057)	(0.057)
West-Brabant en Hart van Brabant	-0.017	-0.023	-0.037	-0.024	-0.029	-0.037
	(0.059)	(0.059)	(0.059)	(0.059)	(0.059)	(0.060)
Woongaard	-0.044	-0.051	-0.058	-0.055	-0.056	-0.059
	(0.058)	(0.058)	(0.058)	(0.058)	(0.058)	(0.059)
Zeeland	-0.033	-0.033	-0.045	-0.050	-0.048	-0.054
	(0.070)	(0.070)	(0.070)	(0.070)	(0.070)	(0.070)
Zwolle - Stedendriehoek	-0.053	-0.054	-0.066	-0.058	-0.059	-0.065
	(0.055)	(0.055)	(0.055)	(0.055)	(0.055)	(0.055)
Affordability	-0.002	-0.003	-0.003	-0.001	-0.002	-0.002
	(0.007)	(0.008)	(0.008)	(0.007)	(0.007)	(0.008)
Constant	0.739***	0.746***	0.766***	0.744***	0.752***	0.761***
	(0.060)	(0.060)	(0.062)	(0.060)	(0.061)	(0.063)
Observations	203	203	203	203	203	203
R^2	0.242	0.242	0.243	0.244	0.241	0.234
Adjusted R^2	0.125	0.125	0.126	0.127	0.124	0.116
Residual Std. Error (df = 177)	0.082	0.082	0.082	0.082	0.082	0.082
F Statistic (df = 25; 177)	2.066***	2.073***	2.076***	2.092***	2.058***	1.984***
Note:						*p<0.1; **p<0.05; ***p<0.01

Appendix E – Subdivision of housing act regions.

Randstad	Associations
Metropoolregio Amsterdam	30
U 16	24
Haaglanden/Midden-Holland/Rotterdam	45
Holland Rijnland	15
Amersfoort/Noord-Veluwe/Zeewolde	9
Total	123
North	
Noord-Holland Noord	13
Friesland	10
Groningen/Drenthe	19
Total	42
East	
Arnhem/Nijmegen	17
Zwolle/Stedendriehoek	23
Oost Nederland	18
Food Valley	7
Total	65
South	
Zeeland	10
West-Brabant en Hart van Brabant	15
Metropoolregio Eindhoven	13
Limburg	27
Woongaard	14
Noordoost Brabant	13
Drechtsteden/Hoeksche Waard/Goeree Overflakkee	10
Total	102

Category	Rental units
XXS	<1.000
XS	1.001-2.500
S	2.501-5.000
M	5.001-10.000
L	10.001-25.000
XL	>25.000

Appendix F – Survey output

Thank you for your participation and welcome to this survey on risk appetite! The survey consists of two parts. The first part measures risk appetite on a personal level. The second part measures risk appetite on a housing association level and ends with some general questions.

Please enter below the name of the housing corporation you work for and your job title. If you are interested in the results of the survey, please fill in your e-mail address as well.

Contact information

Housing Associations

E-mailadres

Function

Enter your job title here if you entered other:

The questions below measure your personal risk appetite by suggesting a choice between a fictitious lottery with an equal chance of winning or no win OR a sure payment where there is a guaranteed win. The level of risk appetite can be assessed by repeatedly asking this question.

Can you tell me the extent to which you, in general, are willing or unwilling to take risks, using a scale of 0 to 10?

Completely unwilling Very willing

Imagine the following situation: You can choose between a sure payment of a certain amount of money, OR a lottery where you have equal chances of getting €300 euros or getting nothing. I present you five situations:

Which do you prefer: a draw with a 50% chance of receiving €300 and the same 50% chance of receiving nothing, OR an amount of €160 as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €80 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €40 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €60 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €70 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €50 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €20 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €30 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €10 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €120 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €100 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €90 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €110 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €140 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €150 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €130 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €240 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €200 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €180 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €190 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €170 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €220 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €230 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €210 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €280 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €260 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €270 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €250 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €300 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €290 amount as a sure payment?

- Lottery
- Sure payment

Do you prefer a 50/50 chance of receiving €300 OR the €310 amount as a sure payment?

- Lottery
- Sure payment

For the second part, I again present you with several scenarios. These are aimed at mapping out the risk appetite at association level.

