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HOUSING AFFORDABILITY IN ESTONIA: REGIONAL, OCCUPATIONAL AND GENDER PERSPECTIVE

Bachelor thesis

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I have written this Bachelor Thesis independently. Any ideas or data taken from other authors or other sources have been fully referenced.

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Introduction

In recent years, the European housing market has placed unprecedented pressure on household budgets, reflecting a broader historical shift in housing policy. As Whitehead (1991) notes, political discourse is increasingly shifting from an approach focused on "housing need" (traditionally defined by absolute social standards of acceptable accommodation and state support) to market-oriented analyses focused on "housing affordability." This paradigm shift places a significant burden of housing costs on individuals' incomes and free-market prices, making them more vulnerable to macroeconomic changes. The consequences of this market-oriented approach are clearly felt today.

Between 2010 and the last quarter of 2025, Estonia experienced one of the fastest increases in housing prices in the European Union, rising by 120% compared to the EU average of 60.5% (Eurostat, 2026). This types of rapid increase has significantly weakened the ability of households to afford adequate and safe housing, and has particularly affected young adults, women, and low-income groups who are inherently more vulnerable to market fluctuations and crises (OECD, 2021a, 2021b).

In addition to rapidly rising housing prices, the profound factors altering housing affordability in Europe are closely linked to the broader financialization of housing. In today's political economy, housing finds its place not only as a key building block of the welfare state but also as a crucial pillar of global capitalism (Aalbers, 2016). Policies designed to encourage homeownership, such as low-down payments and long-term loans, have improved access to mortgages for some groups while simultaneously increasing long-term financial risk. As Aalbers (2016) emphasizes, the state is often one of the main drivers of these financialization processes, actively pushing families into long-term housing debt. Mortgages have transformed from local tools facilitating homeownership to global investment instruments (Aalbers, 2016). This presents a unique paradox: households may qualify for loans more easily but incur debt with higher long-term repayments. This means that housing risks become systemic financial risks that households will bear for the rest of their lives, threatening their economic stability over time.

These macroeconomic developments once again demonstrate that defining and accurately measuring housing affordability is both challenging and vital for researchers and policymakers. The most commonly used method is the 30% income rule, which classifies housing as unaffordable if housing costs exceed 30% of household gross income (Herbert et al., 2018). It is a simple and widely accepted measurement method. However, this approach

can be quite misleading. Its rigid uniformity fails to account for critical differences in household size, structure, and essential non-housing expenses such as childcare, healthcare, or transportation (Herbert et al., 2018; Heylen, 2023). For example, families with young children incur significant additional costs. This means that allocating 30% of income to housing may not be sufficient to meet these basic needs. Consequently, the traditional single threshold rate tends to overestimate the affordability issues faced by higher-income or smaller households, while completely underestimating the severe financial constraints experienced by larger or more economically vulnerable families.

To overcome the limitations of the method, researchers are now trying to use alternative measures, such as the residual income approach (Kutty, 2005; Stone, 2006). This method explicitly subtracts basic, demographically adjusted costs of living from household income to determine what a household can actually afford without falling into "housing-induced poverty" (Kutty, 2005). However, this method also has its drawbacks (Herbert et al., 2018). The accuracy of these measures is not only a theoretical concern but also a practical necessity for people's well-being. As Bramley (2012) emphasizes, serious housing affordability problems are strongly correlated with tangible material hardship. When measures fail and housing costs become unbearable, households may be forced to make difficult choices. They may violate basic poverty standards, grapple with unsustainable debt, deplete their savings, or default on payments altogether, ultimately facing the risk of eviction or foreclosure. Therefore, it is necessary to accurately measure the true human cost of the housing crisis and design effective, targeted interventions.

Despite the widely accepted limitations of the 30% rule, single-threshold approaches continue to dominate international and state reports (JCHS, 2025). This reliance creates a significant research gap. There is limited literature examining how the application of diverse, multidimensional measurement methods fundamentally alters the housing affordability landscape. This gap is particularly critical for Estonia, given that the country has experienced the most dramatic housing price increases in the EU over the last decade. Relying solely on traditional measures obscures the true extent of financial stress, material hardship, and housing poverty faced by households. Furthermore, Housing affordability conditions vary significantly across regions, and national-level data may not capture these local differences (Whitehead, 1991), the housing struggles of key workers (Gilbert et al.,2021), and gender-based vulnerabilities (Vásquez-Vera et al., 2022). Therefore, an analysis at a disaggregated level is necessary.

Thus, the aim of this thesis is to evaluate housing affordability in Estonia, focusing on regional, occupational and gender differences. Through this granular analysis, the thesis highlights vulnerabilities often obscured by single-threshold rules, providing data-driven support for future housing and welfare policies.

To achieve this, the research is structured around four specific theoretical and empirical objectives:

- To explain the differences in the definitions of housing affordability found in the literature.
- To analyze the measurement methodologies and approaches existing in literature and discuss the limitations of traditional methods.
- To apply different affordability indicators to Estonian data, evaluating the results specifically by region, occupation and gender.
- To discuss the results between these methods and examine what each reveals about housing affordability across regions, occupations and gender groups in Estonia.

The findings of this research offer very important insights. Policymakers and government agencies in Estonia can use these findings to design more detailed housing policies that go beyond national averages, considering regional, occupational, and gender factors.

The thesis consists of two main parts: theoretical and empirical. The first part establishes the theoretical foundation of the thesis by discussing various conceptual definitions of housing and affordability, and measurement methodologies found in the existing literature. The second part constitutes the empirical portion of the study and focuses solely on Estonia. This section includes the methodology, data interpretation, and a comprehensive evaluation of housing affordability across different Estonian regions, occupational groups and gender groups. The conclusion summarizes the research findings and presents key implications based on the empirical findings.

Keywords: Estonia, measurement, housing affordability, occupation, gender groups.

1. Theoretical background of housing affordability

1.1. Conceptual framework and definitions of housing affordability

Mallett (2004) does not define the house as a physical building or a stone structure. Instead, she considers space, abstract feelings, and the individual's daily practices as a multidimensional phenomenon. Clapham (2005), similarly, does not see housing as a static object. He sees it as a dynamic process constantly transforming with the individual's life.

Therefore, he proposes a “pathways approach” that examines how the housing experience is shaped over time. However, in addition to these subjective and cultural definitions of housing, the issue of how it is produced and distributed is very important. Rolnik (2013) argues that in the neoliberal period, housing has increasingly been transformed into a financial product, and this has seriously undermined policies that treat housing as a social right. Madden and Marcuse (2016) take this critique further, suggesting that the current housing crisis is fundamentally rooted in the tension between housing being a space where people live and being a tool used to generate profit in the market.

As housing becomes increasingly disconnected from its primary purpose as shelter and transforms into a financial asset, properly defining and accurately measuring “housing affordability” becomes a critical necessity. The concept of housing affordability is viewed as a multidimensional and complex phenomenon in both economic and social policy research. Essentially, it defines a household's ability to afford adequate and liveable housing based on their income. However, over time, this concept has evolved beyond the simple definition to include a broader framework covering factors such as standard of living, housing quality, and social structure. (OECD, 2021a; UN-Habitat, 2020)

As a natural consequence of this expanding framework, there is no single internationally agreed-upon definition of “housing affordability,” and the preferred measurement metric varies widely (OECD, 2021a). Traditional objective indicators paint a purely financial picture, focusing on the share of housing expenditure in total household consumption (OECD, 2025) or the “housing cost burden rate” as a percentage of disposable income (OECD, 2024a). However, affordability is not limited to paying rent or mortgage; it also encompasses physical deprivations that directly affect quality of life, such as the ability of households to adequately warm their homes in winter (OECD, 2024b). Furthermore, subjective measures (OECD, 2023) reflecting individuals' housing stress, insecurity, and housing satisfaction demonstrate how differently households in the same economic conditions can experience varying levels of hardship, depending on their demographic and socio-cultural expectations. In short, how the concept is defined determines what constitutes a “crisis”; using only income-indexed, one-dimensional metrics can obscure the reality of households unable to heat their homes or constantly facing the risk of being forced to leave their homes. Therefore, grasping the true dimensions of the housing crisis is only possible through a holistic approach that considers both objective and subjective indicators.

International organizations define the concept of housing affordability not merely as a financial metric, but as a multi-dimensional concept linked to social well-being. While the OECD (2021a) emphasizes housing affordability as a multi-dimensional concept encompassing housing quality and subjective perceptions, UN-Habitat (2020) adopts a human rights perspective, viewing housing as a fundamental human right. Specifically, UN-Habitat (2020) describes adequate housing as a basic entitlement that goes beyond shelter, including access to safe water, sanitation, and security for all urban people (p.147). Though these perspectives differ in focus, both institutions agree that housing affordability should reflect an individual's ability to maintain an adequate standard of living across multiple dimensions, not just financial one (OECD, 2021a). Together, these perspectives suggest that addressing housing affordability requires both measuring costs and ensuring that all people can live in decent and dignified conditions

Academic literature, similar to the frameworks of international institutions, has developed different perspectives when attempting to define the concept of housing affordability. The primary goal of these studies is to explain how affordability relates not only to housing costs but also to the structure of household income, living standards, and social welfare. Thus, academic definitions deepen the general framework of international institutions and reveal the economic, social, and structural dimensions of the concept. The following sections will discuss these dimensions in detail, drawing on prominent academic approaches frequently cited in the literature: Hulchanski's (1995) contextual definitions, Kutty's (2005) standard-of-living framework, Stone's (2006) residual income definition, Yates's (2007) focus on financial stress, Gan and Hill's (2009) multidimensional model, Haffner and Boumeester's (2010) inequality approach, and Nagarjun and Sridhar's (2023) post-pandemic perspective.

Hulchanski (1995) argues that housing affordability is too complex to be captured by a single economic indicator like the expenditure-to-income ratio. He criticizes the reliance on fixed percentage rules, stating that they fail to reflect the diverse realities of household budgets. Instead, Hulchanski (1995) identifies six distinct ways the term is used, ranging from analyzing market trends to determining eligibility for public housing. This classification demonstrates that affordability is not just a mathematical equation but a tool used for different purposes depending on the context. Therefore, he concludes that no single ratio can truly capture the dynamic relationship between housing costs and a household's ability to

maintain a decent quality of life, making affordability a dynamic issue of social policy rather than simple statistics

Kutty (2005) criticizes traditional ratio-based measures and introduces the concept of 'housing-induced poverty.' She argues that defining affordability solely by the ratio of housing costs to income is insufficient, as it fails to reveal whether a household has enough money left for other necessities. According to her framework, affordability should be measured by whether a household retains sufficient income to cover a minimum basket of non-housing goods, such as food and healthcare, after paying for housing. Thus, affordability is not just a mathematical percentage, but a condition directly linked to a household's ability to maintain a minimum standard of living. In this view, even if a household falls below the traditional 30% ratio, they may still face affordability issues if their residual income is too low to prevent poverty.

Stone (2006) defines housing affordability based on the residual income approach. Unlike traditional measures, this approach focuses on the availability of income to meet basic living needs after covering housing expenses. Stone (2006) describes this situation as 'shelter poverty', which occurs when housing costs prevent a household from affording essentials such as food and other basic needs. This perspective distinguishes affordability from simple ratio-based measures (like the 30% rule) by connecting it directly to the standard of living. Thus, housing affordability is conceptualized not just as a cost issue but as a welfare indicator that varies with a household's income level and size.

Yates (2007) links the concept of housing affordability directly to 'financial stress,' arguing that it is more than just a simple balance between income and price. According to her, affordability is defined by the degree of pressure housing expenses exert on a household's budget, which varies significantly depending on income level. For instance, the same housing cost might be minor for a high-income family but can create severe hardship for a low-income household. Yates (2007) suggests that when housing costs limit the ability to meet other basic needs, it ceases to be just a market indicator and becomes a broader issue of economic well-being. This perspective can be interpreted as transforming affordability into a social concept centered on the financial resilience and vulnerability of households in their daily lives. While Yates (2007) does not explicitly adopt a dynamic framework, her findings across age groups and time points suggest that housing stress shifts in form rather than disappearing, allowing for a dynamic interpretation of affordability.

Gan and Hill (2009) criticize traditional affordability measures that rely solely on median income and median house prices, arguing that these averages fail to capture the financial stress faced by lower-income households. Instead, they propose a framework that distinguishes between three primary conceptual dimensions of affordability to reflect the diverse realities of the housing market. The first dimension, 'purchase affordability', refers to the ability of a household to borrow sufficient funds to enter the market. The second, 'repayment affordability', focuses on the ongoing financial burden of meeting mortgage obligations after the purchase. The third, 'income affordability', simply measures the ratio of house prices to income. By separating these definitions, Gan and Hill (2009) demonstrate that access and sustainability are different issues. For instance, a household might easily obtain a loan (purchase) but struggle significantly to pay it back (repayment). Thus, this approach redefines affordability not as a single statistic, but as a concept with three distinct dimensions: access to credit, repayment capacity, and income affordability.

Haffner and Boumeester (2010) argue that housing affordability cannot be explained solely by the cost of rent or house price. According to them, the real issue is whether household incomes are sufficient to keep up with rising housing expenditures to sustain themselves and meet their basic needs. Therefore, affordability is not fixed numbers, but rather a social issue directly related to the growing income gap between renters and homeowners. By looking at the issue from this perspective, the authors define affordability not just in terms of market prices, but as a structural problem shaped by income distribution and housing policy.

Nagarjun and Sridhar (2023) argue that in the post-COVID-19 era, housing affordability is not merely a fixed economic rate, but a dynamic construct sensitive to economic shocks and government interventions. Their study demonstrates how tax cuts and low-interest rate policies implemented during crises can temporarily improve housing affordability. They also note that new lifestyles, such as remote work, have altered people's spatial movements (e.g., migration from expensive centers to more affordable suburbs) and reshaped their perception of housing affordability. This view is crucial today because Cox (2024) argues that the housing problem is now the biggest cause of the global cost crisis we are experiencing. Housing affordability is no longer simply about market figures or rates, but rather about how people survive. Crowe and Rowley (2024) also state that energy and transportation costs must be considered when evaluating housing affordability, as these expenses constitute a significant portion of the actual costs people pay. When these three

factors consider together, it becomes clear that affordability is not just a financial metric, but a complex process of daily life and economic survival, and a more global issue.