Indicate what probability you find acceptable that the external ratio for the LTV and ICR will be exceeded while achieving all social objectives in terms of affordability, availability, quality (of life) OR sustainability. The risk appetite of each objective is tested with respect to three time periods:

- A budgeted excess over 5 years (= assessment period of Aw/WSW)
- A budgeted excess over 10 years
- A budgeted excess over 30 years

PLEASE NOTE: read the questions carefully and determine for yourself what probability of overshoot you consider acceptable in the event that all the objectives in the area of one of the social objectives are met.

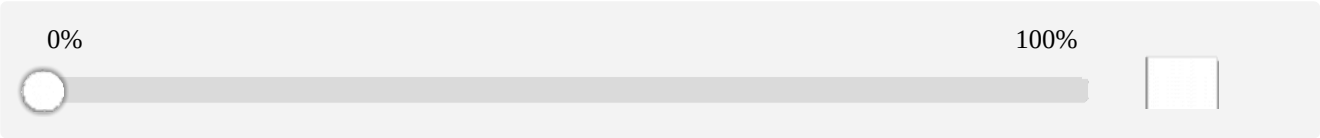
NOTE: The following questions focus specifically on the probability of exceeding for the LTV.

Imagine that your association can meet all of its **availability** targets. What probability do you accept of exceeding the external ratio for **LTV** in 2025?

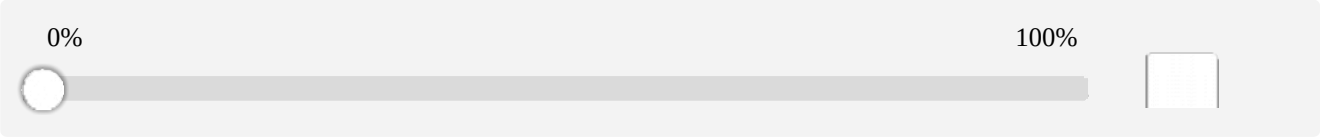
0% 100%

Imagine that your association can meet all of its **affodability** targets. What probability do you accept of exceeding the external ratio for **LTV** in **2025**?

Imagine that your association can meet all of its **quality** targets. What probability do you accept of exceeding the external ratio for **LTV** in **2025**?

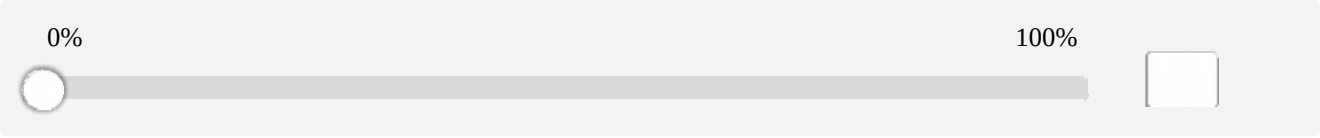


Imagine that your association can meet all of its **sustainability** targets. What probability do you accept of exceeding the external ratio for **LTV** in **2025**?

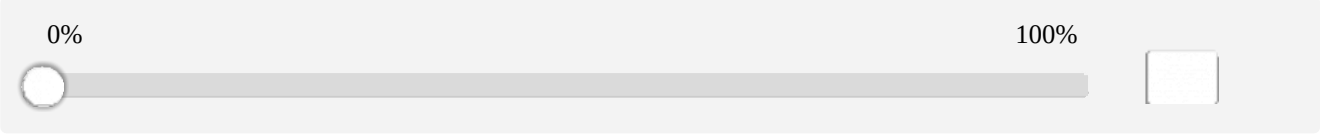


For the next 4 questions, the horizon has been extended to 2030. Please indicate the probability of exceeding the LTV that you accept for this longer time dimension.

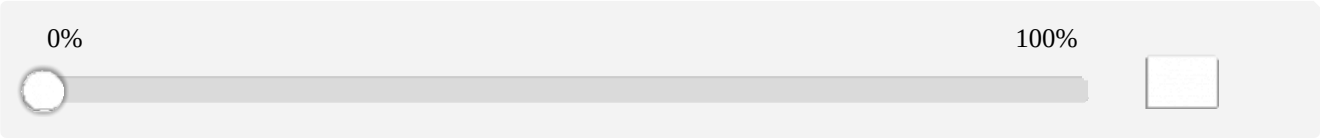
Imagine that your association can meet all of its **availability** targets. What probability do you accept of exceeding the external ratio for **LTV** in **2030**?