Examining the historical development of studies in the literature reveals that the concept of housing affordability has evolved from a simple calculation method to a more detailed and layered structure centered on household well-being. Initially, researchers like Hulchanski (1995) argued that this concept was too flexible to fit into a single mold, but over time the discussion shifted from 'mathematical ratios' to people's quality of life. In this context, Stone (2006) and Kutty (2005) redefined affordability in terms of 'money left in pocket after paying rent' and the risk of poverty, adding a human dimension to the issue. This social approach was further deepened in later years by Gan and Hill (2009) and Haffner and Boumeester (2010); it was shown that the problem is not limited to the moment of purchasing a home, but is a structural process encompassing income inequalities and long-term payment difficulties. Yates (2007), on the other hand, highlighted the 'material stress' created by this process, drawing attention to the psychological and social effects of the issue. Today, with Nagarjun and Sridhar's (2023) post-pandemic analysis, affordability is no longer considered a static state, but a dynamic process constantly shaped by economic shocks, crises, and changing lifestyle choices (such as mobility). Building on this, Cox (2024) shows that high housing costs are now the main driver of the global cost of living crisis, putting a lot of pressure on middle-class budgets. In addition, Crowe and Rowley (2024) suggest that policymakers must include energy and transport costs in our definitions because these are the real bills people struggle to pay today not just the rent or mortgage.

When these different approaches are considered together, it is clear that relying solely on ratio-based approaches or residual income measures is insufficient to explain housing affordability today. Since households, income levels, and social policies vary significantly between countries, a single indicator is often inadequate to fully describe the situation. Therefore, in modern literature, as seen above, some sources consider affordability not only from a numerical perspective but also as a multidimensional concept encompassing social structure, quality, and living standards. This approach considers affordability not simply as paying rent, but as a multidimensional condition shaped by income level, household structure, and broader socioeconomic pressures.

Based on the various perspectives summarized in Table 1 below, this thesis adopts a comprehensive definition. Housing affordability is conceptualized as a household's capacity to secure adequate and livable shelter without sacrificing essential non-housing expenditures, while maintaining financial resilience against economic fluctuations and uncertainties.

Table 1

Definition comparison of housing affordability

Source	Focus	Main Idea of Definition
OECD (2021a) &UN-Habitat (2020)	Social Well-being & Quality of Life & Multi-dimensional Concept	States that affordability is not just about the cost. It is about quality of living and human rights perspective.
Hulchanski (1995)	Flexible Definitions	Says there is no single "correct" definition. It is a flexible term that changes depending on the situation.
Kutty (2005)	Housing-Induced Poverty	Argues that simple ratios are not enough. It looks at whether a family has enough money left for food and health after paying for housing
Stone (2006)	Residual Income Approach	Uses the idea of "Shelter Poverty." Affordability means having enough income to keep a decent standard of living after housing costs
Yates (2007)	Financial Stress	Explains affordability as the "financial stress" or pressure that high housing costs put on a household's budget
Gan & Hill (2009)	Purchase, Repayment & Income	Breaks affordability into three parts: ability to get a loan (purchase), ability to repay it (repayment), and the ratio of house prices to income (income affordability
Haffner & Boumeester (2010)	Income Inequality	Focuses on the income gap between renters and owners. It links affordability to social policy and how wealth is distributed
Nagarjun & Sridhar (2023)	Dynamic Process/Mobility	It shows that affordability is not fixed. It changes quickly with economic shocks (like COVID-19) and lifestyle change
Crowe & Rowley (2024)	Real Cost/Hidden Costs	To see the true expenses people are paying today, it is argued that energy and transportation costs should also be included in the analysis of affordability.
Cox (2024)	Global Living Costs	Views housing as the main reason for the global cost-of-living crisis and a key part of economic survival.

Source: Author's own compilation based on the reviewed literature.

Although the various definitions found in the literature show that the concept of affordability has a broad enough scope that it cannot be reduced to a single dimension, this diversity can often make it difficult to see which aspect of the concept is being emphasized. Some definitions focus on household economic difficulties and income balance, such as those presented by Stone (2006), Kutty (2005), Yates (2007), Gan & Hill (2009) and Cox (2024), while others center on social welfare, living standards, or the policy context, including the works of OECD, (2021a), UN-Habitat (2020) and Haffner and Boumeester (2010), Crowe and Rowley (2024). Therefore, considering definitions from various sources within a common framework provides a clearer perspective.

Figure 1 visualizes these relationships by synthesizing the three fundamental dimensions found in the literature: economic, social-welfare, and political-institutional. This classification highlights not only the diversity of definitions but also the conceptual intersection (See Figure 1).

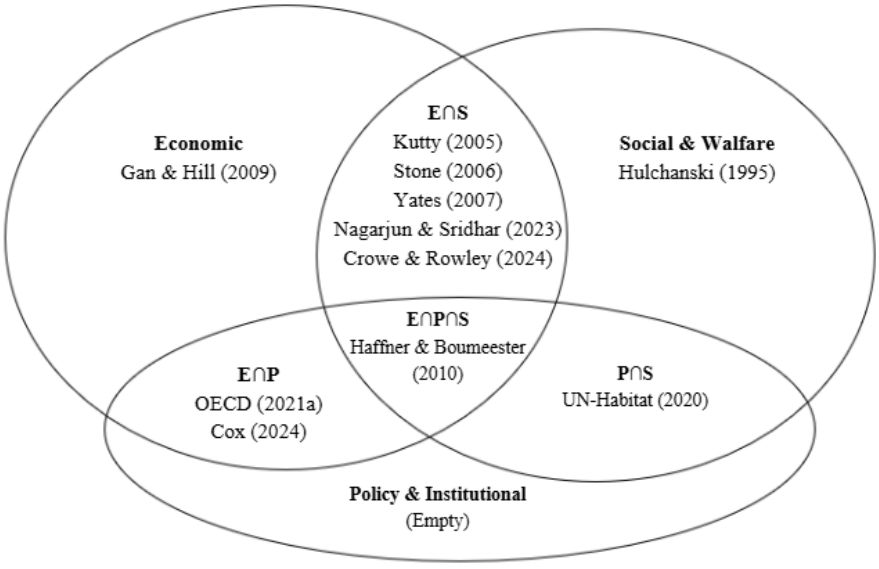


Figure 1. Conceptual clusters of housing affordability definitions in the literature.
Source: Author's own compilation based on the reviewed literature

In conclusion, Chapter 1.1 argues that to properly understand the concept of housing affordability, it is necessary to first understand the structural transformation of housing today. This transformation has shifted housing from simply fulfilling a need for shelter to, as Madden and Marcuse (2016) state, a financial construct. Therefore, since housing itself does not have a static definition, housing affordability must also be examined in terms of its evolution from a simple mathematical ratio to a broader, modern, and socially framed concept. This chapter demonstrates how definitions have shifted from purely economic

criteria to a broader concept encompassing household well-being and the basic cost of living (Stone, 2006; Kutty, 2005; Crowe & Rowley, 2024). This shift reflects the view that housing affordability is a multidimensional problem where economic pressures, social factors, and institutional policies overlap (Yates, 2007; OECD, 2021a; Cox, 2024). Based on these different perspectives, this thesis defines housing affordability as a household's capacity to acquire adequate, livable, and structurally secure shelter without compromising its basic non-housing needs. As shown in Figure 1, this section provides a clear and supportive theoretical foundation for the practical analysis of housing problems in the later sections of the thesis, by presenting different perspectives on the concept.

1.2. Measurement methodologies and approaches of housing affordability

Defining the concept of housing affordability is a fundamental step in understanding it. Measuring the concept accurately is equally difficult and vital. As discussed in the previous section, the definition of affordability has evolved from a simple financial calculation to a broader concept encompassing social welfare and financial stress. Consequently, measurement methods, like the definition itself, are not fixed but open to development and change. While generally accepted definitions and measurements are widely used, academic literature also utilizes more complex and detailed indicators that take into account household residual income and poverty levels.

Considering the comprehensive review of the literature and the methods of measuring housing affordability that are thought to be easier to understand, these methods will be examined in this thesis under three main approaches.

1. Ratio Based Approaches: Methodologies that focus on the percentage of income spent on housing costs (e.g., 30% rule, Price-to-Income ratio) (Hulchanski, 1995; Cox, 2024, JCHS, 2025).
2. Residual Income Based Approaches: Measurements that focus on the amount of income remaining after housing or housing-related expenses have been paid (Stone, 2006; Kutty, 2005; Crowe & Rowley, 2024).
3. Composite, Dynamic and Subjective Approaches: Measurements that combine multiple indicators such as financial stress, repayment capacity and subjective output of households (Yates, 2007; Nagarjun & Sridhar, 2023; OECD, 2023).

The Ratio Approach is the most used method for measuring housing affordability because it is simple and easy to understand (Herbert et al., 2018; Hulchanski, 1995). This approach directly compares housing costs to household income (gross). It is primarily used in

two ways: the expenditure to income ratio (for tenants and which includes utilities) and the price-to-income ratio (for homeowners and which focuses on the market value of house).

Expenditure-to-income ratio, which is most commonly applied through the "30% rule" serves as the primary metric in this category. As Hulchanski (1995) points out, this rule is not a precise and in-depth scientific calculation. It is more of a rough proportional estimate. It suggests that if a household spends more than 30% of its income on gross housing cost (including rent and utilities), it is experiencing housing stress (or housing affordability issues). Hulchanski (1995) states that this rule is too simplistic and not an accurate measurement for defining individual needs or predicting ability to pay because it does not account for household differences. However, he notes that it remains a valid tool for descriptive and analytical purposes, which explains why it is still the most used ratio.

The Joint Center for Housing Studies of Harvard University (JCHS, 2025) uses this rule in its latest report to categorize households into two groups:

- Cost Burdened: Households spending between 30% and 50% of their income on housing and utilities (housing related expenses)
- Severely Cost Burdened: This term is used when households spend more than 50% of their income on housing and utility bills. According to data from the JCHS (2025) report, the number of households under "Severely Cost Burdened" due to rising rent and energy costs has reached record levels.

Price-to-income ratio (for home buyers), also known as the "Median Multiplier," compares median home prices directly to median incomes. While the "Median Multiplier" is simply the mathematical formula used to calculate this ratio, both terms essentially represent the same concept. This ratio show how many years of household income are needed to buy a house, making it easy to see if market prices are reasonable relative to annual earnings, especially in the context of shifting market dynamics as explored by Nagarjun and Sridhar (2023). Essentially, the purpose of this metric is to show how many years of total income are needed to buy an average or targeted house. Based on this logic, Cox (2024) classifies housing markets into distinct affordability categories, ranging from affordable to severely unaffordable.

- 3 or less: Affordable (Approximately 3 years of income needed to buy).
- 9.0 or more: Impossible Unaffordable (More than 9 years of income needed). This means that in cities with a score above 9, local wages are completely independent of home prices.

In addition to the previous two measurement methods, more specific metrics are used to identify areas where the price-to-income ratio generally creates the most significant problems in terms of housing costs. One of these is the 30:40 rule (Hulse et al., 2014), which focuses on households in the bottom 40% of the income distribution spending more than 30% of their income on housing, though Meen (2018) criticizes this as oversimplified. This is a crucial measurement method for better identifying 'housing stress' among the most vulnerable groups. Additionally, the Mortgage Adequacy Index (Biljanovska et al., 2023) provides a practical measure of join to the housing market by calculating the ability of a middle-income household to obtain a bank loan based on current interest rates and credit conditions. Table 2 summarizes all these ratios, formulas, and explanations, providing a simpler and more practical perspective on these different ratio-based metrics.

Table 2

Key ratio-based indicators and their interpretations

Method	Formula	Threshold	Interpretation	Source
Expenditure-to-Income	Housing Cost (Rent + Utilities) / Monthly Gross Income	< 30% 30% - 50% > 50%	Affordable Cost Burdened Severely Cost Burdened	JCHS (2025), Hulchanski (1995)
Price-to-Income	Median House Price (Market Price) / Median Annual Income	3.0&Under 3.1 to 4.0 4.1 to 5.0 5.1 to 8.9 9.0&Over	Affordable Moderately Unaffordable Seriously Unaffordable Severely Unaffordable Impossibly Unaffordable	Cox (2024)
30:40 Rule Criticism	Housing Costs / Gross Income > 25% (weighted across income quintiles	>25%	Indicates housing stress for low-income groups	Meen (2018)
Mortgage Qualification	(Median Income / Necessary Income for Loan) * 100	< 100 100 > 100	Cannot qualify for loan Exactly enough to qualify More than enough to qualify	Biljanovska et al. (2023)

Source: Author's own compilation based on the reviewed literature.

The ratio approaches shown in Table 2 are the most well-known ratios. However, they have significant shortcomings. These measurement methods assume that the 30% threshold affects every household in the same way. However, Stone's (2006) opposing view claims that

a high-income family can comfortably live on the remaining 50% by spending 50% of their income on housing and household expenses. This is because 50% of a high-income family's income is not the same as 50% of a low-income family's income. Conversely, if the remaining 80%, excluding the 20% spent on housing, is insufficient for food or medicine, it can pose a problem for a low-income family. This is because simple ratios do not account for the “real money left in pocket” after bills are paid. However, Meen (2018) argues that applying a quintile-weighted 25% threshold provides a better understanding of 'housing stress' than the standard 30:40 rule (Hulse et al., 2014). Finally, a different and current ratio-based approach concerns mortgage eligibility (Biljanovska et al., 2023). It examines the relationship between household income and loan ratios. In general, while ratio-based approaches are the oldest, most common, and somewhat problematic methods, they also have different orientations within themselves.

While ratio-based approaches provide a general framework for assessing affordability, they are not always sufficient to understand the true financial situation of households. In this context, the income approach no longer focuses solely on specific ratios instead, it draws attention to the 'residual income' remaining after housing costs have been paid (Stone, 2006). One of the most important studies, Stone (2006), explains this with the concept of 'shelter poverty' arguing that even if a household reaches or falls below the traditional 30% rule, it is experiencing scarcity if it has problems meeting basic needs such as housing costs, food, and healthcare. Similarly, Kutty (2005), using the term 'housing-induced poverty', examines how housing costs push a household below the poverty line. Crowe and Rowley (2024), offering one of the most up-to-date measurement methods, argues that modern living costs such as energy and transportation should be included in this analysis to reflect the true financial pressure on families. Table 3 summarizes these measurements and their focus areas.

In addition, it should be noted that the classifications in the measurement methods used throughout the thesis (tables 3, 4 and 5) do not draw net limits. Many studies use more than one approach. For example, Yates (2007), while using the ratio-based 30:40 rule to measure housing stress, also approaches it from a residual income perspective through financial stress indicators. Such overlaps are common in the literature, and the categories in this table have been created for the purpose of comparatively evaluating studies and do not draw definitive boundaries.