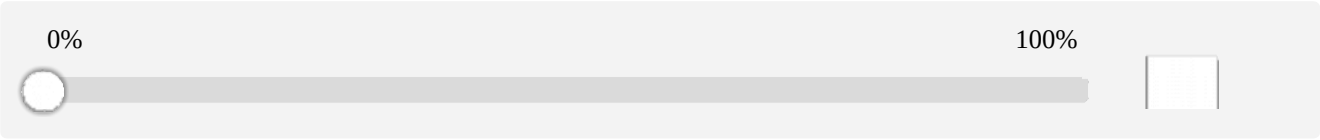
Imagine that your association can meet all of its **affordability** targets. What probability do you accept of exceeding the external ratio for **LTV** in **2030**?



Imagine that your association can meet all of its **quality** targets. What probability do you accept of exceeding the external ratio for **LTV** in **2030**?

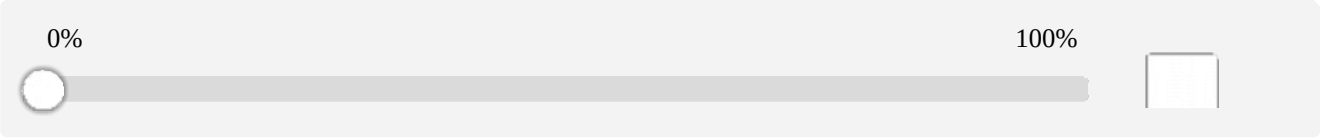


Imagine that your association can meet all of its **sustainability** targets. What probability do you accept of exceeding the external ratio for **LTV** in **2030**?

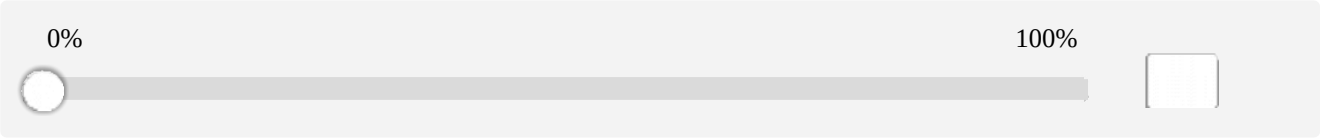


For the next 4 questions, the horizon has been extended to 2050. Please indicate the probability of exceeding the LTV that you accept for this longer time dimension.

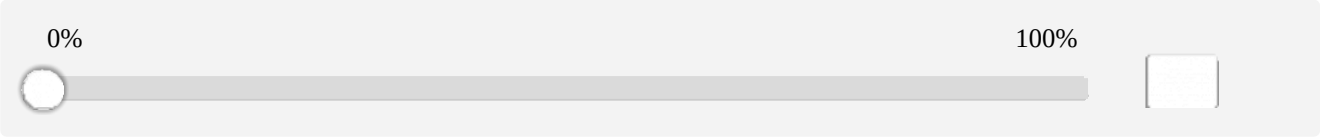
Imagine that your association can meet all of its **availability** targets. What probability do you accept of exceeding the external ratio for **LTV** in **2050?**



Imagine that your association can meet all of its **affordability** targets. What probability do you accept of exceeding the external ratio for **LTV** in **2050?**



Imagine that your association can meet all of its **quality** targets. What probability do you accept of exceeding the external ratio for **LTV** in **2050?**



Imagine that your association can meet all of its **sustainability** targets. What probability do you accept of exceeding the external ratio for **LTV** in **2050?**

0% 100%

Explanation, if any, of choices made:

NOTE: The following questions are specific to the probability of exceedance for the ICR**.**

Imagine that your association can meet all of its **availability** targets. What probability do you accept of exceeding the external ratio for **ICR** in **2025**?

0% 100%

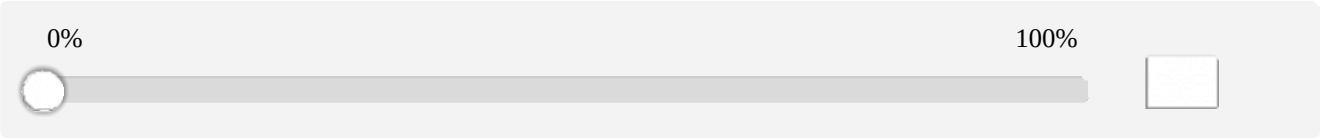
Imagine that your association can meet all of its **affordability** targets. What probability do you accept of exceeding the external ratio for **ICR** in **2025?**

0% 100%

Imagine that your association can meet all of its **quality** targets. What probability do you accept of exceeding the external ratio for **ICR** in **2025?**