Table 3

Key residual based indicators and their interpretations

Method	Formula	Threshold	Interpretation	Source
Residual Income (Shelter Poverty)	Disposable Income – Housing Cost	Cost of non-housing essentials	Unaffordable if residual income cannot cover a minimum standard of living.	Stone (2006)
Residual Income (Housing-Induced Poverty)	Residual Income vs Poverty Line	Poverty Threshold	Identifies if housing costs are the reason a family falls below the poverty line.	Kutty (2005)
Real Cost Scoping	Residual Income - (Energy + Transport)	Total Living Cost Standards	Includes energy and transport to see if households can afford all mandatory living costs.	Crowe and Rowley (2024)

Source: Author's own compilation based on the reviewed literature

The measurements in Table 3 focus on the actual housing-related stress experienced by a household, offering a more practical perspective on affordability. As Stone (2006) argues, the traditional 30% threshold can be misleading. Instead, the residual income approach better identifies families in 'housing poverty' where residual income is insufficient to meet basic needs such as food and healthcare. However, Kutty (2005) notes that these thresholds are not universal and vary significantly between countries and regions, depending heavily on local economic conditions and social policies. Additionally, Crowe and Rowley (2024) argues that including energy and transportation costs provides a more detailed and realistic framework. However, the difficulty in accurately collecting such detailed data makes these models more challenging to implement than simpler thresholds like 30%. Consequently, even though these methods more accurately represent the economic situation of households in determining true hardship, the subjectivity of the thresholds remains a challenge.

Rate and residual income methods focus on objective numbers. However, they may fall short of reflecting how households perceive their living conditions or how affordability changes over time. As highlighted by the OECD (2023), subjective measures and the levels of satisfaction reported by households are crucial. This approach measures the psychological pressure of housing costs and the subjective feedback people have about their access to quality and affordable housing. Yates (2007)' findings allow for a dynamic interpretation of

housing stress, suggesting that it is not a static condition but changes throughout its life cycle. Housing stress is not a static state. It varies throughout a household's life as their income, family size, and housing needs evolve. Additionally, Nagarjun and Sridhar (2023), in their study on the COVID-19 pandemic, demonstrated the importance of external shocks. Their research shows how sudden economic changes affect both household incomes and market prices simultaneously, impacting housing affordability for households. Table 4 summarizes these multidimensional approaches.

Table 4

Key composite, dynamic and subjective approaches and their interpretations

Method	Focus	Interpretation	Source
Subjective Assessment	Self-reported satisfaction	Measures how households feel about their housing costs and quality.	OECD (2023)
Dynamic Stress Analysis	Changes over the life cycle and time	Examine how housing stress changes as a family grows or years pass.	Yates (2007)
External Shock Impact	Sudden economic shifts (e.g., Pandemic)	Analyzes how crises like COVID-19 disrupt affordability.	Nagarjun & Sridhar (2023)

Source: Author's own compilation based on the reviewed literature

When examining the approaches presented in Tables 2, 3, and 4 for measuring housing affordability, it is seen that each measurement model examines the housing market from a different perspective. Ratio-based approaches (Hulchanski, 1995; Cox, 2024; JCHS, 2025), the best-known method for assessing affordability (especially the 30% threshold), are the most usable tools for large-scale comparisons due to their simplicity and compatibility with macroeconomic data. However, these methods have a fundamental weakness. They provide a superficial assessment of household expenditure. Researchers such as Stone (2006) and Kutty (2005) argue that these methods fail to distinguish between high-income families who can live comfortably with high housing expenses and low-income families who cannot meet their basic needs even with low ratios (such as 20%), thus exhibiting "shelter poverty". In contrast, the income approach now provides a more sensitive analysis by focusing on the money remaining in the household's hands after housing expenses have been paid. The strength of this method lies in defining housing affordability directly through its relationship to basic needs. On the other hand, as highlighted in the Crowe and Rowley (2024) report, the biggest problem with this methodology is the complexity and detail in the data collection

process. In particular, the inclusion of other costs such as energy, water, and transportation makes national-level standardization difficult.

Finally, the dynamic or subjective approaches highlighted by Yates (2007) and the OECD (2023) add a more humane and social dimension to the housing problem. These methods can show the financial pressure felt by individuals and how housing stress develops or changes throughout the life cycle, rather than just the ratio or remaining income. External shocks or crises, especially COVID-19, prove that affordability is not a snapshot but a dynamic process that needs to be continuously monitored. These theoretical discussions serve as a fundamental guide in the analysis and methodological section to be used in the remainder of this study.

2. Empirical analysis of housing affordability in Estonia

2.1. Methodology and data description

Appropriate methodology and data are crucial for a more detailed examination and mapping of housing affordability in Estonia. This section will explain what methodology will be used in the analysis and how to use it. The methodology of this thesis follows a plan as shown in Figure 2.

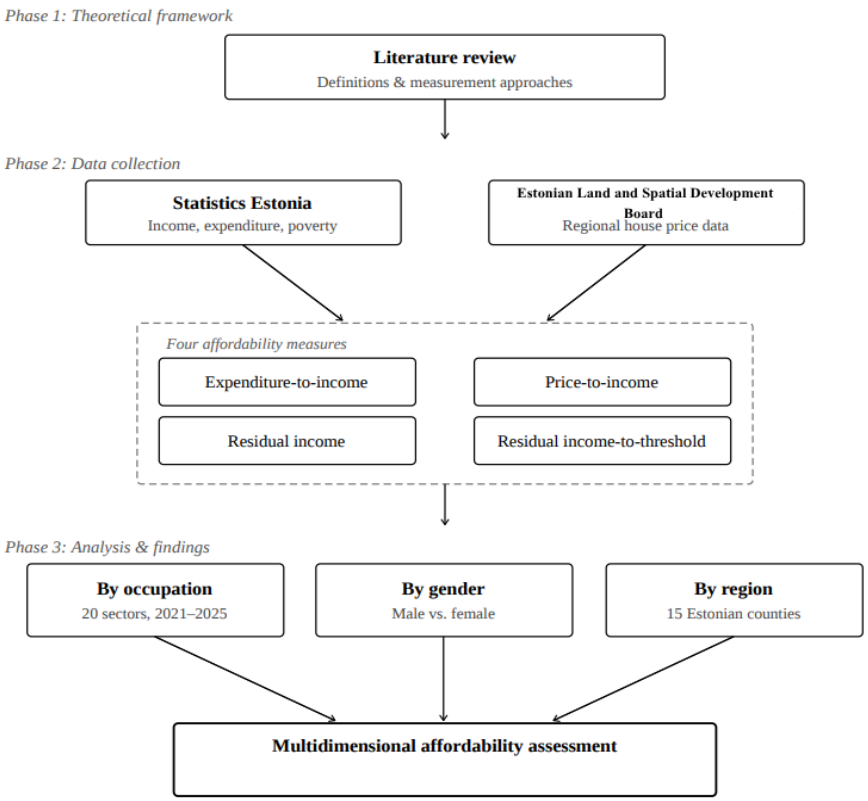


Figure 2. Structure of the thesis and methodology

Source: Compiled by the author

This study employs a quantitative research design based on Statistics Estonia (*Statistikaamet*) and Estonian Land and Spatial Development Board (*Maa- ja Ruumimet*) secondary data to examine housing affordability in Estonia. A similar quantitative approach using these national databases was recently applied by Kährik et al. (2025) to analyze housing affordability. While qualitative methods are useful for understanding personal experiences related to housing (OECD, 2023), a quantitative approach is considered more accurate for demonstrating the true extent of the housing affordability situation. The primary objective of this methodology is to apply multiple housing affordability indicators to Estonian data and to map the results across different occupational groups, gender and counties where applicable, providing a more granular perspective than national-level measures alone.

To implement 4 different approaches (expenditure-to-income, price-to-income, the residual income and residual income-to-threshold) research follows a sequential plan. These four methods form a hybrid approach where each complements the others. Although simple ratios (expenditure-to-income and price-to-income) are criticized in the literature, they are easy to apply and provide a general overview. Combining these traditional ratios with residual income measures allows for a detailed examination of the overall structure of the thesis.

First, using data from Statistics Estonia, national housing expenditure data and income data for occupational groups are used to show how the relationship between housing expenditures and the incomes of occupational groups and individuals generally looks. Then, this general picture is further detailed at regional levels, beyond occupation, using the price-to-income ratio. The first two measurement methods used in the analysis focus on specific occupational groups, different regions in Estonia, and gender differences. The last two measurements, residual income and poverty threshold measures, will be applied at the national level in Estonia. This allows for a broader analysis of housing affordability in Estonia and fills an academic gap by looking at specific occupations and gender differences, which are usually ignored in national-level Estonian studies..

The primary sources used throughout this methodology were the Statistics Estonia (2021), (2024), (2025), (2026a), (2026b), (2026c), (2026d), (2026e) the Estonian Land and Spatial Development Board (2026).

Table 5

Use of expenditure-to-income ratio in the thesis

Primary Indicators	Variables & Calculation	Key Interpretation & Assumptions	Data Sources
Expenditure-to-Income	1. Average monthly housing expenditure: $\frac{\text{Total Annual Housing Expenditure}}{\text{Total Number of Households}} / 12$ 2. Average monthly gross income: (Official monthly average gross wage) Formula: $\frac{\text{Average Monthly Housing Expenditure}}{\text{Average Monthly Gross Income}}$	Threshold: The house burden rate threshold is assumed to be 30%.	Statistics Estonia (2021), (2025), (2026a), (2026b)

Source: Author's own compilation based on the reviewed literature

As shown in Table 5, the first measurement method uses data on average monthly housing expenditure and gross monthly income in Estonia. To find the monthly housing expenditure in Estonia, the total annual housing expenditure (national) is divided by the number of households in Estonia. This value is then divided by twelve to convert it to a monthly figure. (Statistics Estonia, 2025; 2026a).

For gross salary, data is used that includes average monthly gross salaries for different occupational groups and genders across 22 categories, as shown in Table 6. The objective here is to gain a more detailed understanding of housing affordability, expenditure-to-income ratio, has differed across occupational groups and genders based on 2021 to 2025. (Statistics Estonia, 2026b). The data used in the expenditure-to-income measurement covers the years 2021-2025. This specific range was chosen so that the effects of post-pandemic inflation and the worldwide crisis can be seen in relation to home affordability through this measurement. In terms of definition, the definition of housing expenditure in the dataset does not only include rent; it also encompasses house-related expenses such as bills (Statistics Estonia, 2026a). Stacked bars are used for data interpretation and visualization. In addition to the 2021-2025 analysis, this section will also calculate the expenditure-to-income ratio for 2020 to be used in the residual income to threshold section (Statistics Estonia, 2021).

Table 6

Groups used as the basis for measurement

Groups				
Agriculture, forestry and fishing	Mining and quarrying	Manufacturing	Transportation and storage	Human health and social work activities
Electricity, gas, steam and air conditioning supply	Water supply; sewerage, waste management and remediation activities	Construction	Accommodation and food service activities	Arts, entertainment and recreation
Wholesale and retail trade; repair of motor vehicles and motorcycles	Information and communication	Financial and insurance activities	Real estate activities	Other service activities
Professional, scientific and technical activities	Administrative and support service activities	Public administration and defence; compulsory social security	Education	Total
Males	Females			

Source: Statistics Estonia (2026b)

Table 6 shows the 22 groups used in this study. These groups cover different sectors of the Estonian economy, such as agriculture, manufacturing, education, and health. The occupational groups are considered diverse enough to cover the whole of Estonia. Both men and women are included, which will be used for gender-based comparisons. A table format is used here because it presents a large number of groups in a clear and organized way, making them easier to follow.

A limitation of this study is that the dataset does not directly include monthly housing expenses for individual Estonian households. To solve this, the total national annual housing expenditure was divided by the total number of households to find a monthly baseline. This approach provides a realistic estimation for household-level costs.

Dividing total housing expenses by the total population would incorrectly assume that costs are distributed equally per person, ignoring children or non-working members who share the same home. Similarly, dividing only by the working population would ignore the housing contributions of non-working individuals who live on government pensions or

disability benefits. Therefore, using the number of households provides the most accurate baseline. Based on this baseline, the study evaluates expenditure-to-income measurements by specific occupational and gender groups, providing a detailed analysis at the 22-group level rather than focusing on general national trends.

Table 7

Use of price to income ratio in methodology

Primary Indicators	Variables & Calculation	Key Interpretation & Assumptions	Data Sources
Price to Income	1. Median House Price: Median price per m² × 55 2 Median Annual Income: (Median monthly income * 12) Formula: $\frac{\text{Median House Price}}{\text{Median Annual Income}}$	Dwelling Size: While the dataset average house size is 55.5 m², a standardized 55 m² was used. This provides a conservative, accurate benchmark aligned with typical two-room apartments.	Estonian Land and Spatial Development Board (2026), Statistics Estonia, (2026b), (2026d)

Source: Author's own compilation based on the reviewed literature

As shown in Table 7, the methodology used the price-to-income measure, employing median house price and median annual income. The median house price data was taken from Estonian Land and Spatial Development Board (2026). House prices were calculated by multiplying the median price per square meter of apartments in Estonia by a standardized size of 55 m² (while the actual five-year average in the dataset was 55.5 m²). (Estonian Land and Spatial Development Board, 2026).

To calculate the annual median income, the median monthly income of the 22 groups in Table 6, the median monthly income of individuals in the 15 regions of Estonia are multiplied by 12 to obtain separate regional, occupational, and gender-based median incomes, which are then annualized (Statistics Estonia 2026b, 2026d).

The price-to-income measurement is based on data from 2021-2025. The choice of years here allows for a detailed examination of the relationship between the effects of the pandemic and global inflation and home affordability. The price-to-income ratio measurement will examine regional variations in addition to the expenditure-to-income ratio, which is different from the expenditure-to-income ratio. This will allow for mapping Estonia using this ratio. The 22-group measurement will be visualized using stacked bar charts. In these charts, a classification scale ranging from 0 to 10 is utilized to assess the housing

purchasing difficulties of these 22 groups. Threshold values are classified as 3 and below as 'Affordable', 3.1 to 4 as 'Moderately unaffordable', 4.1 to 5 as 'Seriously unaffordable', 5.1 to 8.9 as 'Severely unaffordable', and 9 and above as 'Impossibly unaffordable', as defined by Cox (2024). In regional measurements, a 5-year map visualization will allow for an in-depth examination of the impact of regional differences in Estonia on housing affordability.

To see the housing-related pressure on the population, the next metric to be calculated is residual income; the basic data and calculations for this are presented in Table 8 below.

Table 8

Use of residual income in methodology

Primary Indicators	Variables & Calculation	Key Interpretation & Assumptions	Data Sources
Residual Income	1. Monthly disposable income: (Mean monthly disposable income) 2. Average monthly housing expenditure: $\frac{\text{Total Annual Housing Expenditure}}{\text{Total Number of Households} \times 12}$ Formula: Monthly disposable income – Average monthly housing expenditure	Assumption: A low residual income indicates high material deprivation and shelter-induced poverty	Statistics Estonia, (2025), (2026a), (2026e)

Source: Author's own compilation based on the reviewed literature

As shown in Table 8, in addition to proportional approaches, the methodology will first use the residual income method to examine home affordability in Estonia using income-based approaches.

To apply the residual income method, mean monthly disposable income data was used as raw data directly monthly disposable income. Subsequently, to find monthly household expenses, the total annual housing expenditure (national) data was first divided by the number of households to calculate it on a per-household basis and then divided by 12 to calculate it on a per-month basis. The formula is to subtract the average monthly household expense from the monthly disposable income. The aim here is to determine how much income remains after deducting household expenses from the individual's disposable income.

The residual income approach used in this thesis covers the years 2020 and 2024. Unlike Tables 7 and 8, the 2025 data is not available, therefore the analysis is conducted over a 5-year period, but from 2020 to 2024. Additionally, the household expenses dataset does

not only include rent; it also includes other household-related expenses such as bills. The reason for dividing total annual housing expenditure (national) by the number of households, as shown in Table 5, is that this method provides more accurate data than dividing by the number of employed people or the population.

Table 9

Use of residual income-to-threshold in methodology

Primary Indicators	Variables & Calculation	Key Interpretation & Assumptions	Data Sources
Residual Income-to-Threshold	1. Monthly Residual Income: Disposable income – Housing expenditure 2. Non-housing poverty threshold: Poverty threshold * (1 – expenditure to income ratio) Formula: $\frac{\text{Monthly Residual Income}}{\text{Non-Housing Poverty Threshold}}$	- Assumption: The expenditure-to-income ratio is considered to represent the housing weight at the standard poverty threshold.	Statistics Estonia, (2026c), (2021), (2026e)

Source: Author's own compilation based on the reviewed literature

As shown in Table 9, to better examine income-based approaches to housing affordability in Estonia and to better analyze the living conditions of individuals, the residual income-to-threshold will be used in the methodology.

To find the residual income-to-threshold, the monthly residual income data described in Table 8 will be ratioed to the non-housing poverty threshold data. The purpose of this measurement is to understand whether a person's residual income falls below the non-housing poverty threshold and, in this way, how well the person's residual income covers their non-housing basic expenses (non-housing poverty threshold).

This ratio incorporates certain assumptions to ensure internal consistency. The standard poverty threshold is calculated to include all basic living costs, including housing. Since residual income represents the income remaining after deducting housing expenses, a direct comparison of these two indicators would result in housing costs being factored in twice. Therefore, to subtract housing-related expenses from the poverty threshold, the expenditure-to-income ratio used in Table 5 will be employed. That is, expenditure to income ratio will be subtracted from 1 for each year to find the non-housing ratio, which will then be multiplied by the poverty threshold (Statistics Estonia, 2026c). This simplifies the comparison and is assumed to ensure internal consistency.

According to the residual income vs non-housing poverty threshold perspective developed by Kutty (2005), the methodology makes a mathematical inference; housing affordability is operationalized through a ratio that divides a household's residual income by the non-housing poverty threshold. Based on this framework, a ratio of less than 1 indicates that the residual income remaining after housing expenses falls below the poverty threshold, meaning the household cannot meet its basic non-housing needs. Conversely, a ratio of 1 and above demonstrates that the residual income exceeds or meets the poverty threshold, classifying the household as secure (Kutty, 2005). The dataset covers the period from 2020 to 2024.

In summary, the methodology of this thesis employs a quantitative research design based on secondary data to map housing affordability in Estonia in detail. The study combines traditional ratio-based measures (expenditure-to-income and price-to-income ratios) with residual income approaches that focus on household welfare, offering a multi-layered analysis that reveals the national, regional, occupational, and gender-based dimensions of the problem.

2.2. Empirical findings and discussion of housing affordability in Estonia

The empirical analysis subsection evaluates the results of four measurement methods applied to housing affordability in Estonia across 20 different occupational groups, 2 gender groups, and 15 different regions. Changes in each of the four measurement methods were examined over five different time periods. Data applied for calculation of housing affordability metrics in Estonia, given in Appendix (A), were used to perform the measurements. This data was analyzed using MS Excel as described in the methodology, as shown in Appendix (B).

This subsection analyzes housing affordability in Estonia across 20 different occupational groups and genders. The analysis uses two key indicators to reveal the pressure on household budgets and housing affordability. The 22 groups are evaluated using two distinct metrics: while the expenditure to income ratio reveals which groups face short-term, monthly budgetary pressures in renting and paying bills, the price to income ratio highlights those experiencing long-term limitations when trying to purchase property. This study evaluates the sectoral and gender-based housing affordability situation in Estonia and analyzes the housing affordability of these groups according to these two methods.

Figure 3. Stacked bars for expenditure-to-income and price-to-income ratios of 2021 based on occupational group and gender

Source: Compiled by the author

Figure 3 expenditure to income ratio shows a deep inequality in monthly housing expenses among different occupations. While the total expenditure to income ratio in Estonia is 32%, sectors like accommodation and food service (55%) and real estate activities (47%) clearly exceed the 30% danger limit set by JCHS (2025), indicating severe financial stress. In contrast, high-value sectors like information and communication (ICT) (18%) and finance

(19%) can comfortably cover their housing needs without straining their monthly budgets. Beyond monthly financial stress, long-term affordability to the housing market is also in a severe crisis (Figure 3, price to income ratio). According to the Cox (2024) classification, Estonia's total price to income ratio (6.4) falls into the “severely unaffordable” category. The sectors with the heaviest monthly burden, accommodation and food sector (10.6) and real estate (11.2), cross the critical 9.0 threshold, making homeownership mathematically “impossibly unaffordable” for them. Meanwhile, the ICT sector (3.5) remains one of the few groups that can still afford to enter the property market.

When different measurement methods are evaluated together, it becomes clear how relying only on the traditional 30% rule can hide the true scale of the crisis. For example, if the focus is placed only on expenditure to income ratio for human health and social work activities (28%) and professional and scientific activities (27%), one might mistakenly conclude that these groups are in the affordable zone and experience no housing stress. However, when examining their PIR (5.7 and 5.3), it becomes clear that entering the housing market is actually “severely unaffordable” for these professionals. This situation shows demonstrates the difficulty of acquiring property in the housing market.

This structural mismatch creates a kind of trap for the middle class. Those working in essential jobs, such as healthcare workers and educators (facing a burden of 28% and 34% respectively, and an income-to-price ratio of 5.7), are forced to remain indefinitely in the rental housing market because they cannot afford the high costs of buying a home. As a result, they cannot begin acquiring property through homeownership, leaving them permanently vulnerable to future rent increases.

Furthermore, the data reveals a clear gender inequality in housing affordability. Looking at national averages by gender, women spend 35% of their income on housing, well above the 30% threshold, while men fall just below at 29%. This inequality is even more pronounced in the real estate market. With a price-to-income ratio of 6.9 for women and 6.0 for men, women have to work almost a year longer to afford the same average-priced home. This situation underscores that the housing crisis in Estonia is not just a matter concerning the working class, but also a significant issue of gender inequality.

Figure 4. Stacked bars for expenditure to income and price to income ratios of 2022 based on occupational group and gender

Source: Compiled by the author

Figure 4, which shows the expenditure-to-income ratio for 2022, reveals that monthly housing expenditures continue to put pressure on household budgets. In vulnerable sectors such as accommodation and food (63%) and real estate (58%), the monthly cost burden remained well above the 30% danger threshold. Another finding that proves the impact is truly significant is that in 2021, eight groups had expenditure-to-income ratios below 30%

(Figure 3), but in 2022, this number dropped to three, meaning only three groups were not experiencing housing cost burden. This sharp decline is a significant indicator of the impact of the 2022 inflation crisis on housing affordability. For example, essential workers in human health and social work, who were in the safe zone at 28% in 2021, were aggressively pushed to 35% in 2022, officially crossing into the cost-burdened area. This situation indicates that the economic crisis that began in 2022 transformed the daily livelihood stress of lower and middle-income groups into a chronic housing problem. The real turning point for 2022 is the sharp rise in the Average price-to-income ratio from 6.4 to 7.4 in just one year. For the lowest income groups in the real estate (12.8) and accommodation and food service activities (11.0) sectors, homeownership is now classified as “impossible”. The effects of the crisis have impacted such a broad base that even high-income sectors like Information and Communication Technologies (ICT) have reached the brink of being classified as 'seriously unaffordable' (rising from 3.5 to 3.9) due to the economic crisis.

When the two figures are considered together, it is clear that 2022 was an economically challenging year. In 2022, compared to 2021, the housing crisis transformed from an individual problem for certain professions into a national issue. While in 2021, those experiencing difficulties in the housing market were limited to certain service sectors, the inflation shock in 2022 caused housing problems for upper-class professionals. Furthermore, the demographic dimension of this shock is very important. The average time it takes for women to acquire property jumped from 6.9 to 7.9 years in one year, demonstrating the shift in gender-based property inequality during times of crisis. In addition to this long-term obstacle, women's monthly housing burden rose very rapidly to 43%. This situation, coupled with the 2022 economic shock, made homeownership even more unattainable for women, while also severely negatively impacting their budgets, leaving them with much less money for other life needs compared to men.

Figure 5. Stacked bars for expenditure-to-income and price-to-income ratios of 2023 based on occupational group and gender

Source: Compiled by the author

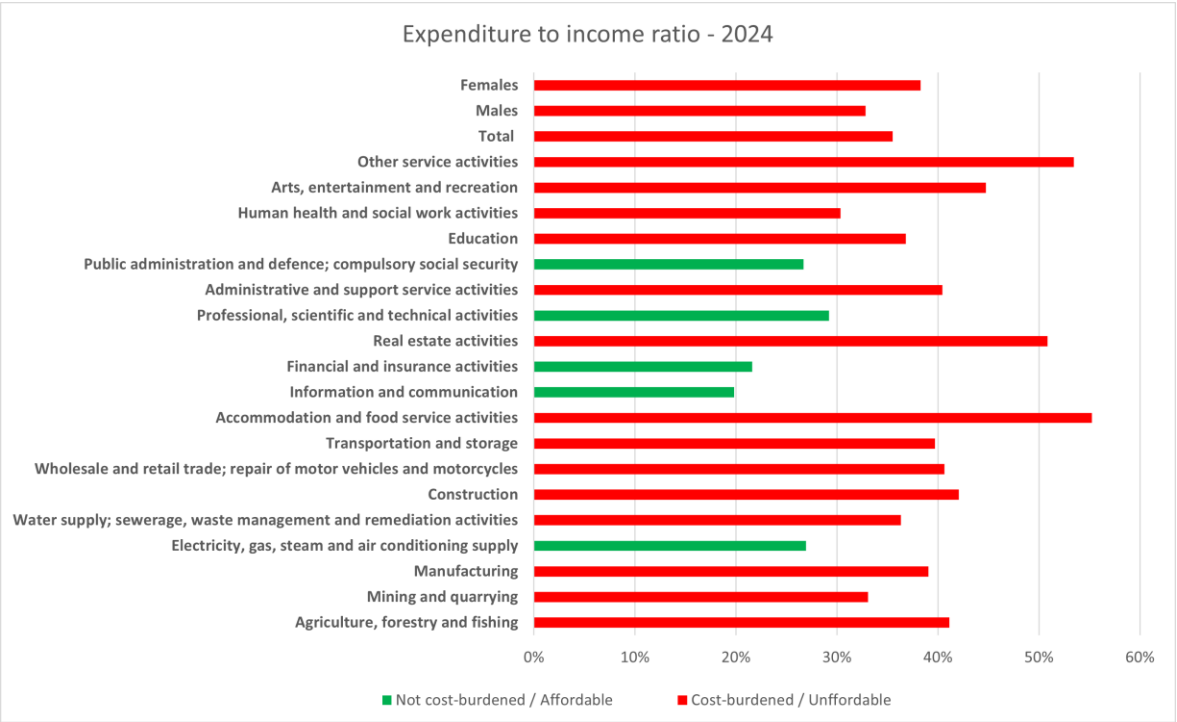
Data from 2023 shows partial changes in the Estonian housing market. According to Figure 5, while there is a partial improvement in the total (average) price-to-income ratio from 7.4 to 6.8, the market has not yet returned to its relatively more affordable levels of 2021 (6.4). For example, while the accommodation and food sector's rate of home ownership (PIR) fell below double digits (from 11.0 to 9.9), the real estate sector still faces high PIR of

11.9. Even the most advantaged group, the information and communication technology (ICT) sector, is at 3.6, indicating that the long-term barrier to home ownership remains largely intact for some groups. However, the truly dangerous situation is evident in the expenditure-to-income ratio.

Despite the relative decline in the price-to-income ratio for 2023, the average monthly expenditure to income ratio has increased from 32% in 2021 to 37%, a decrease of only 2 percentage points from the 39% peak in 2022. So, it's still significantly higher than the 32% threshold from 2021. To better understand this, among all the groups analyzed, only four sectors (e.g., ICT at 20% and public administration at 28%) managed to bring their monthly housing and housing-related costs below the 30% safety threshold. The majority of other occupational groups are still experiencing expenditure problems above the threshold. Accommodation and food (57%) and real estate (53%) sectors allocate more than half of their income to housing.

Furthermore, the housing burden for women and men remained structurally unequal, just as it had been in the previous two years. Women faced higher rates than both men and the national average in all figures. Specifically, women spent 40% of their monthly income on housing, while this figure was 34% for men. Gender inequality also persisted in terms of purchasing real estate. Women needed 7.2 years of their total income to buy a house, while men needed 6.4 years.

In summary, although the market slowdown in 2023 showed a decrease in both ratios (expenditure-to-income and price-to-income), the negative situation regarding housing affordability did not end. The vast majority of occupational groups are still stuck well above the thresholds. This indicates that instead of returning 2021, this shows that housing affordability in Estonia has normalized in a negative direction; even though there is a decrease in both rates, they are still higher than in 2021, so the new normal prices in Estonia are actually high.



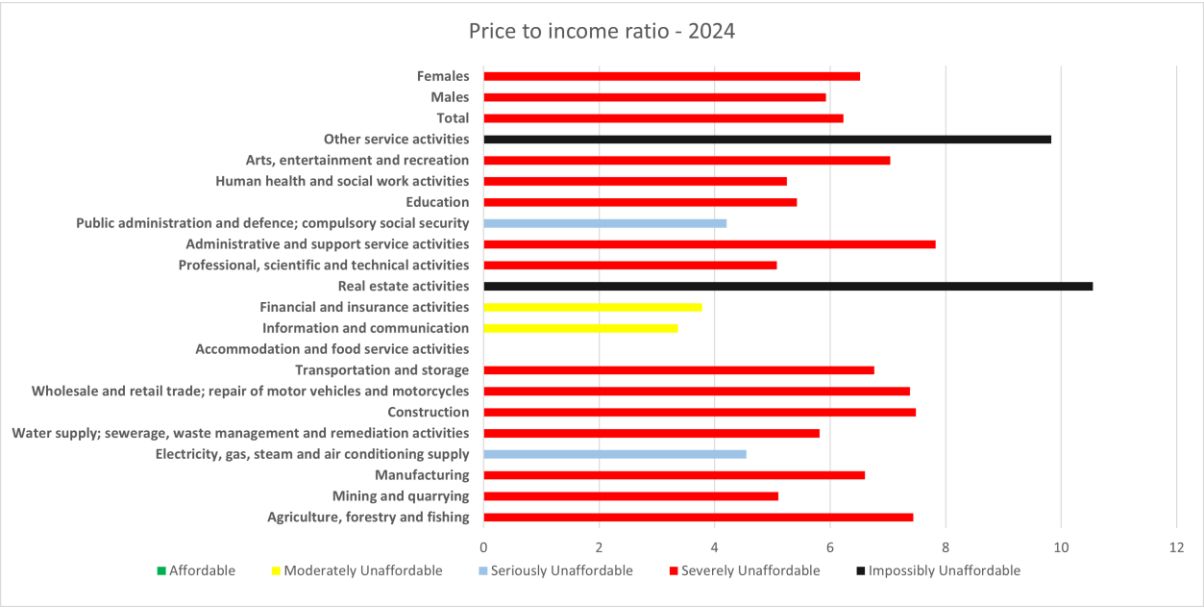


Figure 6. Stacked bars for expenditure-to-income and price-to-income ratios of 2024 based on occupational group and gender

Source: Compiled by the author

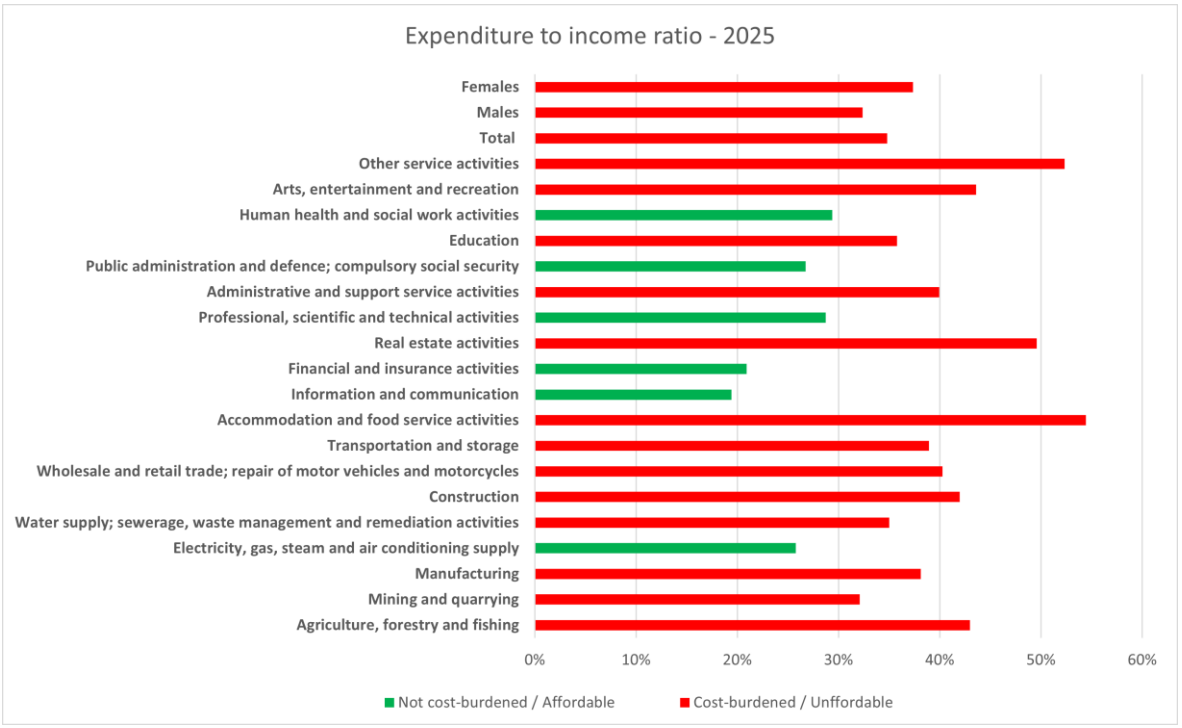
As shown in Figure 6, a careful examination of the 2024 data reveals a significant downward trend in both indicators after the peaks seen in 2023 and 2022. The total price-to-income ratio decreased from 6.8 to 6.2, falling even below the 2021 level (6.4), indicating relatively easier afford to the market. This indicates that the obstacles to buying real estate have improved to some extent. Accommodation and food sectors, bearing the heaviest burden, saw their value drop from 9.9 to the 9.0 mark, while the real Estate sector fell from

11.9 to 10.5. There is a clear improvement in the affordability of homes for those working in essential sectors such as education (5.4) and human health (5.3) for 2024 compared to 2021. However, it is still not classified as affordable.

However, this improvement in the price-to-income ratio was not reflected at the same rate in monthly rent and living costs. Although the average monthly expenditure burden decreased from 37% to 35%, it is still above the 30% threshold and this is higher than the 32% base level in 2021. This indicates that while there has been an improvement in home sale prices, daily housing expenses such as rent and utility bills have remained consistently elevated. Other service sectors activities, accommodation and food service activities and real estate activities continue to allocate more than half of their income (53%, 55% and %51) to housing. As a positive development, several sectors began to fall below or reach the threshold in 2024. For example, human health workers fell exactly to the 30% mark, and professional activities dropped to 29%.

In addition, demographic data for 2024 shows that the expenditure-to-income ratio remained unfavorable for women; their expenditure burden (38%) exceeded that of men (33%). Furthermore, women were at a disadvantage in terms of the time it takes to acquire property; a disadvantage of 6.5 years compared to 5.9 years. Although both genders have experienced some relief compared to the peak in 2022, gender inequality is clearly visible in both the expenditure-to-income and PIR indices.

In summary, while home prices in 2024 became gradually more affordable compared to 2022 and 2023, monthly housing costs remain a persistent burden on household budgets. The crisis has essentially shifted from a problem of acquiring property to a problem of sustaining daily living expenses.



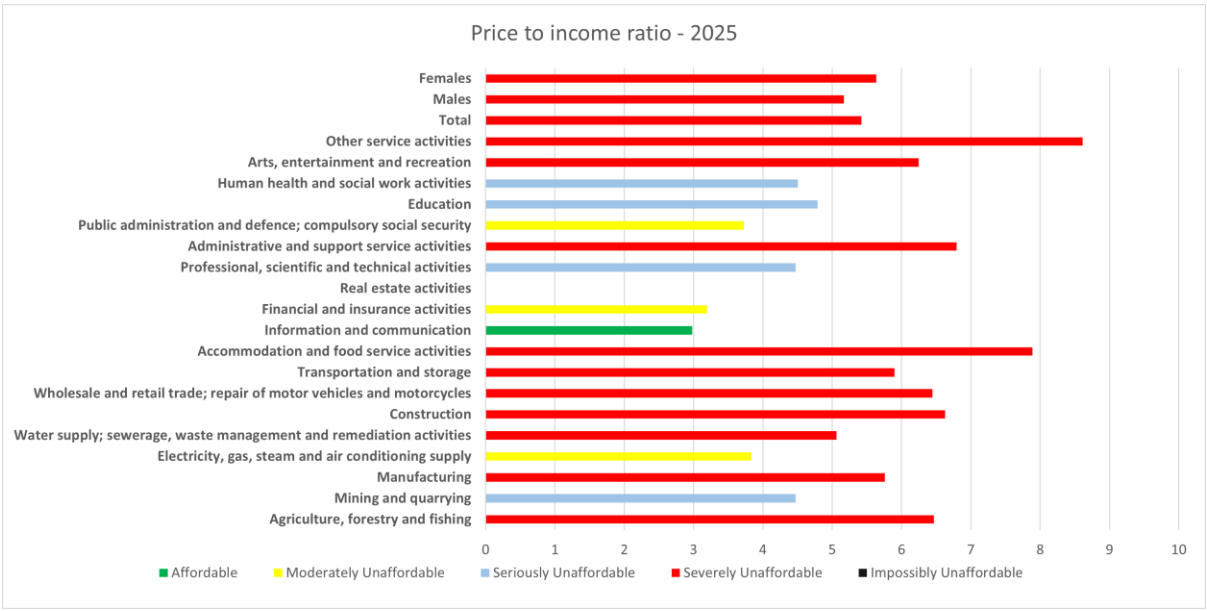


Figure 7. Stacked bars for expenditure-to-income and price-to-income ratios of 2025 based on occupational group and gender

Source: Compiled by the author

As shown in Figure 7, the data for 2025, the end of the five-year analysis period, indicates a transformation in the Estonian housing market. Figure 7 shows that the total (average) price to income ratio has fallen to 5.4, reaching its most affordable point in the last five years. Even the most disadvantaged groups, such as accommodation and food (7.9), other service activities (8.6) and real estate (8.9), have managed to fall below the "impossibility" threshold of 9.0. Despite the relative easing of the price-to-income ratio, the

Expenditure-to-Income Ratio in Figure 7 shows that the crisis has not actually ended but has only changed form. The average expenditure burden has solidified around 35%. It has not returned to pre-inflation shock baseline of 2021 (32%). Moreover, demographic inequality, which began in 2021 and has remained unchanged since then, still persists. The housing burden for men (32%) is lower than that of women (37%). Ultimately, while buying a home in Estonia in 2025 may be theoretically appear more affordable than even before the inflation surge, the pressure of monthly rent/utility costs created by high inflation is causing persistent housing stress for the population, according to the expenditure-to-income ratio.

When the expenditure-to-income and price-to-income indicators of the Estonian housing market for the period 2021-2025 are examined together, it is determined that the economic strain has not only deepened but also changed its structure. At the beginning of the five-year period (2021-2022), the main problem was the affordability of the property market due to high house prices. At the end of the period (2024-2025), houses became relatively affordable in the property market (5.4). The real primary burden shifted to the expenditure-to-income ratio (35%) triggered by high inflation. The shift has transformed into a situation that makes daily life difficult for households, creating financial stress, especially for specific groups such as service sector, accommodation, food sector and real estate workers. Because they are forced to spend more of their income on housing-related costs compared to 2021, these groups have become even more insecure and stressed. Ultimately, although improvements in the price-to-income ratio are observed over a five-year period following economic shocks, the expenditure-to-income ratio, which relates to the cost of living, clearly demonstrates empirically that a large portion of household income is now directly consumed by housing-based expenses.

This finding is consistent Yates (2007) who demonstrates that housing stress and financial stress are interconnected and shaped by socioeconomic conditions. Looking at the findings, the economic strain did not disappear, it merely changed form. Furthermore, as Nagarjun and Sridhar (2023) demonstrated in the context of COVID-19, external shocks do not simply raise and then lower prices. That is, they continuously affect pricing even long after the initial shock. This is essentially what the 2022 inflation surge did for Estonian households, as seen in the findings. In line with this, as Crowe and Rowley (2024) argue, because transportation costs incurred by households are not fully included in standard housing calculations due to data limitations, the observed 35% expenditure-to-income ratio likely underestimates the actual financial pressure.

In the second part of the empirical analysis, the affordability of housing across 15 regions of Estonia is examined. The median property prices of these 15 different regions and the median income of the population in those areas are used to calculate the price-to-income ratio, which is then mapped across Estonia.

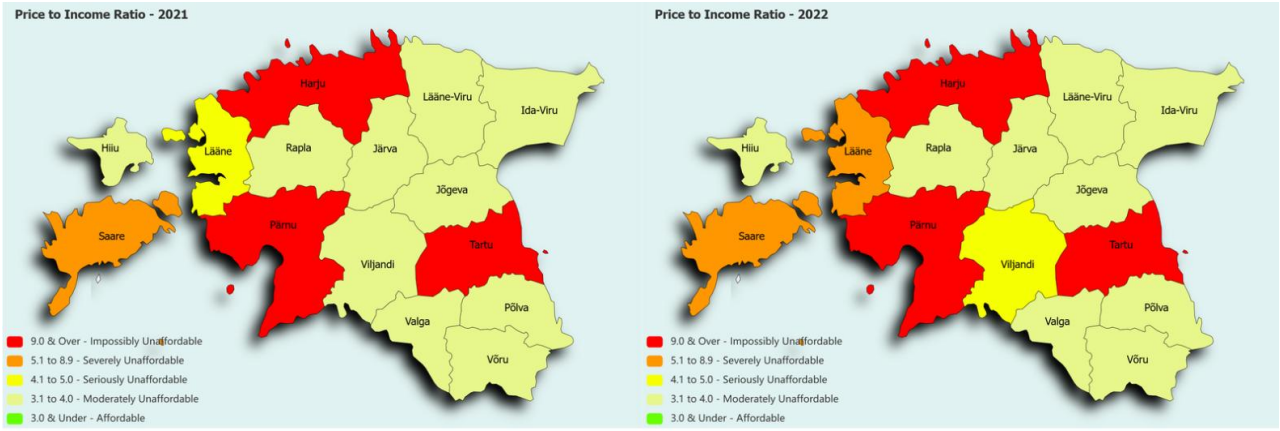


Figure 8. Mapping of price to income ratio on counties for 2021 and 2022
Source: Compiled by the author

Figure 8 shows that regional data for the 2021-2022 period, reveals that the gap in the Estonian housing market between the country's economic centers and what we might call rural areas, or regions with less economic activity, widened with the shock of 2022. The significant increase in the price-to-income ratio in the economic centers of Harju (7.4 to 8.5) and Tartu (6.5 to 7.3) has made these centers “seriously unaffordable,” turning property ownership into a luxury. On the other hand, the fact that ratios remained very low (around 1.2) in areas like Valga and Ida-Viru might be mistakenly seen as a success in purchasing power; rather, it's more accurate to view it as a result of outward migration and insufficient employment. In conclusion, this period presents a situation that forces the Estonian population to either face a housing crisis (Harju/Tartu) in search of job opportunities or to migrate to rural areas with fewer job opportunities and less development in search of cheaper housing.

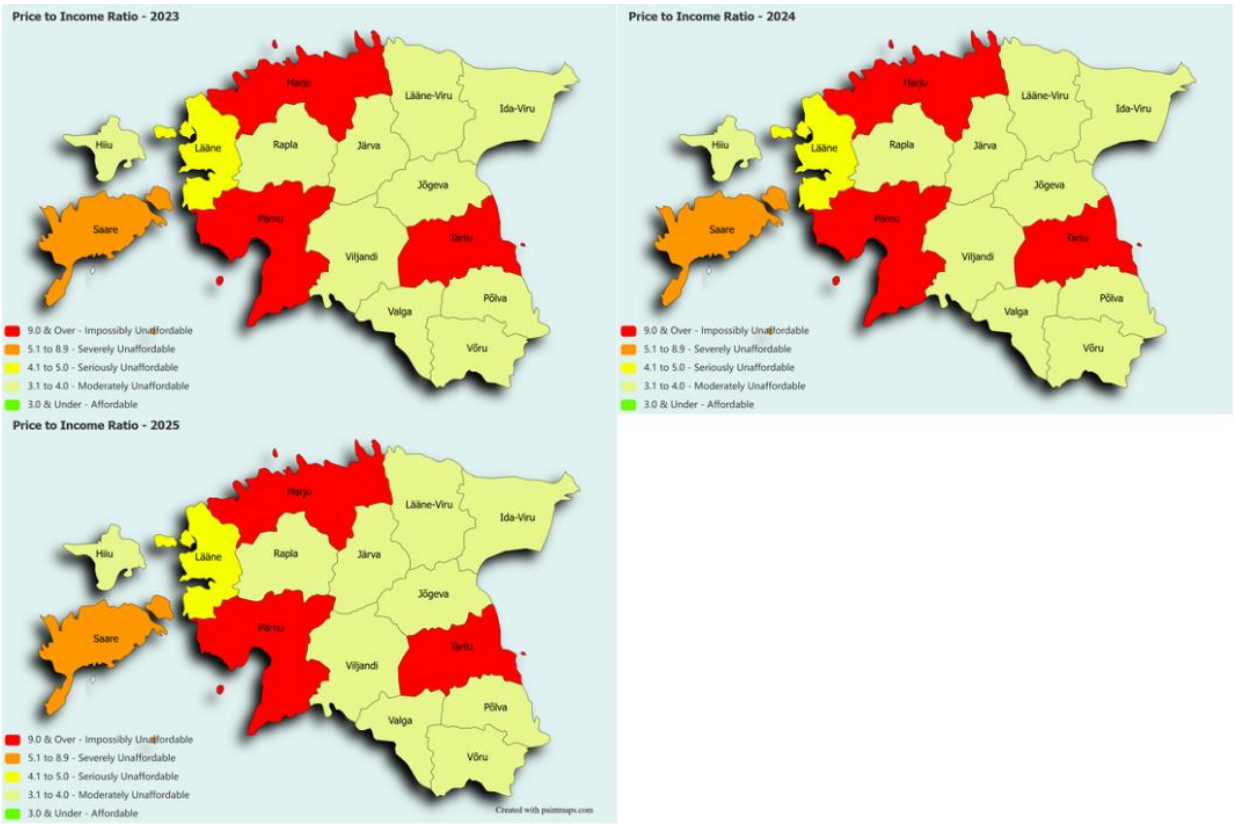


Figure 9. Mapping of price to income ratio on counties for 2023 - 2025

Source: Compiled by the author

As shown in Figure 9, regional data for the 2023-2024 period, when compared with the inflationary situation in 2021-2022, indicate that the Estonian housing market has entered a phase of relative recovery from the economic shock. However, it shows that regional disparities have persisted. Price-to-Income Ratios, which peaked in 2022 in economic powerhouses such as Harju (8.5) and Tartu (7.3), declined to 7.2 and 6.5 respectively in line with the cooling trend in prices during the 2023-2024 transition. However, this improvement has not been able to close the deep disparity between the countryside and the center seen in the data 2021-2022. The ratios in the metropolitan regions are still firmly above the national average. The fact that purchasing power has improved, but the demographic and economic stagnation in these regions should not be ignored, even though purchasing power has fallen below 2022 levels in surrounding areas such as Ida-Viru (1.10) and Valga (1.22). In short, although the severe crisis environment of 2022 may weaken slightly in the 2023-2024 period, the spatial housing purchasing problem has become more persistent.

Following economic stabilization period, the 2025 data shows that regional differences have reached extreme levels. In economic centers such as Harju (6.9) and Tartu

(6.1), the Price-Income Ratio has fallen to levels lower than in 2021. However, the most striking finding of the 2025 outlook is the difference with other regions. In the Ida-Viru region, its value has fallen even below the 1.0 threshold (0.99), showing that the median price of a house has become even cheaper than the median annual income. While this situation may be considered affordable, or perhaps even very affordable, in terms of definition, it should be approached with skepticism. This is because the lack of investment in such regions and the migration of the young population to economically more vibrant regions lead to a decrease in prices in the regional housing market. This difference in Estonia's geographical landscape is an empirical reflection of the “circular causation mechanism” as defined by Krugman (1991) in his New Economic Geography literature. In other words, economically and industrially developed regions, i.e., central areas, become a center of attraction while harming the demographic and economic demand of the surrounding regions.

When five years of spatial data from Estonia (2021-2025) are evaluated holistically, one of the main claims of this study the inadequacy of individual measurements regarding home affordability is proven at the geographical level. Although the average price-to-income value in Estonia in 2025 is at a relatively good level of 5.4, the data shows that this average is a misconception that does not reflect reality. This is because the rates are above average in Tartu, and Harju, which can be classified as relatively densely populated and immigration-receiving regions. In rural and sparsely populated areas, the rates are below average. This is the biggest indicator that a misconception about home affordability can occur if detailed analyses are not carried out.

These results provide an example of the “center-periphery” model described by Krugman (1991). On one hand, there are regions where everyone migrates to live and work, leading to increased house prices (Harju/Tartu). On the other hand, there are regions where house prices fall due to economic and demographic barriers (Ida-Viru/Valga). This difference, in addition to interest rates or external economic factors, is also influenced by demographic and economic disparities between rural and urban areas, contributing to housing affordability problems in Estonia. Policymakers should consider these differences when developing solutions. Furthermore, this spatial differentiation directly supports Whitehead’s (1991) view that national-level data is often insufficient to reveal critical regional differences in housing needs and affordability. The Estonian example demonstrates this precisely. While the national average of 5.4 obscures the serious problems faced by households in Harju and Tartu regarding housing affordability, households in Ida-Viru face a completely different

problem of demographic decline (Statistics Estonia, 2024). As can be understood from the data above, housing affordability is not a rigid, uniform construct; it is by nature a regional phenomenon shaped by location and local economic conditions, and the spatial mapping carried out in this thesis provides concrete empirical evidence for this claim in the Estonian context.

In the final analysis section of the empirical chapter, residual income (Appendix B), which is the money individuals have left after deducting household expenses (Appendix A) from disposable income (Appendix A), will be examined. Simultaneously, to improve the perspective, residual income will be ratioed to the non-housing poverty threshold. This will allow for a more detailed examination of the relationship between individuals' disposable incomes after deducting household expenses and the threshold value. The dataset covers the period between 2020 and 2024, allowing for observation of the effects of the pandemic and inflation.

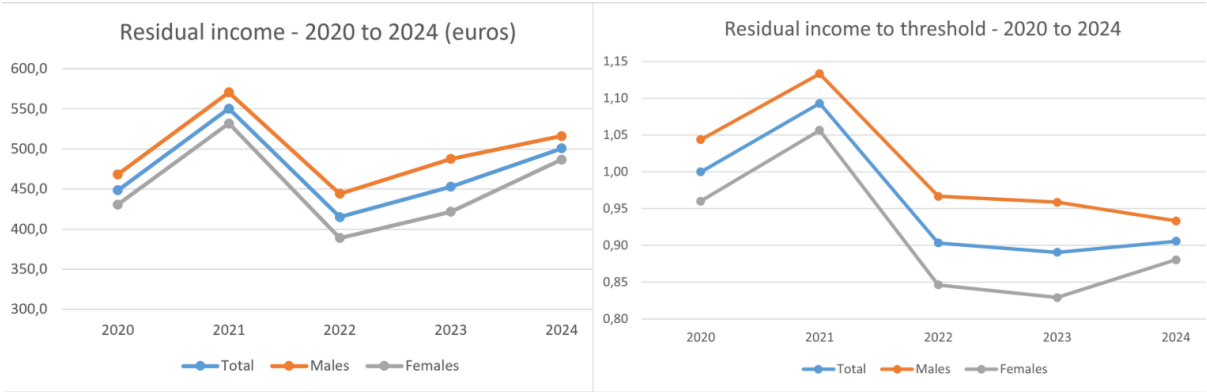


Figure 10. Graphs of residual income and residual income to threshold 2020 to 2024
Source: Compiled by the author

As shown in Figure 10, cross-analysis of residual income and non-housing poverty threshold data in Estonia broadens the perspective on housing affordability. Following the inflation shock of 2022, the amount of residual income in euros held by households exceeded pre-economic shock levels in both 2023 and 2024. At first glance, this suggests an economic recovery. However, when this residual income is compared to the rapidly rising non-housing poverty threshold, the data shows the opposite: residual income to threshold for all demographic groups fell below 1.0 in 2022, meaning that residual income was no longer sufficient to cover basic non-housing needs (Kutty, 2005), and it remained below 1.0 until 2024 despite the increase in residual income. This contrast demonstrates that one of the major causes of the crisis was related to housing. Residual income represents the money remaining

for the household after housing expenses (rent and housing-related costs) are paid. Residual income to threshold below 1.0 indicates that excessive and rigid costs in the housing market are severely damaging household budgets. It shows that individuals are spending a large portion of their income just to afford housing, leaving them below the threshold and pushing them into poverty.

This situation, described in the literature as "shelter poverty" by Stone (2006) and consistent with Kutty's (2005) emphasis on "housing-induced poverty", also shows a significant gender inequality, particularly with women ranking at the bottom of the graph. This empirical finding aligns with the "feminization of poverty" framework (Pearce, 1989), demonstrating how structural labor market disadvantages leave women disproportionately vulnerable to inelastic housing costs, a dynamic that purely income-based metrics often mask (Chant, 2006). In short, instead of looking only at euro-based residual income or considering a single measure, using a different ratio allows for a better understanding of the living and housing affordability problems experienced by individuals. The housing crisis in Estonia is no longer just about "not being able to buy a house," but about the high housing costs, which could lead to permanent housing-induced poverty if no action is taken.

The results of this study are consistent with previous research on housing affordability. Ben-Shahar and Warszawski (2016) studied Israel between 1992 and 2011 and found that housing affordability is not the same for every group. Their research showed that female-headed households and workers in low-wage industries always face higher price to income ratios. This same pattern is visible in the Estonian data. In Estonia, workers in accommodation and food services, as well as women, were the most problematic groups based on housing affordability throughout the entire five-year period analyzed. Furthermore, the analysis is consistent with the findings of Dewilde and Lancee (2013), who demonstrate that income inequality restricts housing affordability in ways that vary significantly across local contexts. While Estonia has projected a national average price-to-income ratio of 5.4 in 2025, this singular metric masks a serious affordability crisis in major economic centers such as Harju and Tartu. In contrast, the remarkably low ratio of 0.99 observed in the Ida-Viru region presents a misleading picture. This regional divide is strongly supported by the recent report by Kährik et al. (2025). Their assessment of the Estonian market noted a sharp decline in the supply of affordable housing in the urban centers of Tallinn, Tartu, and Pärnu between 2015 and 2023. At the same time, there was a visible increase in affordability in some areas such as Ida-viru. However, as the current study also confirms, the apparent affordability in

Ida-Viru reflects demographic decline and industrial contraction rather than real improvements in housing affordability.

Conclusion

This thesis aimed to evaluate housing affordability in Estonia, focusing on regional, occupational and gender differences. To achieve this aim, the study adopted a quantitative research design based on secondary data and used four measurement methods: expenditure-to-income ratio, price-to-income ratio, residual income approach, and residual income-to-threshold ratio. Data were obtained from the Statistics Estonia and the Estonian Land and Spatial Development Board, covering the period 2021-2025 for ratio-based measurements and 2020-2024 for residual income approaches.

The theoretical section of this thesis reveals that there is no single universally accepted definition of housing affordability. From Hulchanski's (1995) critique of rigid rate rules to Stone's (2006) residual income approach, from Yates' (2007) financial stress framework to Crowe and Rowley's (2024) argument for including energy and transportation costs, the literature demonstrates a transformation of the concept from a simple calculation method to a multidimensional concept of well-being. The three measurement categories discussed in the theoretical section ratio based, residual income based, and subjective approaches. each reveal a different aspect of housing pressure, demonstrating that none alone can fully reflect the problem. The empirical findings of this thesis directly support this theoretical argument.

The expenditure-to-income ratio analysis reveals a deep inequality in monthly housing expenses among different occupational and gender group. While the national average was 32% in 2021, eight occupational groups remained below the 30% threshold. This number dropped to three with the 2022 inflation shock, indicating that the crisis transformed from an individual sectoral problem into a national one. Although a partial recovery was observed in 2024 and 2025, the average spending burden stabilized around 35% and did not return to pre-pre-shock levels. Despite some improvements accommodation and food service activities, as well as the real estate sector, continued to allocate more than half of their income to housing expenses throughout the five-year period. Furthermore, the housing expenditure burden experienced by women was consistently higher than that experienced by men throughout the five-year period. This concretely demonstrates that women and the accommodation and food service activities, other service activities and real estate sectors experienced more pressure

than other groups in the measurement results used, and that this pressure would be invisible if only national analyses were conducted.

Price-to-income ratio analysis reveals that monthly financial stress and long-term market affordability constitute two distinct dimensions of housing affordability. The national average price-to-income ratio rose to 7.4 in 2022, but declined to 5.4 in 2025, the most affordable point in the five-year period. However, this improvement masks occupational inequalities. Accommodation and food service, as well as the real estate sector, exceeded the 9.0 threshold during the economic shock years and were classified as “impossibly unaffordable.” Even more critical is the fact that some groups that appear affordable according to the expenditure-to-income ratio fall into the severely unaffordable category according to the price-to-income ratio. In addition, as seen in the expenditure-to-income ratio over the 5-year period, women are also at a disadvantage compared to men in the price-to-income ratio. This situation concretely demonstrates that relying on a single indicator and solely national assessments can obscure the true extent of the crisis and the problems faced by groups that are truly experiencing pressure and hardship.

The latest regional analysis of the price-to-income ratio, mapping the regional ratios across fifteen Estonian counties, shows that the national average is far from reflecting regional differences in housing conditions. Economic centers such as Harju and Tartu recorded ratios above the national average throughout the period, reaching 8.5 in Harju in 2022. In contrast, Ida-Viru showed a decline to 0.99 in 2025, indicating that the median house price fell below the median annual income. However, the low prices in these regions are not a reflection of true affordability; rather, they reflect demographic stagnation and migration waves resulting from a lack of economic opportunities. This situation in Estonia points to a deepening economic and demographic shift between the center and the periphery, revealing that national-level policies and measurements are failing to meet regional realities.

The residual income analysis and the residual income-to-threshold ratio now provide the most direct evidence of housing-induced poverty in Estonia. Although residual income increased in euro terms following the 2022 shock, the residual income-to-threshold ratio fell below 1.0 for all demographic groups in 2022 and remained below this level until 2024. This finding indicates that housing expenses pushed household budgets to a point where remaining income was insufficient to meet basic non-housing needs. Women consistently showed lower rates throughout this period, revealing that gender-based inequality in housing affordability persists in daily economic life.

When all four measurement methods are considered together, the findings demonstrate that studies on housing affordability in Estonia cannot be understood with a single indicator. The crisis has undergone a structural transformation over the five-year period. In the 2021-2022 period, the main problem was the difficulty in affordability the market due to rapidly rising housing prices. By 2024-2025, housing prices had become relatively affordable; however, the monthly cost burden remained fixed above economic strain base values and continued to put pressure on household budgets. A single-measurement approach would have prevented this structural transformation from being seen.

By applying four different methods, the problems related to housing affordability in Estonia during the years under consideration were examined outside of single-dimensional and national measurements, revealing how different groups and regions are distinctively affected. Consequently, policymakers need to move beyond single-threshold approaches and adopt multidimensional measurement frameworks that consider occupational and regional differences. Targeted interventions are essential for the most vulnerable occupational and gender groups, such as women and those in the service sector. Regional housing policy should not be limited to practices in Harju and Tartu; it should also include economic development incentives aimed at preventing demographic decline in surrounding provinces.

This thesis has several limitations. First, the 55 square meter apartment standard used in price-income ratio calculations represents the official national average size for apartments in Estonia over five years. However, it may not reflect the needs of larger households. Second, due to data limitations, the total national annual housing expenditure was divided by the total number of households to derive a representative monthly baseline. Finally, the absence of qualitative or subjective data has resulted in the failure to capture the psychological, social, and emotional dimensions of housing stress in this quantitative analysis.

Future research could address and improve upon these shortcomings by integrating subjective data with quantitative indicators, expanding the analysis to a Baltic comparative framework encompassing Latvia and Lithuania, and examining the impacts of policy interventions such as housing subsidies or rent controls on different occupational, gender, and regional groups. Furthermore, future studies should investigate the impact of credit availability and fluctuating mortgage interest rates on home affordability, which represents another significant dimension of financial pressure on households.

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APPENDICES

Appendix A.

Data applied for calculation of housing affordability metrics in Estonia

Table A1

Household numbers in Estonia (2020-2025)

2020	2021	2022	2023	2024	2025
626.000	626.500	632.400	643.500	655.500	651.300

Source: Statistics Estonia (2025)

Table A2

Annual total housing expenditure in Estonia in euros (2020–2025)

2020	2021	2022	2023	2024	2025
2.999.000.000	3.390.600.000	4.575.300.000	4.972.800.000	5.288.700.000	5.469.100.000

Source: Statistics Estonia (2026a)

Table A3

Average monthly gross wage by occupation and gender in Estonia in euros (2021–2025)

Occupations or gender / Year	2021	2022	2023	2024	2025
Agriculture, forestry and fishing	1192	1331	1437	1634	1628
Mining and quarrying	1619	1681	1876	2032	2179
Manufacturing	1315	1416	1581	1721	1836
Electricity, gas, steam and air conditioning supply	1831	2131	2435	2496	2714
Water supply; sewerage, waste management and remediation activities	1438	1489	1631	1850	1998
Construction	1234	1333	1479	1598	1667
Wholesale and retail trade; repair of motor vehicles and motorcycles	1269	1390	1560	1654	1738
Transportation and storage	1278	1412	1576	1694	1797
Accommodation and food service activities	817	959	1124	1217	1285
Information and communication	2549	2840	3160	3393	3605
Financial and insurance activities	2434	2636	2952	3114	3344
Real estate activities	951	1047	1209	1322	1411
Professional, scientific and technical activities	1690	1886	2131	2301	2436
Administrative and support service activities	1192	1351	1525	1663	1752
Public administration and defence; compulsory social security	1807	1984	2326	2517	2615
Education	1329	1394	1671	1827	1955
Human health and social work activities	1605	1737	1899	2216	2382
Arts, entertainment and recreation	1115	1220	1409	1503	1605
Other service activities	919	1012	1142	1258	1337
Total Activities	1406	1536	1741	1894	2011
Males	1540	1683	1894	2047	2160
Females	1283	1398	1598	1756	1874

Source: Statistics Estonia (2026b)

Table A4

Mean monthly disposable income in Estonia per households' member in euros (2020-2024)

Gender / Years	**2020**	**2021**	**2022**	**2023**	**2024**
Total	847,7	1001,3	1018,0	1096,9	1173,1
Males	867,4	1021,6	1047,1	1131,5	1188,4
Females	829,9	982,9	991,8	1065,6	1159,2

Source: Statistics Estonia (2026e)

Table A5

Median monthly gross wage by occupation and gender in Estonia in euros (2021-2025)

Occupations or gender / Year	**2021**	**2022**	**2023**	**2024**	**2025**
Agriculture, forestry and fishing	1001	1078	1200	1300	1382
Mining and quarrying	1459	1500	1724	1896	2000
Manufacturing	1118	1194	1342	1465	1552
Electricity, gas, steam and air conditioning supply	1588	1821	2066	2125	2331
Water supply; sewerage, waste management and remediation activities	1290	1317	1488	1662	1766
Construction	1033	1100	1215	1292	1349
Wholesale and retail trade; repair of motor vehicles and motorcycles	1000	1089	1222	1310	1387
Transportation and storage	1080	1167	1318	1430	1516
Accommodation and food service activities	704	837	984	1077	1133
Information and communication	2100	2350	2661	2873	3000
Financial and insurance activities	2000	2127	2395	2555	2800
Real estate activities	665	720	813	917	1000
Professional, scientific and technical activities	1395	1520	1749	1905	2000
Administrative and support service activities	921	1014	1143	1236	1316
Public administration and defence; compulsory social security	1612	1789	2100	2300	2400
Education	1312	1341	1637	1782	1867
Human health and social work activities	1310	1415	1562	1841	1985
Arts, entertainment and recreation	996	1083	1280	1374	1431
Other service activities	700	779	892	984	1038
Total Activities	1158	1240	1424	1553	1649
Males	1230	1320	1504	1632	1729
Females	1081	1168	1348	1483	1586

Source: Source: Statistics Estonia (2026b)

Table A6

Median house price per m2 by counties in Estonia in euros (2021-2025)

House Price	**2021**	**2022**	**2023**	**2024**	**2025**
Harju maakond	2103,48	2593,97	2771,93	2755,91	2791,88
Hiiu maakond	459,3	619,83	722,02	680,63	902,32
Ida-Viru maakond	253,14	302,79	321,17	296,44	289,13
Jõgeva maakond	287,3	363,67	370,31	426,29	389,83

Järva maakond	358,94	449,51	481,8	526,32	621,55
Lääne maakond	801,69	966,85	984,85	1062,31	1117,73
Lääne-Viru maakond	319,15	399,07	380,84	489,08	471,22
Põlva maakond	341,69	441,18	483,52	528,11	496,74
Pärnu maakond	1168,7	1548,76	1612,9	1613,24	1734,69
Rapla maakond	486,86	683,31	752,69	783	932,04
Saare maakond	973,01	1048,79	1195,6	1212,65	1438,52
Tartu maakond	1675,49	2025,77	2281,89	2299,22	2310,57
Valga maakond	235,73	252,71	308,31	319,98	374,81
Viljandi maakond	549,2	849,06	710,9	814,68	830,51
Võru maakond	520,39	617,7	676,82	715,83	737,75
Total	1622,87	2008,77	2114,8	2110,16	1950,35

Source: Estonian Land and Spatial Development Board (2026)

Table A7

Annual poverty threshold of household members in Estonia in euros (2020-2024)

2020	**2021**	**2022**	**2023**	**2024**
7573,60	8896,00	9076,57	9684,25	10287,47

Source: Statistics Estonia (2026c)

Table A8

Average gross salary in Estonia in euros (2020)

2020
1380

Source: Statistics Estonia (2021)

Table A9

Median monthly salary by counties in Estonia in euros (2021-2025)

Median Salary Monthly	**2021**	**2022**	**2023**	**2024**	**2025**
Harju maakond	1.297	1.395	1.600	1.741	1.838
Hiiu maakond	942	1.016	1.168	1.290	1.369
Ida-Viru maakond	894	952	1.100	1.237	1.334
Jõgeva maakond	942	1.019	1.167	1.266	1.350
Järva maakond	1.022	1.100	1.257	1.373	1.467
Lääne maakond	1.007	1.067	1.201	1.270	1.348
Lääne-Viru maakond	987	1.041	1.188	1.281	1.366
Põlva maakond	966	1.039	1.167	1.270	1.351
Pärnu maakond	972	1.047	1.181	1.294	1.368
Rapla maakond	1.017	1.086	1.230	1.300	1.395
Saare maakond	944	1.010	1.150	1.230	1.314
Tartu maakond	1.181	1.267	1.471	1.608	1.721
Valga maakond	900	930	1.104	1.205	1.296
Viljandi maakond	1.016	1.101	1.207	1.341	1.420
Võru maakond	933	1.006	1.133	1.243	1.333
Total	1.158	1.240	1.424	1.553	1.649

Source: Statistics Estonia (2026d)

Table A10
Average house size (m²)

	2021	2022	2023	2024	2025	Total (2021-2025)
Average m²	55,80	55,00	54,90	55,70	56,10	55,50

Source: Estonian Land and Spatial Development Board (2026)

Table A11
Population change and net migration data in selected regions in Estonia (2021–2025)

		Net migration	Population at the end of the year	Change in population figure
2021	Harju county	6204	614561	5046
	Ida-Viru county	-202	132736	823
	Tartu county	1241	157758	3846
2022	Harju county	24351	638076	23515
	Ida-Viru county	2242	133358	622
	Tartu county	4725	162390	4632
2023	Harju county	8877	646315	8239
	Ida-Viru county	332	132286	-1072
	Tartu county	2110	164460	2070
2024	Harju county	1862	647024	709
	Ida-Viru county	-773	130156	-2130
	Tartu county	464	164650	190
2025	Harju county	-1064	644758	-2266
	Ida-Viru county	-622	127909	-2247
	Tartu county	349	164825	175

Source: Statistics Estonia (2024)

Appendix B

Calculations of housing affordability metrics

Table B1

Housing expenditure per household monthly in euros

2020	**2021**	**2022**	**2023**	**2024**	**2025**
2.999.000.000/ 626.000/12 = 399	3.390.600.000/ 626.500/12 = 451	4.575.300.000/ 632.400/12 = 603	4.972.800.000/ 643.500/12 = 644	5.288.700.000/ 655.500/12 = 672	5.469.100.000/ 651.300/12 = 700

Table B2

Expenditure to income ratio only for 2020 total (%)

2020
399/1380= 29%

Table B3

Median annual salary by counties in Estonia in euros

Median Annual Salary	**2021**	**2022**	**2023**	**2024**	**2025**
Harju maakond	15.564	16.740	19.200	20.892	22.056
Hiiu maakond	11.304	12.192	14.016	15.480	16.428
Ida-Viru maakond	10.728	11.424	13.200	14.844	16.008
Jõgeva maakond	11.304	12.228	14.004	15.192	16.200
Järva maakond	12.264	13.200	15.084	16.476	17.604
Lääne maakond	12.084	12.804	14.412	15.240	16.176
Lääne-Viru maakond	11.844	12.492	14.256	15.372	16.392
Põlva maakond	11.592	12.468	14.004	15.240	16.212
Pärnu maakond	11.664	12.564	14.172	15.528	16.416
Rapla maakond	12.204	13.032	14.760	15.600	16.740
Saare maakond	11.328	12.120	13.800	14.760	15.768
Tartu maakond	14.172	15.204	17.652	19.296	20.652

Valga maakond	10.800	11.160	13.248	14.460	15.552
Viljandi maakond	12.192	13.212	14.484	16.092	17.040
Võru maakond	11.196	12.072	13.596	14.916	15.996
Total Median Annual Salary	13.896	14.880	17.088	18.636	19.788

Table B4

Expenditure to income ratio (%)

Occupations or gender / Year	**2021**	**2022**	**2023**	**2024**	**2025**
Agriculture, forestry and fishing	=451/1192 = 0,38	=603/1331 = 0,45	=644/1437 = 0,45	=672/1634 = 0,41	=700/1628 = 0,43
Mining and quarrying	=451/1619 = 0,28	=603/1681 = 0,36	=644/1876 = 0,34	=672/2032 = 0,33	=700/2179 = 0,32
Manufacturing	=451/1315 = 0,34	=603/1416 = 0,43	=644/1581 = 0,41	=672/1721 = 0,39	=700/1836 = 0,38
Electricity, gas, steam and air conditioning supply	=451/1831 = 0,25	=603/2131 = 0,28	=644/2435 = 0,26	=672/2496 = 0,27	=700/2714 = 0,26
Water supply; sewerage, waste management and remediation activities	=451/1438 = 0,31	=603/1489 = 0,40	=644/1631 = 0,39	=672/1850 = 0,36	=700/1998 = 0,35
Construction	=451/1234 = 0,37	=603/1333 = 0,45	=644/1479 = 0,44	=672/1598 = 0,42	=700/1667 = 0,42
Wholesale and retail trade; repair of motor vehicles and motorcycles	=451/1269 = 0,36	=603/1390 = 0,43	=644/1560 = 0,41	=672/1654 = 0,41	=700/1738 = 0,40
Transportation and storage	=451/1278 = 0,35	=603/1412 = 0,43	=644/1576 = 0,41	=672/1694 = 0,40	=700/1797 = 0,39
Accommodation and food service activities	=451/817 = 0,55	=603/959 = 0,63	=644/1124 = 0,57	=672/1217 = 0,55	=700/1285 = 0,54
Information and communication	=451/2549 = 0,18	=603/2840 = 0,21	=644/3160 = 0,20	=672/3393 = 0,20	=700/3605 = 0,19
Financial and insurance activities	=451/2434 = 0,19	=603/2636 = 0,23	=644/2952 = 0,22	=672/3114 = 0,22	=700/3344 = 0,21
Real estate activities	=451/951 = 0,47	=603/1047 = 0,58	=644/1209 = 0,53	=672/1322 = 0,51	=700/1411 = 0,50
Professional, scientific and technical activities	=451/1690 = 0,27	=603/1886 = 0,32	=644/2131 = 0,30	=672/2301 = 0,29	=700/2436 = 0,29
Administrative and support service activities	=451/1192 = 0,38	=603/1351 = 0,45	=644/1525 = 0,42	=672/1663 = 0,40	=700/1752 = 0,40

Public administration and defence; compulsory social security	=451/1807 = 0,25	=603/1984 = 0,30	=644/2326 = 0,28	=672/2517 = 0,27	=700/2615 = 0,27
Education	=451/1329 = 0,34	=603/1394 = 0,43	=644/1671 = 0,39	=672/1827 = 0,37	=700/1955 = 0,36
Human health and social work activities	=451/1605 = 0,28	=603/1737 = 0,35	=644/1899 = 0,34	=672/2216 = 0,30	=700/2382 = 0,29
Arts, entertainment and recreation	=451/1115 = 0,40	=603/1220 = 0,49	=644/1409 = 0,46	=672/1503 = 0,45	=700/1605 = 0,44
Other service activities	=451/919 = 0,49	=603/1012 = 0,60	=644/1142 = 0,56	=672/1258 = 0,53	=700/1337 = 0,52
Total	=451/1406 = 0,32	=603/1536 = 0,39	=644/1741 = 0,37	=672/1894 = 0,35	=700/2011 = 0,35
Males	=451/1540 = 0,29	=603/1683 = 0,36	=644/1894 = 0,34	=672/2047 = 0,33	=700/2160 = 0,32
Females	=451/1283 = 0,35	=603/1398 = 0,43	=644/1598 = 0,40	=672/1756 = 0,38	=700/1874 = 0,37

Table B5

Price to income ratio for regional

Region / Year	**2021**	**2022**	**2023**	**2024**	**2025**
Harju maakond	2103,48*55/15564=7,43	2593,97*55/16740=8,52	2771,93*55/19200=7,94	2755,91*55/20892=7,26	2791,88*55/22056=6,96
Hiiu maakond	459,3*55/11304=2,23	619,83*55/12192=2,8	722,02*55/14016=2,83	680,63*55/15480=2,42	902,32*55/16428=3,02
Ida-Viru maakond	253,14*55/10728=1,3	302,79*55/11424=1,46	321,17*55/13200=1,34	296,44*55/14844=1,1	289,13*55/16008=0,99
Jõgeva maakond	287,3*55/11304=1,4	363,67*55/12228=1,64	370,31*55/14004=1,45	426,29*55/15192=1,54	389,83*55/16200=1,32
Järva maakond	358,94*55/12264=1,61	449,51*55/13200=1,87	481,8*55/15084=1,76	526,32*55/16476=1,76	621,55*55/17604=1,94
Lääne maakond	801,69*55/12084=3,65	966,85*55/12804=4,15	984,85*55/14412=3,76	1062,31*55/15240=3,83	1117,73*55/16176=3,8
Lääne-Viru maakond	319,15*55/11844=1,48	399,07*55/12492=1,76	380,84*55/14256=1,47	489,08*55/15372=1,75	471,22*55/16392=1,58
Põlva maakond	341,69*55/11592=1,62	441,18*55/12468=1,95	483,52*55/14004=1,9	528,11*55/15240=1,91	496,74*55/16212=1,69
Pärnu maakond	1168,7*55/11664=5,51	1548,76*55/12564=6,78	1612,9*55/14172=6,26	1613,24*55/15528=5,71	1734,69*55/16416=5,81
Rapla maakond	486,86*55/12204=2,19	683,31*55/13032=2,88	752,69*55/14760=2,8	783*55/15600=2,76	932,04*55/16740=3,06
Saare maakond	973,01*55/11328=4,72	1048,79*55/12120=4,76	1195,6*55/13800=4,77	1212,65*55/14760=4,52	1438,52*55/15768=5,02
Tartu maakond	1675,49*55/14172=6,5	2025,77*55/15204=7,33	2281,89*55/17652=7,11	2299,22*55/19296=6,55	2310,57*55/20652=6,15
Valga maakond	235,73*55/10800=1,2	252,71*55/11160=1,25	308,31*55/13248=1,28	319,98*55/14460=1,22	374,81*55/15552=1,33
Viljandi maakond	549,2*55/12192=2,48	849,06*55/13212=3,53	710,9*55/14484=2,7	814,68*55/16092=2,78	830,51*55/17040=2,68
Võru maakond	520,39*55/11196=2,56	617,7*55/12072=2,81	676,82*55/13596=2,74	715,83*55/14916=2,64	737,75*55/15996=2,54
Total	1622,87*55/13896=6,42	2008,77*55/14880=7,42	2114,8*55/17088=6,81	2110,16*55/18636=6,23	1950,35*55/19788=5,42

Table B6

Price to income ratio for occupational and gender groups

Region / Year	**2021**	**2022**	**2023**	**2024**	**2025**
Agriculture, forestry and fishing	1622,87*55/12012=7,4	2008,77*55/12936=8,5	2114,8*55/14400=8,1	2110,16*55/15600=7,4	1950,35*55/16584=6,5
Mining and quarrying	1622,87*55/17508=5,1	2008,77*55/18000=6,1	2114,8*55/20688=5,6	2110,16*55/22752=5,1	1950,35*55/24000=4,5
Manufacturing	1622,87*55/13416=6,7	2008,77*55/14328=7,7	2114,8*55/16104=7,2	2110,16*55/17580=6,6	1950,35*55/18624=5,8
Electricity, gas, steam and air conditioning supply	1622,87*55/19056=4,7	2008,77*55/21852=5,1	2114,8*55/24792=4,7	2110,16*55/25500=4,6	1950,35*55/27972=3,8
Water supply; sewerage, waste management and remediation activities	1622,87*55/15480=5,8	2008,77*55/15804=7	2114,8*55/17856=6,5	2110,16*55/19944=5,8	1950,35*55/21192=5,1
Construction	1622,87*55/12396=7,2	2008,77*55/13200=8,4	2114,8*55/14580=8	2110,16*55/15504=7,5	1950,35*55/16188=6,6
Wholesale and retail trade; repair of motor vehicles and motorcycles	1622,87*55/12000=7,4	2008,77*55/13068=8,5	2114,8*55/14664=7,9	2110,16*55/15720=7,4	1950,35*55/16644=6,4
Transportation and storage	1622,87*55/12960=6,9	2008,77*55/14004=7,9	2114,8*55/15816=7,4	2110,16*55/17160=6,8	1950,35*55/18192=5,9
Accommodation and food service activities	1622,87*55/8448=10,6	2008,77*55/10044=11	2114,8*55/11808=9,9	2110,16*55/12924=9	1950,35*55/13596=7,9
Information and communication	1622,87*55/25200=3,5	2008,77*55/28200=3,9	2114,8*55/31932=3,6	2110,16*55/34476=3,4	1950,35*55/36000=3
Financial and insurance activities	1622,87*55/24000=3,7	2008,77*55/25524=4,3	2114,8*55/28740=4	2110,16*55/30660=3,8	1950,35*55/33600=3,2
Real estate activities	1622,87*55/7980=11,2	2008,77*55/8640=12,8	2114,8*55/9756=11,9	2110,16*55/11004=10,5	1950,35*55/12000=8,9
Professional, scientific and technical activities	1622,87*55/16740=5,3	2008,77*55/18240=6,1	2114,8*55/20988=5,5	2110,16*55/22860=5,1	1950,35*55/24000=4,5
Administrative and support service activities	1622,87*55/11052=8,1	2008,77*55/12168=9,1	2114,8*55/13716=8,5	2110,16*55/14832=7,8	1950,35*55/15792=6,8

Public administration and defence; compulsory social security	1622,87*55/19344=4,6	2008,77*55/21468=5,1	2114,8*55/25200=4,6	2110,16*55/27600=4,2	1950,35*55/28800=3,7
Education	1622,87*55/15744=5,7	2008,77*55/16092=6,9	2114,8*55/19644=5,9	2110,16*55/21384=5,4	1950,35*55/22404=4,8
Human health and social work activities	1622,87*55/15720=5,7	2008,77*55/16980=6,5	2114,8*55/18744=6,2	2110,16*55/22092=5,3	1950,35*55/23820=4,5
Arts, entertainment and recreation	1622,87*55/11952=7,5	2008,77*55/12996=8,5	2114,8*55/15360=7,6	2110,16*55/16488=7	1950,35*55/17172=6,2
Other service activities	1622,87*55/8400=10,6	2008,77*55/9348=11,8	2114,8*55/10704=10,9	2110,16*55/11808=9,8	1950,35*55/12456=8,6
Total	1622,87*55/13896=6,4	2008,77*55/14880=7,4	2114,8*55/17088=6,8	2110,16*55/18636=6,2	1950,35*55/19788=5,4
Males	1622,87*55/14760=6	2008,77*55/15840=7	2114,8*55/18048=6,4	2110,16*55/19584=5,9	1950,35*55/20748=5,2
Females	1622,87*55/12972=6,9	2008,77*55/14016=7,9	2114,8*55/16176=7,2	2110,16*55/17796=6,5	1950,35*55/19032=5,6

Table B7

Residual income in euros

Gender / Years	**2020**	**2021**	**2022**	**2023**	**2024**
Total	847,7-399,2=448,5	1001,3-451=550,3	1018-602,9=415,1	1096,9-644=452,9	1173,1-672,3=500,8
Males	867,4-399,2=468,2	1021,6-451=570,6	1047,1-602,9=444,2	1131,5-644=487,5	1188,4-672,3=516,1
Females	829,9-399,2=430,7	982,9-451=531,9	991,8-602,9=388,9	1065,6-644=421,6	1159,2-672,3=486,9

Table B8

Monthly poverty threshold

2020	**2021**	**2022**	**2023**	**2024**
7573,60/12=631,133	8896,00/12=741,333	9076,57/12=756,381	9684,25/12=807,021	10287,47/12=857,289

Table B9
Residual income to threshold

	Total	**Males**	**Females**
2020	448,47 / (631,13 * (1 - 0,29)) = 1	468,17 / (631,13 * (1 - 0,29)) = 1,04	430,67 / (631,13 * (1 - 0,29)) = 0,96
2021	550,3 / (741,33 * (1 - 0,32)) = 1,09	570,6 / (741,33 * (1 - 0,32)) = 1,13	531,9 / (741,33 * (1 - 0,32)) = 1,06
2022	415,1 / (756,38 * (1 - 0,39)) = 0,9	444,2 / (756,38 * (1 - 0,39)) = 0,97	388,9 / (756,38 * (1 - 0,39)) = 0,85
2023	452,92 / (807,02 * (1 - 0,37)) = 0,89	487,52 / (807,02 * (1 - 0,37)) = 0,96	421,62 / (807,02 * (1 - 0,37)) = 0,83
2024	500,75 / (857,29 * (1 - 0,35)) = 0,91	516,05 / (857,29 * (1 - 0,35)) = 0,93	486,85 / (857,29 * (1 - 0,35)) = 0,88

Resümee

ELUASEME TASKUKOHASUS EESTIS: REGIONAALNE, KUTSEALANE JA SOOLINE PERSPEKTIIV

Umut Küçük

Käesolevas bakalaureusetöös hinnatakse eluaseme taskukohasust Eestis, keskendudes piirkondlikele, ametialastele ja soolistele erinevustele. Töö lähtub asjaolust, et Eestis on viimase kümne aasta jooksul toimunud üks Euroopa Liidu kiiremaid eluasemehindade tõuse. See tõus on tõsiselt mõjutanud leibkondade võimet leida endale sobivat eluaset ning avaldab eriti suurt survet haavatavatele rühmadele, sealhulgas naistele, noortele täiskasvanutele ja madala sissetulekuga töötajatele. Uuringu teoreetiline osa annab ülevaate eluaseme taskukohasuse mõiste arengust ja mõõtmismeetoditest. Selgub, et taskukohasuse määratluse osas puudub rahvusvaheline konsensus – mõiste on aja jooksul laienenud lihtsast sissetuleku ja kulude suhtest laiemaks heaolu mõisteks. Teoreetilises raamistikus vaadeldakse erinevaid määratlusi ja mõõtmismeetodeid, mis on jagatud kolme kategooriasse: suhtarvupõhised lähenemisviisid, jääktulupõhised meetodid ning komposiit- ja subjektiivsed lähenemisviisid. Iga meetod toob esile eluaseme kättesaadavuse erinevaid aspekte ja näitab, miks ükski neist eraldi ei suuda kriisi täielikult hõlmata.

Empiriline analüüs põhineb Eesti Statistikaameti ja Maakatastri sekundaarandmetel ning kasutab nelja erinevat mõõdikut: kulude ja sissetulekute suhet, hinna ja sissetulekute suhet ameti ja soo lõikes ning 15 maakonna lõikes, jääksissetulekut ning jääksissetuleku ja vaesuspiiri suhet. Analüüsiperiood hõlmab suhtarvudel põhinevate meetodite puhul aastaid 2021–2025 ja jääktulul põhinevate meetodite puhul aastaid 2020–2024. Kulude ja sissetulekute analüüs näitab, et 2022. aasta inflatsioonishokk muutis eluasemekriisi valdkondadevaheliseks probleemiks: 30% künnisest allapoole jäävate ametirühmade arv vähenes kaheksalt kolmele. 2025. aastaks on keskmine koormus stabiliseerunud 35% tasemel, ületades 2021. aasta kriisieelse taseme. Majutus- ja toitlustussektor ning kinnisvarasektor on kogu perioodi jooksul kulutanud eluasemele üle poole oma sissetulekust. Naiste koormus on järjepidevalt suurem kui meestel. Hind-sissetuleku suhe näitab, et riiklik keskmine varjab märkimisväärseid ametialaseid ja piirkondlikke erinevusi. Majutus- ja toitlustussektori töötajate puhul ületas suhe kriisiaastatel kriitilise taskukohasuse künnise. Piirkondlikul tasandil ilmneb selge keskuse ja äärealade vaheline lõhe: Harju maakonnas jõudis suhe haripunkti 2022. aastal, samas kui Ida-Viru maakonnas langes see 2025. aastaks

alla 1,0. Viimane ei peegelda taskukohasust, vaid pigem demograafilise väljarände põhjustatud hindade kokkuvarisemist.

Jääktulu analüüs annab kõige otsesema tõendi eluasemest tingitud vaesusest. Kuigi jääktulu eurodes on pärast 2022. aasta šokki taastunud, jäi jääktulu ja vaesuspiiri suhe kõigi rühmade puhul kuni 2024. aastani alla ohutu taseme, mis näitab, et eluasemekulud koormasid leibkondi niivõrd, et jääktulu ei katnud põhivajadusi. Naiste näitajad olid kogu perioodi vältel järjepidevalt madalamad, peegeldades struktuurilist ebavõrdsust tööturul. Uuringu peamine järeldus on, et eluaseme kättesaadavust Eestis ei saa mõista üheainsa näitaja abil. Kriisi olemus on viie aasta jooksul struktuuriliselt muutunud: perioodi alguses oli peamine probleem piiratud juurdepääs kinnisvaraturule kõrge turuhindade tõttu, kuid perioodi lõpuks oli koormus nihkunud igakuistele eluasemekuludele. Poliitikakujundajad peaksid liikuma ühe läve mõõtmiselt mitmemõõtmeliste raamistike poole ning rakendama sihtmeetmeid, et toetada haavatavaid elukutseid, naisi ja majanduslikus stagnatsioonis olevaid piirkondi.

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