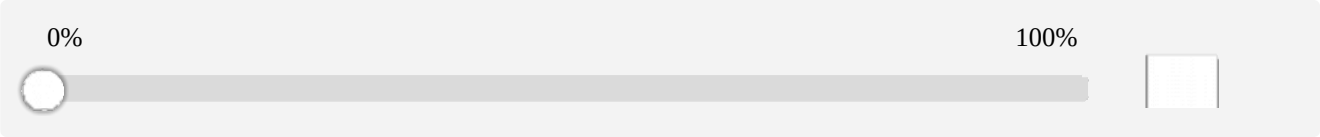
0% 100%

Imagine that your association can meet all of its **sustainability** targets. What probability do you accept of exceeding the external ratio for **ICR** in **2025?**

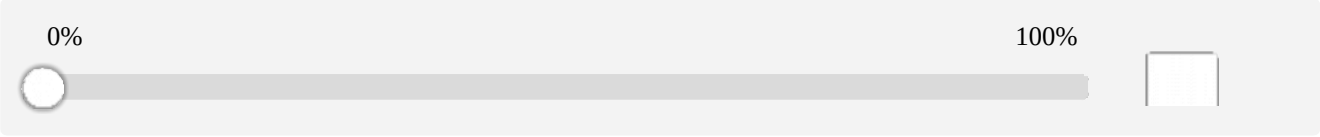


For the next 4 questions, the horizon has been extended to 2030. Please indicate the probability of exceeding the ICR that you accept for this longer time dimension.

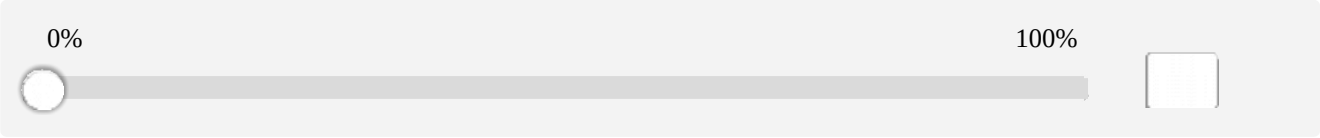
Imagine that your association can meet all of its **availability** targets. What probability do you accept of exceeding the external ratio for **ICR** in **2030?**



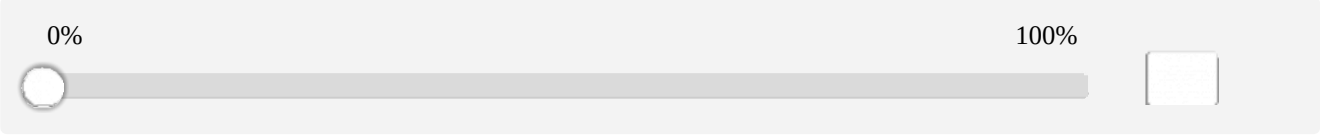
Imagine that your association can meet all of its **affordability** targets. What probability do you accept of exceeding the external ratio for **ICR** in **2030**?



Imagine that your association can meet all of its **quality** targets. What probability do you accept of exceeding the external ratio for **ICR** in **2030?**



Imagine that your association can meet all of its **sustainability** targets. What probability do you accept of exceeding the external ratio for **ICR** in **2030?**



For the next 4 questions, the horizon has been extended to 2050. Please indicate the probability of exceeding the ICR that you accept for this longer time dimension.

Imagine that your association can meet all of its **availability** targets. What probability do you accept of exceeding the external ratio for **ICR** in **2050?**

0% 100%

Imagine that your association can meet all of its **affordability** targets. What probability do you accept of exceeding the external ratio for **ICR** in **2050?**

0% 100%

Imagine that your association can meet all of its **quality** targets. What probability do you accept of exceeding the external ratio for **ICR** in **2050?**

0% 100%

Imagine that your association can meet all of its **sustainability** targets. What probability do you accept of exceeding the external ratio for **ICR** in **2050?**

0% 100%

Explanation, if any, of choices made:

I will now ask you some general questions:

Prioritize the following objectives where score 1 is the highest priority for your housing association and 4 is the least.

Sustainability

Availability

Affordability

Quality

What is your association's own internal ratio for LTV? (in percentages)

0% 100%

What is your association's own internal ratio for ICR?

Explanation, if any, of choices made:

This is the end of my survey on risk appetite. Thank you very much for your cooperation! Below again the opportunity to leave your email address if you are interested in the results.

Contact information

E-mailadres: