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Housing Tenure, Housing Satisfaction, and Fertility Intentions in the Nordic Context of the Early 2020s

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Abstract

The declining fertility rate in Nordic countries since the 2010s has challenged previous fertility theories. Among the many factors, housing has become increasingly recognized as a crucial determinant of family formation and reproductive decisions. In Nordic countries, where housing systems vary despite shared welfare-state characteristics, the recent relationship between housing and fertility outcomes remains underexplored, particularly from a comparative perspective.

Using microdata from the Generations and Gender Survey - Round 2 Wave 1 for Finland, Sweden, Norway, and Denmark (n = 14,573), this research investigates whether housing tenure and individuals' perceived housing satisfaction relate to fertility intentions, employing logistic regression models. It further examines whether these associations vary across the Nordic countries, among different age groups, and by parity.

Results indicate that homeownership is positively associated with fertility intentions across the Nordic countries, with the exception of Denmark, where it is negatively associated. This divergence may reflect Denmark's tenure-neutral housing policies and extensive provision of social rental housing, potentially reversing the link between homeownership and childbearing. The positive association between homeownership and fertility intentions is particularly evident among younger individuals and those without children. Meanwhile, housing satisfaction shows a negative association with fertility intentions, a pattern more pronounced among younger respondents and in Denmark and Sweden compared to Finland and Norway. This may suggest that higher levels of housing satisfaction reflect lifestyle preferences, larger investments into living standards, or a lower perceived urgency to transition into parenthood.

This research contributes to the broader discussion on the current low levels of fertility in the Nordic countries by examining the role of housing. Drawing on the most recent survey data, it introduces perceived housing satisfaction as a complementary dimension to conventional housing tenure measures. Through comparative analysis within the Nordic context, the study offers a more nuanced understanding of how housing conditions relate to fertility intentions across different institutional and demographic settings.

Key words: Low fertility, housing tenure, housing satisfaction, Nordic countries

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1 Introduction

The declining fertility rate in Nordic countries since 2010 has challenged previous theories (Hiilamo, 2019). This unexpected situation is particularly puzzling for these countries because they are well-recognized for successfully reconciling work-family conflicts for parents (Esping-Andersen, 2009). Despite the strong support systems in place, including generous parental leave policies, affordable childcare, and active encouragement of shared parenting responsibilities, the declining fertility rate suggests that other factors may be at play and calls for alternative theories to explain the change in fertility patterns. Recently, an increasing number of studies have empirically demonstrated that the fertility decline can be influenced by changes of homeownership availability and housing prices, with evidence drawn from countries such as Australia, the Netherlands, and the U.K. (Atalay et al., 2021; Tocchioni et al., 2021; Van Wijk, 2024). However, we have limited knowledge about the extent to which changes in housing status and housing markets may have contributed to the decline in fertility rates in Nordic countries since the 2010s. More importantly, relatively few studies have explored the role of subjective satisfaction with housing in shaping fertility decisions, although it may play a crucial role in understanding the linkage between housing and fertility.

Housing not only represents the largest single asset for households in most advanced economies (Pfeffer & Waitkus, 2021), but also symbolizes adulthood, offers physical shelter, and provides economic security—often prerequisites for union formation and childbearing (Mulder, 2006a). Therefore, housing tenure—whether individuals live in owner-occupied or rented homes—has emerged as a central focus in previous fertility studies (Brauner-Otto, 2023). These studies have suggested that variations in housing regimes (e.g., Brauner-Otto, 2023) and housing prices (e.g., Van Wijk, 2024) can explain the cross-national differences of postponement of first births and a decline in cohort fertility. At the individual level, owning

an owner-occupied home has been found to be associated with positive fertility intentions. Although the transition to homeownership may delay the first-time parenthood in contexts where housing is expensive, it can also serve as a precondition for later but potentially higher fertility, particularly in societies where homeownership is the normative form of family housing, partly due to expectations of asset appreciation (Chudnovskaya, 2019; Flynn, 2017; Kulu & Steele, 2013; Kulu & Vikat, 2007; Mulder, 2006a).

This research investigates whether housing tenure, i.e., ownership or renting of homes, and individuals' satisfaction with these living arrangements might be key factors associated with fertility intentions in the Nordic context. By examining the relationship between housing and fertility in Finland, Sweden, Norway, and Denmark, this study aims to provide region-specific insights that contribute to more comprehensive fertility theories. While these countries share similarities in their welfare state regimes, there are notable differences in their housing policies and economic conditions. A comparative analysis within the Nordic context allows for a more nuanced understanding of how the housing-fertility relationship can vary. These findings could also inform public policy efforts to address persistently declining fertility rates.

In the following sections, we will present an overview of the theoretical and contextual backgrounds of this study. In the subsequent analysis, the relationship between housing tenure and satisfaction with respect to fertility intentions will be tested using data from the Generations and Gender Survey, Round 2 (GGS-II) Wave 1 from Finland, Sweden, Norway, and Denmark.

2 Theoretical and Contextual Backgrounds

This section reviews the relationship between housing and fertility, with a particular focus on its relevance in the Nordic context. While this topic is important in various settings, the Nordic countries provide a valuable comparative perspective due to their shared welfare state model alongside notable differences in housing systems and fertility trends. I will begin by introducing key theoretical ideas about how homeownership and housing satisfaction may associate with fertility intentions. Next, I will provide a descriptive overview about the contextual background of Nordic countries, including the features of fertility trends, housing systems and family policies, as well as cross-national differences in these dimensions.

2.1 Housing tenure and fertility intentions

Housing is closely related to family formation and childbearing behaviours in the demographically dense period for young people (Flynn, 2017). Their life events are typically characterised by leaving parental home, moving into their rented or purchased home, forming partnerships, and becoming parents (Kulu & Steele, 2013; Öst, 2012). These events are not only interdependent but also shaped by both current housing conditions and anticipations of future housing transitions, which are in turn constrained by housing policy and market structures. Previous research has shown that housing is associated with fertility through various channels such as homeownership status, housing prices, locations, living spaces, and housing types (e.g., Brauner-Otto, 2023; Du et al., 2024; Kulu & Steele, 2013; Kulu & Vikat, 2007; Van Wijk, 2024), as evidenced by both macro-level regional comparisons and micro-level analyses.

At the macro level, housing prices are generally negatively associated with fertility rates, as shown in studies from English-speaking countries (Atalay et al., 2021; Dettling & Kearney, 2014; Lovenheim & Mumford, 2013), Asia (J. Liu et al., 2020; Mizutani, 2015; Yi & Zhang,

2010), Western Europe (Van Wijk, 2024) and more recently from Nordic countries (Chudnovskaya, 2019; Daysal et al., 2021; Florida et al., 2021). This negative association arises because, as summarised by Van Wijk (2024), individuals and couples in increasingly expensive housing markets tend to spend more time seeking stable accommodation, allocate a larger proportion of their income to housing costs, and delay leaving the parental home—thus indirectly postponing union formation. These mechanisms are further intensified by social norms and individual preferences for higher living standards when raising children (Mulder, 2006b, 2013). As a result, rising housing prices impose greater barriers to securing suitable living arrangements, ultimately discouraging individuals or couples from having a (nother) child.

However, at the micro level, rising housing prices have heterogeneous effects depending on housing tenure, i.e., whether housing is owner-occupied or rented. For homeowners, an increase in housing prices often boosts financial wealth via rising housing equity, which can positively influence fertility behaviours and intentions. In contrast, tenants face growing financial pressures, including larger down payments, higher mortgage repayments for future home purchases, and rising rents, all of which typically exert a negative impact on fertility behaviours and intentions (e.g., Atalay et al., 2021; Dettling & Kearney, 2014; Lovenheim, 2011; Lovenheim & Mumford, 2013; Mizutani, 2015; Yi & Zhang, 2010). Consequently, homeownership is generally linked with higher fertility rates and stronger fertility intentions (Chudnovskaya, 2019; Kulu & Steele, 2013; Kulu & Vikat, 2007), although purchasing a home may initially delay childbearing due to the need for savings to cover downpayment that compete with the anticipated cost of childbearing (Clark, 2012; H. Liu et al., 2023; Öst, 2012; Simon & Tamura, 2009). Homeownership not only supports wealth accumulation (Pfeffer & Waitkus, 2021) during periods of housing market volatility following the Great Recession but

also provides a sense of economic security, symbolic status, and protection against eviction (Mulder, 2013).

Most prior empirical studies, however, focus on the period preceding the 2008 Global Financial Crisis, a time when housing markets were less volatile and housing prices increased moderately in most European countries (e.g., Chudnovskaya, 2019; Kulu & Vikat, 2007; Öst, 2012). Notable exceptions include studies from the UK and the Netherlands, which are often characterised as being in the midst of a housing crisis, marked by sharply rising housing prices and rents (Tocchioni et al., 2021; Van Wijk, 2024). These studies support the notion that rising housing prices lead to lower fertility rates, while homeownership continues to be positively associated with childbearing likelihood in the post-crisis period. However, the positive association between home ownership and fertility has weakened since the 2010s (Tocchioni et al., 2021; Van Wijk, 2024). In other words, the fertility advantage of homeowners has declined over time in both the UK and the Netherlands, suggesting that increasingly competitive housing markets have become a significant barrier, with home purchases directly competing with the financial costs of childbearing (Mulder, 2006a).

Taken together, these findings underscore the association between housing tenure status and fertility intentions. Rising housing prices intensify the financial challenges faced by tenants, while homeowners may still benefit from increased housing equity, though the positive association with fertility appears to have weakened over time. These insights inform the following hypothesis:

Hypothesis 1: Homeowners are more likely to intend to have a (or another) child than tenants.

2.2 Subjective housing satisfaction and fertility intentions

Existing research has demonstrated a strong link between homeownership and fertility intentions, often highlighting the role of housing stability and security as a prerequisite for family formation and childrearing (Kulu & Steele, 2013; Mulder, 2006a; van Wijk & Billari, 2024). However, less attention has been paid to the psychological and subjective dimensions of housing conditions, such as housing satisfaction. This study builds on previous research by examining not only the association between homeownership and fertility intentions but also the potential independent and mediating role of housing satisfaction..

Although subjective perceptions of housing status are strongly correlated with material well-being, subjective and objective realities do not always align (e.g., Elsinga & Hoekstra, 2005; Pekkonen & Haverinen-Shaughnessy, 2015; Vera-Toscano & Ateca-Amestoy, 2008). In other words, individuals living in similar housing conditions may perceive their situation differently, shaped by personal experiences, expectations, or prevailing social norms. Therefore, subjective evaluations can offer unique insights into how housing influence fertility intentions, offering a perspective that objective indicators alone may fail to capture.

Housing satisfaction, as a facet of overall life satisfaction, reflects the gap between an individual's aspirations and their perceived housing situations (Amérigo & Aragones, 1997; Campbell et al., 1976; Vera-Toscano & Ateca-Amestoy, 2008). It also captures the cumulative and weighted importance individuals attach to various aspects of housing (Inglehart, 1977), such as tenure, quality, space, stability, affordability, symbolic value, and autonomy. This conceptualisation encompasses not only the physical attributes of housing but also its psychological and symbolic significance. Moreover, it represents a holistic assessment of one's living conditions, helping to explain why subjective perceptions and objective realities of housing are often correlated, yet may sometimes diverge. We can thus speculate

that individuals who perceive their actual living situation as meeting or exceeding their expectations will report higher levels of housing satisfaction. In contrast, those who feel their living situation falls significantly short of their aspirations are more likely to express dissatisfaction and frustrations with their living arrangements.

Given the definition of housing satisfaction and its close connection to individual aspirations and well-being, it is plausible to propose that housing satisfaction either directly affects or mediates the relationship between homeownership and fertility intentions. That is, higher levels of housing satisfaction—derived from a perceived alignment between an individual's living conditions and their aspirations—are likely to provide a sense of security, stability, and optimism about the future, all of which are critical when planning for children (Aassve et al., 2021; Vignoli et al., 2022). Conversely, dissatisfaction with housing, whether due to physical inadequacies, financial strain, or a mismatch with personal expectations, may create psychological and economic barriers that discourage childbearing. Building on this premise, we hypothesise that:

Hypothesis 2: Housing satisfaction is positively associated with individuals' fertility intentions.

Additionally, while homeownership itself is expected to promote fertility intentions, housing satisfaction may act as a mediating factor in this relationship. Specifically, homeowners may be more satisfied with their housing conditions and thus more likely to intend to have a(nother) child, whereas tenants who are dissatisfied may not perceive the same level of security and stability needed for childbearing. This implies a potential mediation effect, whereby the pathway from homeownership to fertility intentions is partially explained by housing satisfaction. Therefore, mediation analysis will be used to account for the potential

mediating role of housing satisfaction and to disentangle its effect from that of homeownership.

2.3 The Nordic context: shared features and country differences

The Nordic countries studied—Denmark, Norway, Sweden, and Finland—have long been regarded as exemplars of high period fertility and stable cohort fertility rates in Europe, largely attributed to generous family benefits, gender-equal policies, and universal welfare systems (Andersson et al., 2009; Esping-Andersen, 1990). Over the past half-century, total fertility rates (TFRs) rebounded from the low levels (around 1.5) of the 1970s to approximately 1.7 by the mid-1980s, eventually recovering and stabilising at 1.8 or higher by 2005 (Andersson et al., 2009).

Since 2010, however, fertility rates across the Nordic region have declined sharply, approaching or falling below the European average. Figure 1 shows the TFRs in Norway, Sweden, Denmark, and Finland from 2000 to 2023 have followed a similar downward trajectory, briefly interrupted by a rebound during the COVID-19 pandemic before reaching record lows. Finland's TFR, for instance, fell to 1.26 in 2023, while Denmark's fluctuated before declining to 1.49 in the same year. Although period-based measures like TFR are influenced by temporary events, such as the postponement of births, recent cohort fertility studies also indicate a decline in cohort fertility rates in the Nordic countries. Forecasts suggest that the completed cohort fertility in the region is expected to decline from approximately 2 for the 1970s cohort to around 1.8 for the late 1980s cohort (Hellstrand et al., 2021). Among these countries, the decline in cohort fertility is more pronounced in Finland and Norway, while Denmark and Sweden are expected to experience relatively milder decreases (Hellstrand et al., 2021).

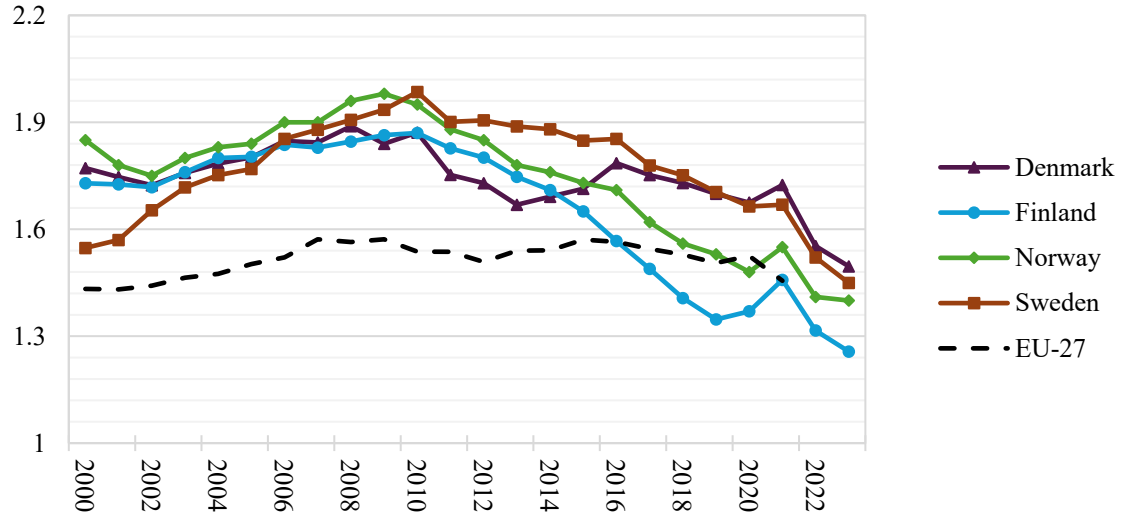

Figure 1. Trends of Total Fertility Rate in Denmark, Finland, Norway, and Sweden (2000-2023)

Data source: Nordic statistics database, CHIL02

This unexpected fertility decline, particularly among younger cohorts and first-time parents (Hellstrand et al., 2021; Jónsson, 2024; Ohlsson-Wijk & Andersson, 2022), challenges earlier theories that portrayed Nordic fertility as persistently high and stable (OECD, 2023). Broader societal and economic changes, including cultural shifts, economic insecurity, and rising housing costs, may now play a more significant role in shaping fertility decisions. While family policies remain supportive, they may not be sufficient to fully offset these trends. In particular, housing market conditions may be a key factor contributing to declining fertility, but this remains a hypothesis that we aim to investigate in the current study.

Nordic urban housing markets have undergone profound shifts in recent decades, largely influenced by the aftermath of the U.S. subprime mortgage crisis and a household debt-driven boom since the mid-1990s (Sørvoll et al., 2023). These transformations are marked by rising housing cost-to-income ratios in capital and major cities (Anundsen, 2021; Knoll et al., 2017), increasingly precarious and deregulated rental markets (Kettunen & Ruonavaara, 2021), and the retrenchment of social housing programs and subsidies (Ruonavaara, 2017; Sørvoll et al.,

2023). As such, Nordic countries increasingly exhibit features and challenges akin to liberal regimes—particularly the debt-driven escalation of residential property prices (Blackwell & Kohl, 2019; Bryant et al., 2022; Kohl & Sørvoll, 2021)—despite continuing to be classified as social democratic welfare regimes with a strong preference for universalism and de-commodification (Esping-Andersen, 1990).

Despite shared trends, notable cross-country differences persist across the Nordic region due to early divergent paths in housing policy and recent variations in housing-related outcomes, which in turn influence fertility decisions. Real house prices, for instance, rose by about 147% in Sweden, 109% in Norway, 49% in Denmark, and 27% in Finland between 2000 and 2019 (Anundsen, 2021). However, house prices do not tell the whole story about housing affordability and the economic pressures faced by individuals. These price increases, coupled with varying tenure structures, may affect decisions about family formation by limiting access to affordable housing.

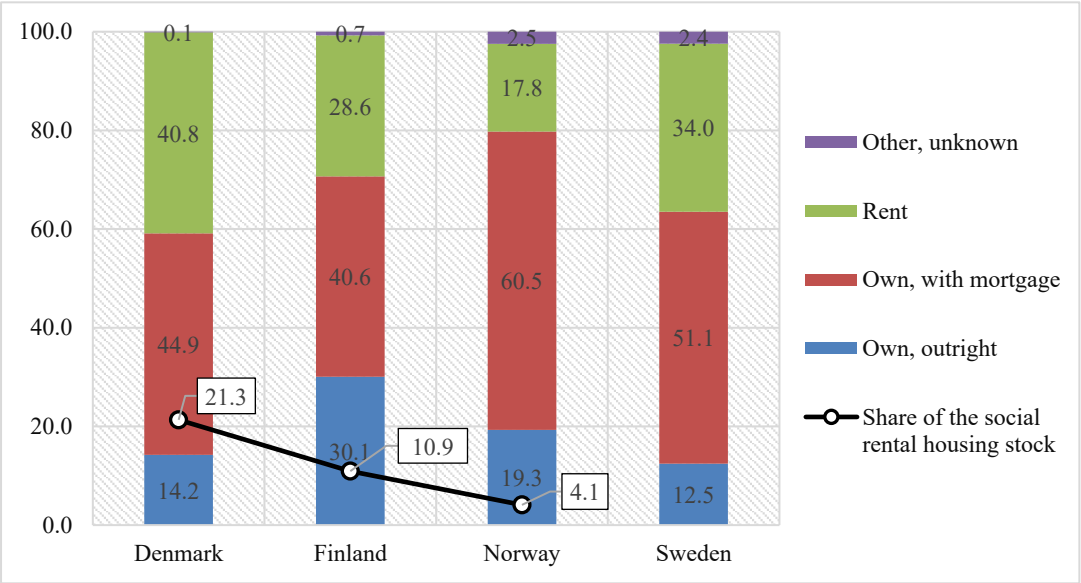

Figure 2. Share of the population in different housing tenure types in 2020 and share of the social rental housing stock to total housing stock in 2022 or latest available year for Denmark, Finland, Norway, and Sweden

Note: Data from OECD Affordable Housing Database - indicator HM1.3 Housing tenures and indicator PH4.2. Social rental housing stock, https://oe.cd/ahd. For Norway, social rental housing stock data only contains dwellings provided by municipalities (about 75% of all social housing). In Sweden, municipal housing associations provide a significant share of housing for low-income households. However, since rents are not below market levels, these units are not classified as social housing in the OECD Affordable Housing Database. Still, public housing is estimated to comprise 15–20% of the total housing stock (cf. Blackwell & Bengtsson, 2023).

Figure 2 presents the tenure structure and the relative size of the social rental sector in the four Nordic countries in recent years. Among them, Norway and Finland exhibit the highest rates of homeownership, with homeowners accounting for approximately 70% to 80% of the total population. This pattern can be attributed to housing policies in both countries that favour mortgage-financed and tax-incentivized homeownership, offering structural advantages for property acquisition (Ruonavaara, 2012; Sørvoll et al., 2023). Private rentals in Norway and Finland are somehow regarded as "residual" or "transitional", operating mostly under market principles, with only means-tested or needs-tested housing allowances provided for low-income groups (Kettunen & Ruonavaara, 2021; Ruonavaara, 2005; Sørvoll et al., 2023). Nevertheless, Finland maintains a larger public rental sector (10.9%) than Norway (4.1%) in terms of total housing stock. In contrast, Denmark and Sweden maintain a more tenure-neutral housing structure, with roughly 60% of the population being homeowners, a more regulated private rental market characterised by collective negotiations between tenants and landlords, and, in the case of Denmark, a larger share of cooperative rental housing supported by state subsidies (21.3% in total housing stock) (Blackwell & Bengtsson, 2023; Vestergaard & Scanlon, 2014). However, social rental housing in Sweden has become increasingly market-oriented compared to Denmark, particularly in terms of rent levels, tenant selection, and security of tenure (Blackwell & Bengtsson, 2023; Sørvoll et al., 2023).

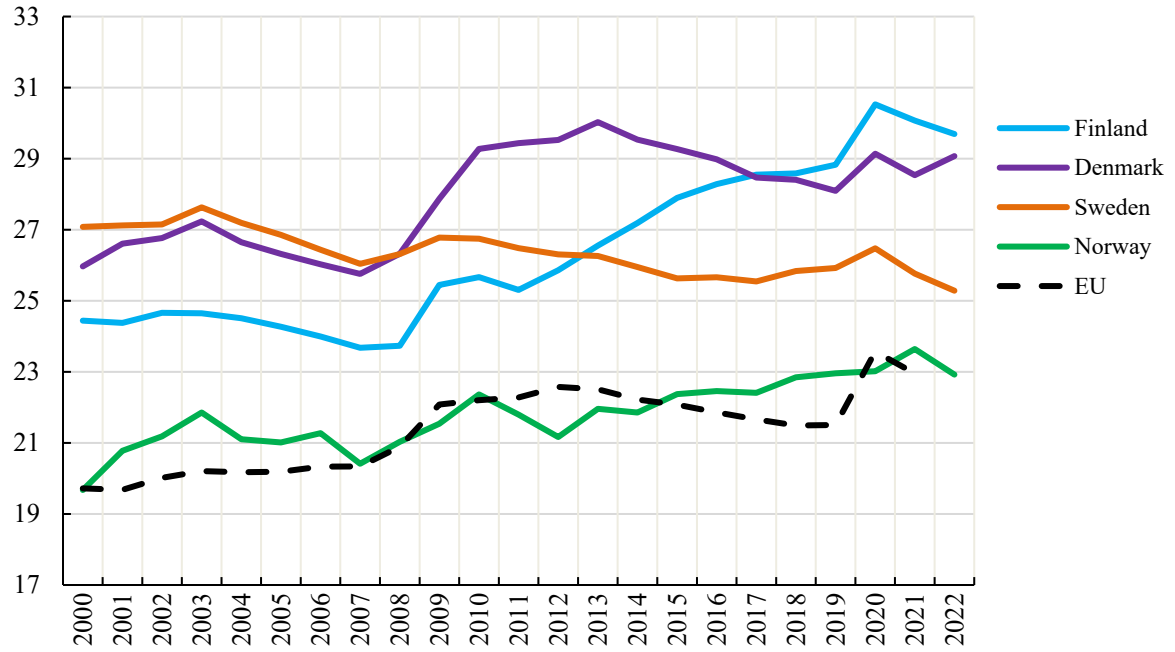

Figure 3. Housing expenditure as % of final consumption expenditure of households in Denmark, Finland, Norway, and Sweden (2000-2022)

Note: data from OECD Affordable Housing Database (http://oe.cd/ahd) - Indicator HC1.1. Housing-related expenditure of households. Housing expenditure includes actual rentals for tenants, imputed rentals for homeowners, maintenance costs, water, and electricity.

Housing expenditure trends further illustrate affordability pressures and cross-country differences. Between 2000 and 2022, the share of housing-related expenditure in final household consumption expenditure increased most significantly in Finland, rising from 24% to 29%. In contrast, Sweden experienced a slight decrease, from 27% to 25%. Denmark and Norway bot saw slower, fluctuating increases, with Denmark consistently exhibiting higher average housing-related expenditure than Norway.

These variations in tenure structures and housing affordability underscore the complex and context-dependent relationship between housing and fertility (Brauner-Otto, 2023). Specifically, tenure systems shape how young adults and families navigate affordability pressures, potentially influencing their willingness or ability to have children. In countries like

Finland and Norway, where homeownership is prevalent but rental markets are relatively limited and less regulated, young adults may delay family formation due to financial insecurity and difficulties in accessing affordable housing. By contrast, the more tenure-neutral systems in Denmark and Sweden may provide a buffer against extreme housing-related pressures. Nevertheless, growing inequalities in wealth and housing cost burdens between homeowners and tenants continue to pose challenges, especially for young people in the early stages of their housing careers and those considering their first or second child (Grander, 2023). Building on the observed patterns of fertility decline and housing market transformations across the Nordic countries, this study proposes the following hypotheses:

Hypothesis 3: The association between housing tenure and fertility intentions varies by age group, parity, and country context.

Specifically, we expect that in countries with more constrained rental markets (e.g., Finland and Norway), homeownership will be more strongly associated with positive fertility intentions than in countries with more tenure-neutral housing systems (e.g., Denmark and Sweden). Furthermore, the association between homeownership and fertility intentions is expected to be stronger among younger individuals and those without children.

Hypothesis 4: The association between housing satisfaction and fertility intentions varies across age groups, parity, and Nordic countries.

Specifically, we expect that in countries with more constrained rental markets (e.g., Finland and Norway), housing satisfaction will be more strongly associated with positive fertility intentions than in countries with more tenure-neutral housing systems (e.g., Denmark and Sweden). In addition, the association between housing satisfaction and fertility intentions is expected to be stronger among younger individuals and those without children.

3 Analytical Approach

3.1 Data

We used data from Round 2 of the Generations and Gender Surveys (GGS) Wave 1, conducted in Finland, Sweden, Denmark, and Norway. Data collection began in 2020 and was carried out between November 2020 and April 2022 accross these countries. The sample frame for GGS II Wave 1 consisted of all permanent residents listed in national population registers, aged 18–59 in Sweden, 18–49 in Denmark, and 18–54 in Finland and Norway. Data were collected using computer-assisted web interviewing (CAWI).

The initial sample sizes were 19,600 in Finland, 30,000 in Sweden, 42,116 in Denmark, and 15,000 in Norway. The final analytical sample consisted of 3,388 in Finland, 8,082 in Sweden, 8,269 in Denmark, and 5,374 in Norway, corresponding to response rates of 18.5% in Finland, 27% in Sweden, 18.8% in Denmark, and 35.8% in Norway. The total sample size across the four countries was 25,113 individuals.

For this study, we initially restricted the sample to respondents of fertile age (18–44), yielding 17,380 cases. We then further limited the sample to those with two or fewer children, as individuals with three or more children tend to have significantly lower fertility intentions (only about 5% intend to have more), resulting 15,973 observations. After excluding cases with missing values on key variables, the final analytical sample comprised 14,573 respondents.

3.2 Variables

Outcome variable: *Fertility intentions* were captured by asking respondents[1], "Do you intend to have another child during the next three years? Please take into account only biological children." Responses are collected on a five-point scale: "definitely not (35.85%)," "probably not (24.47%)," "unsure (9.73%)," "probably yes (15.01%)," "definitely yes (10.95%)," and an additional category "currently expecting a child (3.99%)." Following Begall and Hiekel (2024), we recoded these responses into a binary variable, with "unsure" classified as "not intend to" and "currently expecting a child" classified as "intend to". The decision to focus on the three-year intentions was motivated by its relevance to housing status, as housing decisions often coincide with short-term family planning (Kulu & Steele, 2013). This short-term measure is thus expected to better capture the connection between housing and fertility intentions, enhancing both predictive accuracy and practical relevance.

Explanatory variables: The main independent variables in this study are *housing tenure* and *housing satisfaction*. However, the Swedish survey did not include a question about respondents' homeownership status. In other three countries, housing tenure was measured by asking respondents, "Does your household own or rent this accommodation, or does it come rent-free?" with four categories: owner (51.25%), tenant or subtenant paying rent (40.64%), tenant with rent-free (2.16%), and other (5.96%). We recoded it to a dummy variable

[1] An exception in the Swedish sample is the inclusion of two loop questions preceding the fertility intention question, which asked respondents whether "they are not physically possible to have children" and "currently trying to get pregnant". If respondents selected that they are "not physically possible to have children" *and* "currently trying to get pregnant", they would not be asked about fertility intentions, resulting in missing values for the outcome variable. In contrast, no such loop questions were included in the samples from the other three countries. To enhance comparability across countries, I recoded respondents who indicated "not physically possible to have children" *and* "currently trying to get pregnant" as having positive fertility intention in outcome variable, which added 216 observations.

distinguishing between homeowners and non-homeowners, with the latter group encompassing rent-paying tenants, rent-free tenants, and those classified as "other."

Since the Swedish survey did not collect information on respondents' home ownership, we used self-reported property value as a proxy variable for *housing tenure*. Specifically, the question asked: "What is the combined approximate value of any property that you own? Include your accommodation and any other real estate that you own in the total amount" with ordinal options "4,999 € or less (47.83%)", "5,000 to 9,999 € (0.08%)", "10,000 to 19,999 € (0.25%)", "20,000 to 49,999 € (1.02%)", "50,000 to 99,999 € (2.28%)", "100,000 to 249,999 € (13.99%)", "250,000 to 499,999 € (20.84%)", "500,000 € or more (13.71%)". We tested two recoding strategies: one where respondents with property valued at "4,999 € or less (49.25%)" were classified as non-homeowners, and those with property valued above 5,000 € (49.81%) were classified as homeowners. Another approach classified respondents with property valued below 99,999 € as non-homeowners (52.90%). These two recoding approaches produced similar results in terms of coefficients and significance levels in the full model, and we reported the first approach in the formal analysis, classifying respondents with property valued at 4,999 € or less as non-homeowners. For further justification of the proxy variable's accuracy and robustness, see Appendix 1.

Housing satisfaction was measured on a scale from 0 to 10, where 5 indicates average satisfaction and higher values reflect greater satisfaction. We tested four alternative codings of the housing satisfaction variable: including a quadratic term, creating four quantile categories, dividing it into three categories based on mean and standard deviation, and grouping based on histogram analysis. All approaches yielded consistent results in terms of coefficient direction, significance, and other key metrics. However, the continuous specification provided the best

model fit, as indicated by AIC and BIC comparisons. Therefore, we used the continuous measure in the final analysis.

Control variables included age group, parity, partnership status, education level, activity status, gender, migrant background, and region of residence. *Age group* was categorised into "18 to 24 years", "25 to 29 years", "30 to 34 years", "35 to 39 years", and "40 to 44 years". *Parity* was defined as "no child," "one child," and "two children" based on biological children with current or previous partners; adopted children and stepchildren were excluded, following the user syntax by Jin et al. (2024). *Partnership* status was grouped into "married", "cohabiting", "living separately" (i.e. having a partner but not cohabiting), and "single". *Education level* was recoded according to ISCED 2011into three categories: "low education" (ISCED 0-2), "Medium education" (ISCED 3-4), and "High education" (ISCED 5-8). *Activity status* was classified as "employed," "unemployed,", "in education or military service," and "other."[2] *Gender*, and *migrant background* were dummy variables, where *migrant* indicates whether the respondents were born outside the country of residence. Additionally, we included a dummy variable, *Capital region*, indicating whether respondents resided in the capital region or elsewhere. This variable was used as a robustness analysis, although it was not available in the Danish dataset. A weighted descriptive summary of all variables by country is presented in Table 1 below.

[2] Employed contains those who are employed (59.66%), self-employed (3.68%), helping family member in a family farm or business (0.25%), and on parental leave or childcare leave (2.47%). Unemployed is 4.04%. In education or military service includes who are in education or training (24.25%), and in military or civic service (0.31%). Other refers to those who are retired (0.48%), Taking care of the home or family (0.38%), ill or disabled for a long time or permanently (1.12%), and other (1.65%).

Table 1. Weighted descriptive statistics of all variables by country

Variable	Norway	Sweden	Denmark	Finland	Total
Positive fertility intention (%)	26.1	30.7	26.7	18.6	26.6
Homeowner (%)	61.4	48.5	46.9	44.1	50.0
Housing satisfaction (mean)	7.45	7.65	7.70	7.99	7.68
Female (%)	49.0	48.6	47.8	49.3	48.5
Migrant (%)	14.3	11.9	10.8	5.7	11.1
Activity status (% of column total)					
Employed	66.7	69.4	52.9	58.3	61.2
Unemployed	2.7	4.7	4.3	7.3	4.5
In education or military service	25.9	23.2	33.6	29.0	28.4
Other	4.7	2.7	9.2	5.5	5.9
Parity (% of column total)					
0	62.5	67.7	66.1	70.2	66.4
1	13.8	12.2	14.1	13.1	13.4
2	23.7	20.1	19.8	16.7	20.3
Age group (% of column total)					
18-24	28.9	24.0	34.3	28.0	29.4
25-29	20.0	21.2	15.3	17.5	18.2
30-34	20.2	20.0	17.3	20.6	19.1
35-39	16.8	17.0	16.8	17.8	17.0
40-44	14.2	17.8	16.3	16.2	16.3
Education level (% of column total)					
Low education (ISCED 0-2)	5.4	14.7	40.4	17.7	22.6
Medium education (ISCED 3-4)	50.9	47.5	27.3	49.8	41.1
High education (ISCED 5-8)	43.8	37.8	32.4	32.6	36.3
Partnership (% of column total)					
Married	20.7	22.9	25.7	24.0	23.6
Cohabiting	34.6	35.1	22.2	26.4	29.0
Living separately	11.2	11.0	12.4	12.9	11.8
Single	33.6	31.0	39.6	36.7	35.5
N	3,078	3,546	5,520	2,429	14,573

Source: GGS II Wave 1 in Finland, Sweden, Denmark, and Norway, author's calculations

3.3 Methods

Given the binary nature of the outcome variable—indicating whether individuals intend to have children—multivariate logistic regression models are employed to analyse the data. However, as logistic regression odds ratios are not directly comparable across different models due to the issue of unobserved heterogeneity , this study reports average marginal

effects (AMEs) to facilitate interpretation. AMEs indicate the average change in the predicted probability of expressing fertility intention associated with a one-unit change in each explanatory variable, averaged across all individuals. Unlike odds ratios, AMEs are comparable across models and can be interpreted in a manner analogous to coefficients in ordinary least squares (OLS) regression (Mood, 2010).

In addition, to investigate the potential mediating role of housing satisfaction in the relationship between housing tenure and fertility intentions, we applied path diagram analysis alongside the Karlson-Holm-Breen (KHB) decomposition method. To obtain more robust and unbiased estimates—particularly in contexts where the assumption of normality may not hold, as in logistic regression models—we used 1,000 bootstrap replications to derive confidence intervals (Karlson & Holm, 2011).

4 Research Findings

4.1 Bivariate results

Figure 4 presents weighted fertility intentions across various demographic and social groups, providing descriptive insights into variations of reproductive decisions.

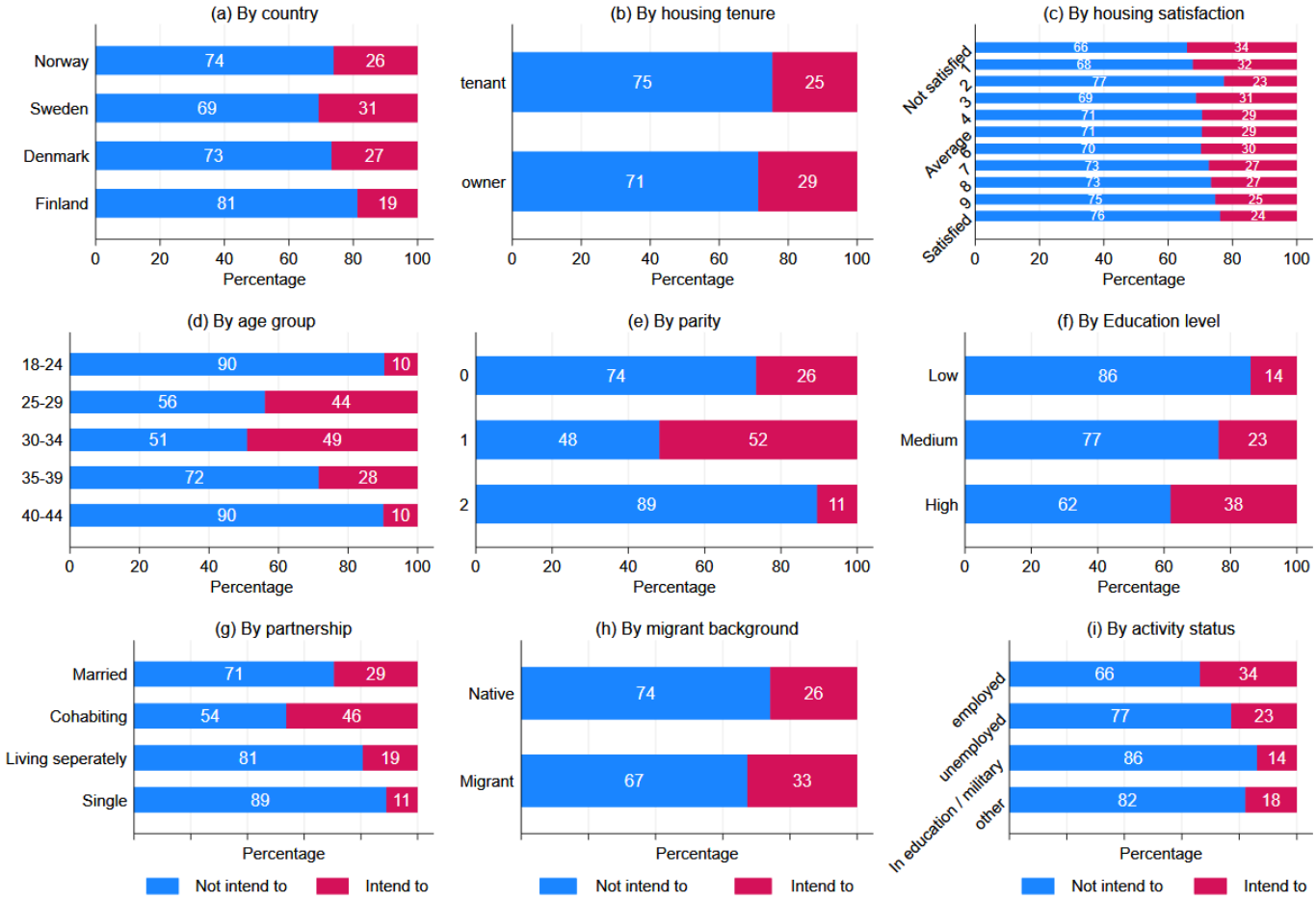

Figure 4. Fertility intentions across various demographic and social groups (n=14,573)

Data source: GGS II Wave 1 in Finland, Sweden, Denmark, and Norway. Author's calculation.

As shown in Figure 4a, in the Nordic countries, a significant 70-80% majority, especially in Finland, do not plan to have children in the next three years, while Sweden has a relatively higher percentage of respondents (31%) intending to have a(nother) child. These patterns

suggest a broadly consistent reluctance across these countries to expand families in the near future, with moderate variations across countries.

Compared to tenants, a larger percentage of homeowners express positive fertility intentions (29% vs. 25%) (see Figure 4b). Figure 4c suggests a negative association between housing satisfaction and fertility intention—individuals who report higher housing satisfaction tend to have lower fertility intentions.

Age group analysis in Figure 4d shows that individuals aged 18-24 and 40-44 are the least likely to express an intention to have children, with only 10% in each group indicating such intentions. In contrast, positive fertility intentions peak among those aged 25-29 (44%) and 30-34 (49%), before sharply declining in older age groups.

The analysis of fertility intentions by parity (number of existing biological children) in Figure 4e shows that 26% of individuals without children intend to have a child within the next three years. Among those with one child, 52% plan to have a second. However, the intention to have more children drops significantly among those with two children, with only 11% intending to have a third child.

Fertility intentions also vary by education level, partnership status, migrant background, and employment status (see Figure 4f-4i). Individuals with higher education levels are more likely to intend to have children, with 38% of highly educated individuals expressing positive fertility intention, compared to 14% of those with low education. In terms of partnership status, cohabiting and married individuals exhibit the highest fertility intentions (46% and 29%, respectively), whereas single individuals and those living separately from their partners are much less likely to plan for children. Additionally, a larger proportion of individuals born outside the studied country express positive fertility intentions (33%) compared to those born

in the native country (26%). Among activity statuses, 34% of employed individuals express positive fertility intentions, compared to 23% of the unemployed and 14% of those in education or military service.

These bivariate results provide an initial understanding of the factors associated with fertility intentions. We will turn to multivariate logistic regression results of fertility intentions, controlling for potential confounders.

4.2 Multivariate analysis of fertility intentions

Figure 5 presents the logistic regression results for housing tenure and housing satisfaction on fertility intentions, expressed as average marginal effects. Both analyses control for covariates such as country, gender, partnership status, migrant background, activity status, age group, education level, and parity.

The results of Model 1 in Figure 5 show that, net of controls, homeownership is not significantly associated with higher fertility intentions, which does not support Hypothesis 1. In this model, we chose not to control for housing satisfaction, as including a potential mediator may obscure the total "effect" of homeownership on fertility intentions. Indeed, additional mediation analysis reveals that the association between housing tenure and fertility intentions is mediated by housing satisfaction (see Appendix 3). Specifically, when considering housing satisfaction as a mediator, homeownership is positively associated with housing satisfaction (AME = 0.999, SE = 0.035, p = 0.000), while housing satisfaction negatively associates with fertility intentions (AME = -0.036, SE = 0.0122, p = 0.004). These results suggest that housing satisfaction acts as a suppressor, accounting for 65.07% of the total effect of homeownership on fertility intentions, thereby masking the positive effect of homeownership on fertility intentions in the total effect model. Additionally, as shown in

interaction analysis in next section, the insignificant association observed in Model 1 may be driven by the Danish case, where homeownership is inversely associated with fertility intentions compared to other countries.

Model 2 in Figure 5 suggests that housing satisfaction is negatively associated with fertility intentions, net of covariates. Specifically, each unit increase in housing satisfaction corresponds to a 0.7 percentage point decrease in the probability of intending to have children. In other words, higher levels of housing satisfaction are associated with lower fertility intentions—a finding that does not align with our Hypothesis 2, which expected a positive association. We deliberately chose not to control for housing tenure in this Model 2, as it may act as an upstream determinant of housing satisfaction. Including tenure as a control could therefore lead to biased estimates of the total association between housing satisfaction and fertility intentions.

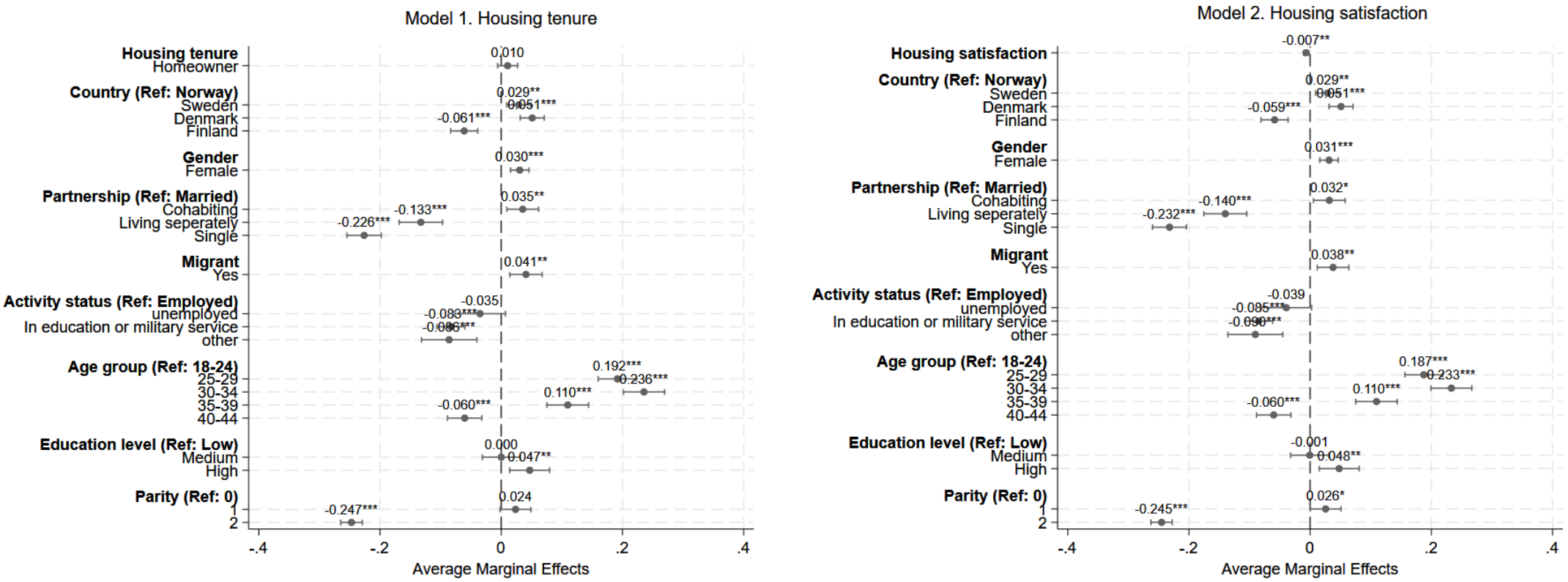

Figure 5. Weighted logistic regression results of housing tenure (Model 1) and housing satisfaction (Model 2) on fertility intentions (n=14,573, CI=95%)

Note: ***p<0.001, **p<0.01, *0.05; data source: GGS II Wave 1 in Finland, Sweden, Denmark, and Norway

We also observed notable differences across Nodic countries. Compared to Norwegians, Danish people are more likely to intend to have a(nother) child, and Finnish people show a lower tendency to have more children in the next three years. In contrast, Swedish people share similar level of fertility intentions with the Norwegian. Age group also plays a significant role, with intentions peaking in the 30-34 years-old group and declining sharply thereafter compared with the youngest group aged 18-24. Additionally, individuals who are living separately with their partner, or single, show significantly lower probability of intending to have children compared to those who are married. Perhaps surprisingly, those cohabiting with a partner have 3.9 percentage points higher probability of having child than those married individuals.

Parity is also associated fertility intentions, with a clear peak in the average probability of having more children among individuals who have one child. However, compared to those with no children, individuals with two children have a 23.4 percentage point lower probability of intending to have another child. Educational level and activity status also play significant roles. A higher level of education is associated with greater fertility intentions, while those currently enrolled in education or military service are less likely to intend to have children.

4.3 Heterogeneity of the influence of housing on fertility intentions

Multivariate analysis suggests that, overall, housing tenure has no significant association with fertility intentions. However, we also aim to explore whether this finding still holds in subsample comparisons, e.g., through interaction analysis. To test our hypotheses that the association between housing tenure and fertility intentions is varied across country, age group, and parity, we added interaction terms on the basis of Model 1 in Figure 5. The results are visualised in Figure 6 below.

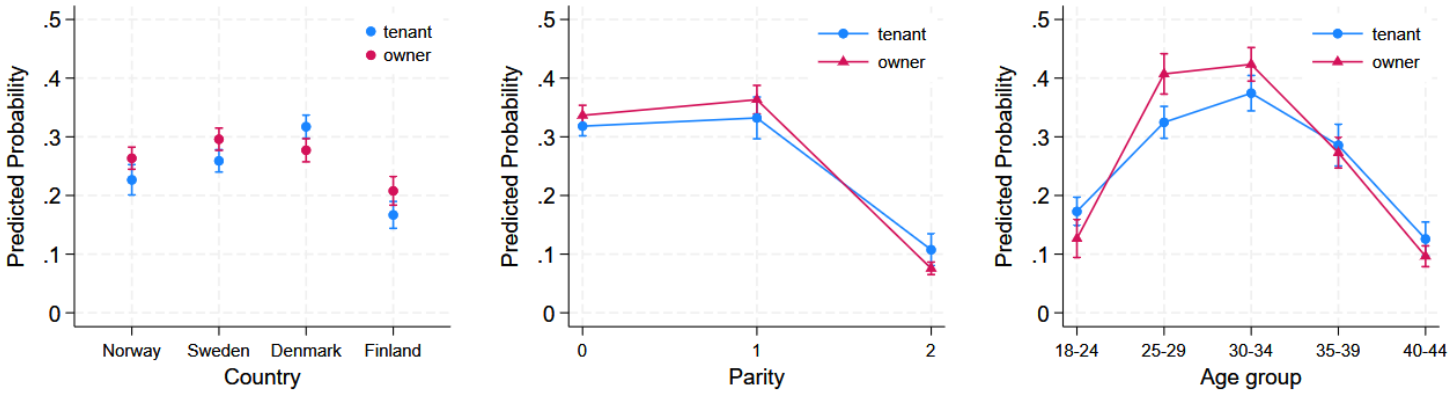

Figure 6. The heterogeneous association of housing tenure and fertility intentions across country, parity, and age group (n=14,573, CI=95%)

Note: Models in Figure 6 are all weighted and controlled for gender, education level, migrant background, partnership, country, parity, age group, and activity status; data source: GGS II Wave 1 in Finland, Sweden, Denmark, and Norway

The results reveal notable country-specific differences, with Denmark showing the highest fertility intentions for both homeowners and non-homeowners on average, while Finland exhibits the lowest fertility intentions for both groups. More importantly, the relationship between homeownership and fertility intentions varies significantly across countries, offering supportive evidence for Hypothesis 3. In Sweden, Norway, and Finland, the fertility intention gap between homeowners and tenants was statistically significant. Homeowners in Norway have a 3.69 percentage points higher fertility intention than tenants ($p = 0.025$), 3.69 percentage points higher in Sweden ($p = 0.008$), and 4.09 percentage points higher in Finland ($p = 0.017$). However, in Denmark, homeowners have 4.01 percentage points lower fertility intention than tenants ($p=0.007$). This variation in magnitude and direction of fertility intention gaps highlights that homeownership appears to play a positive role in shaping fertility plans in Sweden, Norway, and Finland, while in Denmark, the relationship is reverse.

Parity also moderates the association between housing tenure and fertility intentions, supporting Hypothesis 3. In Figure 6, we observe that the fertility intention gap between

homeowners and tenants exists for individuals with zero or one child, although these gaps are not statistically significant. In contrast, among individuals with two children, homeowners are 3.18 percentage points less likely to intend to have another child than tenants (p=0.029).

Age group analysis in Figure 6 further supports Hypothesis 3—that age moderates the relationship between housing tenure and fertility intentions. Fertility intentions are generally low among both the youngest (18–24) and oldest (40–44) age groups. While homeowners in these age groups appear to have lower fertility intentions than non-homeowners, this gap is statistically significant only among those aged 18-24, where homeowners are 4.63 percentage points less likely to intend to have a child ($p = 0.012$). The tenure-related gap is most pronounced among individuals aged 25–29 and 30–34, with homeowners in these groups being 8.26 percentage points ($p = 0.000$) and 4.92 percentage points ($p = 0.016$) more likely to intend to have children than tenants, respectively. This finding aligns with expectations and prior research, which suggests that housing tenure exerts a stronger influence on fertility intentions during the early stages of family formation—particularly in the late twenties and early thirties.

With regard to the association between housing satisfaction and fertility intentions, we identified an overall negative association that is worth exploring whether this pattern remains consistent or becomes more pronounced for certain groups. Figure 7 illustrates the heterogeneity in the relationship between housing satisfaction and fertility intentions across different countries, parity levels, and age groups, on the basis of Model 2 in Figure 5.

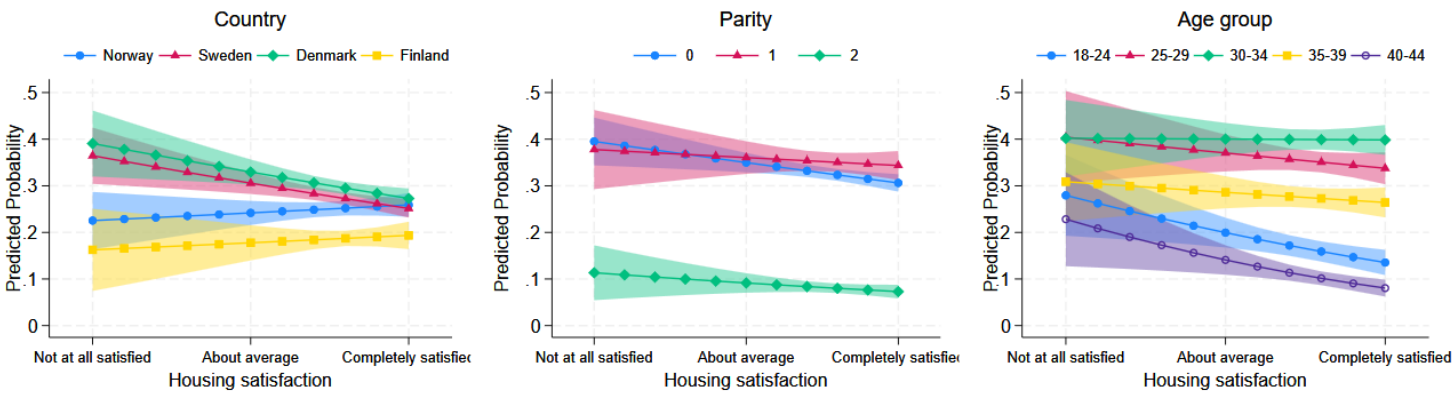

Figure 7. The heterogeneity association of housing satisfaction and fertility intentions across country, parity, and age group (n=14,573, CI=95%)

Note: Models in Figure 6 are all weighted and controlled for gender, education level, migrant background, partnership, country, parity, age group, and activity status; data source: GGS II Wave 1 in Finland, Sweden, Denmark, and Norway

Once again, we observe notable cross-country variations in the association between housing satisfaction and fertility intentions, indicating that the relationship is moderated by country context and providing strong support for Hypothesis 4. Specifically, in Finland and Norway, housing satisfaction is not significantly associated with fertility intentions (Norway: p=0.419; Finland, p= 0.593), as shown in Figure 7, where the predicted probabilities remain relatively flat. In contrast, in Denmark and Sweden, housing satisfaction is negatively associated with fertility intentions. For each one-unit increase in housing satisfaction (on a 0-10 scale), the probability of intending to have a child decreases by approximately 1.1 percentage points in both countries (Sweden: p = 0.002; Denmark: p = 0.006).

Parity moderates the association between housing satisfaction and fertility intentions. Among individuals without children, fertility intentions are negatively associated with housing satisfaction (AME= –0.0087, p = 0.005). However, for those with one or two children, housing satisfaction shows no statistically significant relationship with fertility intentions. This heterogeneous pattern suggests that the relationship between housing satisfaction and

fertility intentions varies by life stage, with non-parents being more influenced by their housing satisfaction when considering whether to have children, compared to parents.

Age moderates the association between housing satisfaction and fertility intentions, aligning with Hypothesis 4 of this study. The interaction analysis reveals a significantly negative relationship for the youngest (18–24; AME = –0.0127, p = 0.002) and oldest (40–44; AME = –0.0119, p = 0.002) age groups, whereas no significant association is observed among the intermediate age groups (25–39).

4.4 Robustness analyses

We include a *Capital region*[3] dummy as part of our robustness analyses, given that the housing–fertility link may vary across geographical contexts. In addition to housing affordability and labour opportunities, capital areas may differ in policy frameworks, demographic composition, and housing norms. Among respondents with valid data (n = 9,043), an average of 32% reside in a capital region—18% in Norway, 42% in Sweden, and 35% in Finland (data for Denmark are unavailable). Table 2 presents the robustness analysis: Models 1 and 2 replicate the baseline models from Figure 5; Models 1a and 2a include an additional control for residence in a capital region; and Models 1b and 2b only exclude the Danish sample from the baseline model.

[3] Due to the limitations in the geographical granularity of this variable, the classification of 'capital region' is somewhat coarse and not fully standardized across countries. Specifically, in the Finnish sample, the capital region refers to Helsinki-Uusimaa; in the Norwegian sample, it refers to Oslo County (one of the 11 counties); and in the Swedish sample, it corresponds to the East region (NUTS-1 level), which includes Stockholm and East Middle Sweden. However, these classifications reflect the finest geographical subdivisions available in the respective datasets.

Table 2. Robustness analyses of housing on fertility intentions with/without capital region controlled

Main variable	**Model 1** (Baseline)	**Model 1a** (+ Capital region)	**Model 1b** (exclude Danish sample)	**Model 2** (Baseline)	**Model 2a** (+ Capital region)	**Model 2b** (exclude Danish sample)
Homeowner	0.010	0.037***	0.037***	-	-	-
	(0.00849)	(0.01059)	(0.01059)			
Housing satisfaction	-	-	-	-0.007**	-0.004	-0.0043
				(0.00219)	(0.01059)	(0.00255)-
Capital region	-	-0.008	-	-	-0.008	-
		(0.00963)			(0.00961)	
Other covariates	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
N	14,573	9,043	9,053	14,573	9,043	9,053
Pseudo R2	0.2749	0.2765	0.2766	0.2758	0.2753	0.2753

Note: * p<0.05, ** p<0.01, *** p<0.001; table reports average marginal effects (AMEs) from logistic regression models on fertility intentions, with standard errors in parentheses; data source: GGS II Wave 1 in Finland, Sweden, Denmark, and Norway

Comparing Model1a and Mode 2a with baseline models, we observe that controlling for capital region residence alters the associations between housing factors and fertility intentions. Specifically, the positive association between homeownership and fertility intentions becomes stronger and reaches statistical significance after accounting for capital region residence. In contrast, the previously negative association between housing satisfaction and fertility intentions weakens and becomes statistically insignificant. The capital region variable itself is not statistically significant.

One possible explanation, for the altered associations between housing tenure/satisfaction and fertility intentions after controlling for capital region residence, is not the inclusion of the capital region variable itself, but rather the exclusion of the Danish sample. Models 1b and 2b exclude Denmark without controlling for *Capital region*, yet yield results similar to Models 1a and 2a. Comparing Model 1a and Model 1b, we observe that the coefficient for homeownership remains nearly unchanged when excluding Denmark, suggesting that sample composition—rather than regional context—is driving the observed shift. This is consistent

with earlier findings in Section 4.3, where the tenure–fertility relationship in Denmark diverges from the other Nordic countries: Danish homeowners are less likely to intend to have children than tenants.

A similar pattern is found for housing satisfaction. The loss of statistical significance in Model 2a also appears in Model 2b, reinforcing the interpretation that the change stems from excluding Denmark, rather than from introducing the capital region control. In Section 4.3, we further showed that Denmark exhibits a stronger negative association between housing satisfaction and fertility intentions than the other countries. Naturally, removing the Danish sample reduces the overall effect size and statistical power, making the association less discernible in the remaining sample. Importantly, the *Capital region* variable itself remains statistically insignificant, indicating that subnational regional differences do not account for the patterns observed.

Additionally, Appendix 2 presents a robustness analysis that controls for net household income. Due to limited data availability, this analysis is included in the appendix; however, the results are consistent with those of the main models. Together with the capital region check, these analyses confirm that our findings are robust to alternative specifications.

5 Conclusions and Discussions

This study investigated the relationship between homeownership, housing satisfaction, and fertility intentions using recently collected data from the Generations and Gender Survey Round II, contributing to the broader discussion on fertility decline in the Nordic countries since the 2010s. By incorporating housing satisfaction as an explanatory and mediating variable, the analysis provides a more nuanced understanding of how housing can be associated with childbearing intentions.

Overall, our analysis demonstrated that homeownership is positively associated with fertility intentions in Nordic countries, with the exception of Denmark. This finding aligns with the previously observed pattern that homeownership is associated with higher fertility rates in West Europe and North America, as it may foster a conducive environment or socioeconomic prerequisite for planning a(nother) child (e.g., Japaridze & Sayour, 2024; Tocchioni et al., 2021). Notably, the positive association is particularly pronounced among individuals who have no children or one-child parents, as well as those aged between 25 and 35—a life stage when individuals are actively making family formation decisions and transitioning from the parental home to establishing their own housing careers (Mulder, 2013; Öst, 2012).

Although the tenure-based differences in fertility intentions among individuals with zero or one child are not statistically significant, the observed pattern still provides suggestive evidence. Specifically, the positive association between homeownership and fertility intention appears to be mainly driven by those with fewer children (i.e., 0–1), rather than those with two children. This trend may reflect a threshold effect, where the relevance of housing conditions becomes less pronounced once families reach a certain size. Therefore, despite the lack of statistical significance, these findings remain theoretically meaningful and highlight

the importance of examining housing–fertility dynamics particularly among early-stage parents.

In terms of country differences, we found that Denmark diverges from the general tenure-fertility pattern: in contrast to other Nordic countries, Danish homeowners are less likely than tenants to express fertility intentions. This negative association may reflect country-specific institutional and structural contexts that shape how housing tenure influences family planning. This divergence may stem from country-specific housing policies or cultural factors that shape the relationship between housing tenure and family planning. One possible explanation lies in Denmark's strong tenure-neutral housing policy and its comparatively large rental sector, including an extensive provision of social rental housing (Blackwell & Bengtsson, 2023; Grander, 2023; Vestergaard & Scanlon, 2014). These features reduce the social and economic pressure to transition into homeownership before starting or expanding a family. In such a context, renting may be seen not as a temporary or inferior tenure, but as a stable and viable long-term option. Additionally, housing costs in Denmark—particularly in Copenhagen—are relatively high compared to other Nordic countries (see Figure 3, Housing expenditure as % of final consumption expenditure of households). This may further encourage individuals to prioritize housing flexibility over ownership. Purchasing a home typically requires a substantial down payment and long-term mortgage commitment, which can compete with family planning due to budgetary constraints. Consequently, in Denmark, homeownership may not serve as a facilitator of childbearing in the same way it does in other Nordic countries, where it is more closely associated with financial security and key life-course transitions.

Regarding housing satisfaction, contrary to initial expectations, it exhibits a negative association with fertility intentions. This pattern is observed in Denmark and Sweden but not

in Finland and Norway. It is particularly pronounced among childless individuals and those aged 18–24 and 40–44. Several possible explanations can account for this finding. One potential reason is that housing satisfaction may serve as a proxy for lifestyle preferences. Individuals with higher housing satisfaction might be more inclined toward a child-free lifestyle, delayed parenthood, or may have already completed their childbearing plans. This could explain why the negative association is strongest among childless individuals and those aged 18–24—who may prefer to postpone parenthood—and among the 40–44 age group, who may have already fulfilled their fertility intentions. Second, higher housing satisfaction may indicate significant financial and emotional investments in one's current living conditions. Those who are highly satisfied with their housing situation may have already allocated substantial resources to maintaining their existing lifestyle, making them more reluctant to face the financial and spatial adjustments associated with childrearing. Besides, the negative association between housing satisfaction and fertility intentions may be partially driven by reverse causality. Individuals who strongly intend to have children might assess their current housing situation more critically or hold higher expectations for their future living conditions, leading to lower reported housing satisfaction.

These findings carry important theoretical and policy implications, highlighting the significant role housing can play in shaping fertility intentions, especially in the context of increased economic uncertainty following the 2008 financial crisis (Fahlén & Oláh, 2018; Florida et al., 2021; van Wijk & Billari, 2024). Housing is a unique component of an individual's life course due to its multifaceted nature—it functions not only as a major household asset or consumption good but also as an emotional anchor, a foundation for community engagement, and often a prerequisite for family formation (Kulu & Steele, 2013; Mulder, 2006a, 2013). The Nordic context provides a crucial lens for interpreting these findings. Unlike in many other advanced economies, Nordic countries are characterised by

extensive welfare provisions, universal childcare, and strong labour market protections for dual-income parents (Andersson et al., 2009; Esping-Andersen, 1990). These institutional features are thought to theoretically reduce the necessity of homeownership as a prerequisite for childbearing. Nevertheless, our findings show that housing conditions remain significantly associated with fertility intentions, even within this supportive welfare regime. Notably, we observe variation across the four countries—for example, Denmark's well-regulated rental sector may reduce the need for ownership before childbearing, while in other countries, homeownership appears more strongly linked to fertility planning.

Despite its contributions, this study has some limitations. The cross-sectional design constrains causal inferences, and unobserved factors such as personal values or economic expectations may also shape fertility intentions. Future research could employ longitudinal data to better capture the dynamic interplay between housing conditions and fertility decisions. Moreover, investigating regional or rural-urban variations within Nordic countries may offer deeper insights into how local housing markets interact with demographic behaviours.

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Appendices

Appendix 1 Accuracy of the proxy measure of housing tenure in Swedish sample

This study used property value as a proxy for housing tenure in Sweden, but assessing the accuracy of this proxy has posed some challenges. Specifically, comparing property value across subsamples from other countries faces significant data limitations. The Norwegian sample is entirely missing from the variable “inc01. value of property”, while the variables for Denmark and Finland have substantial missing values, with 49.95% and 38.25%, respectively. As a result, making direct comparisons between Sweden and these countries based on "inc01" as a housing tenure proxy is difficult.

Alternatively, we the data to housing tenure distribution information from Statistics Sweden (see Figure 8). According to this data, 48% of the population lived in owner-occupied dwellings in 2021, a figure that closely matches what we capture through the property value variable (49.25% unweighted or 52.5% weighted).

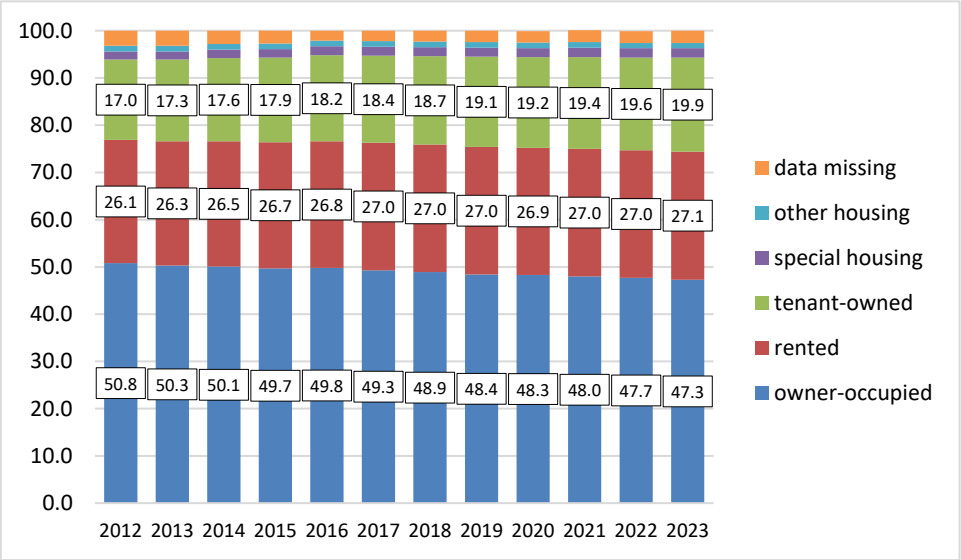

Figure 8. Percentage of persons by housing tenure in Sweden 2012-2023

Note: data source from Statistics Sweden HE0111AB, with own calculations. Tenant-owned refers to cooperative housing (bostadsrätt) that residents buy the right to use rather than

fully right to own. Other housing means buildings that are not intended for residential purposes but still contains ordinary dwellings, e.g. buildings used for business or public function, and owner-occupied dwellings in multi-dwelling buildings. It also includes dwellings where information on form of tenancy is missing. Special housing means dwellings for elderly/disabled, student housing and other special housing. Data missing includes persons registered in Sweden but not linked to a dwelling, which is about 3 per cent of the population.

Appendix 2 Sensitivity analysis for net household income variable

Net household income in this study presents challenges for cross-country comparability. The four Nordic countries use different currencies, and income is measured as an ordinal variable with varying grouping intervals. One solution to this issue is to employ relative income measure—categorising individuals within each country into high, medium, and low-income groups, and then combine into a unified income variable. However, this relative income measure may obscure absolute income differences among countries, as "high income" in one country may have significantly lower purchasing power than in another. Furthermore, relative income may overlook nuances in income distribution within each country, especially at the extremes of wealth and poverty.

The figure below presents the distribution of net household income in each country's sample, excluding cases with missing values. The income distributions across the countries show significant differences. For instance, Denmark and Norway have right-skewed distributions, with a small proportion of extremely high-income households. Alternatively, the more granular income categories used in these distributions can better capture the higher-income families. In contrast, Finland and Sweden exhibit income distributions that are closer to a normal distribution. However, despite this, Finland has a higher proportion of low-income households, while Sweden has a relatively larger share of high-income households.

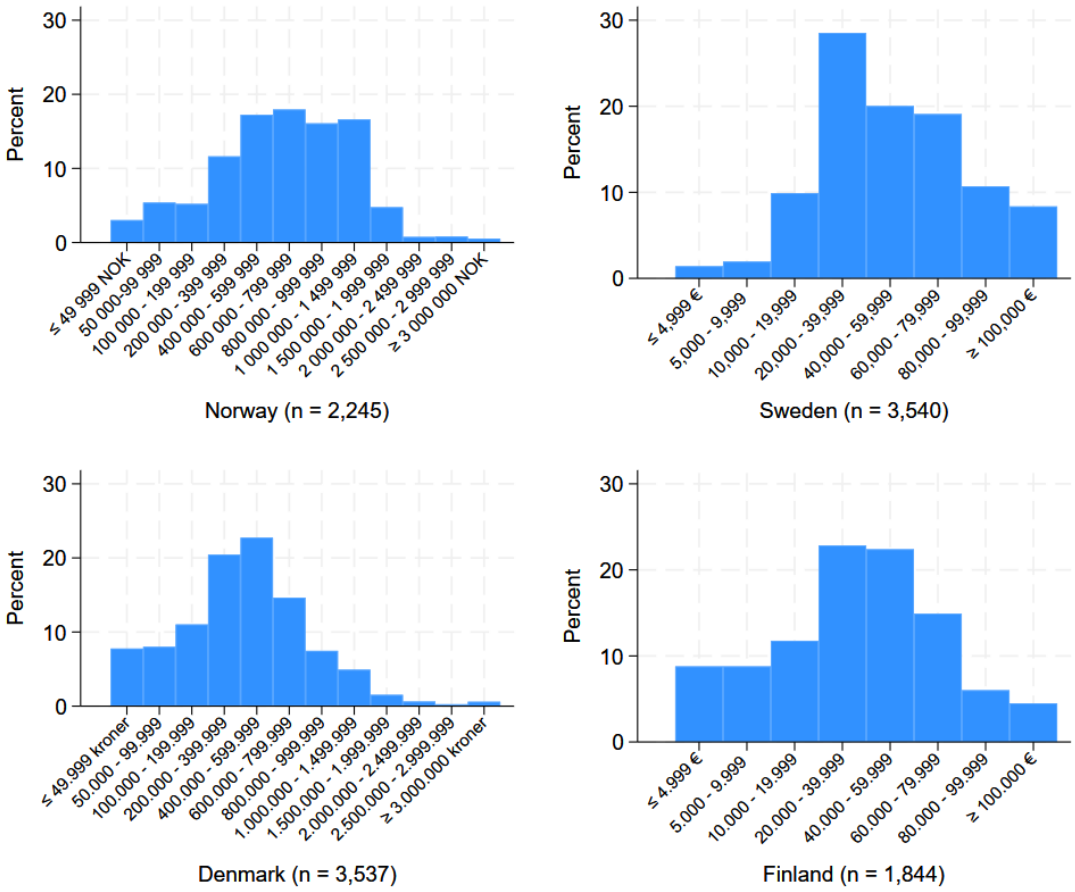

Figure 9. Distribution of net household income across countries (excluding missing values)

The proportion of missing values for the income variable varies significantly across countries. The Norwegian sample has 710 missing cases out of a total of 3,078 observations. The Swedish sample has only 6 missing cases, with a total of 3,364 observations. The Danish sample has the largest proportion of missing values, with 1,983 missing cases in a total subsample of 5,520. The Finnish sample has 585 missing cases in a total subsample of 2,429. These missing values are due to "refusal," "don't know," and "incomplete survey" responses. There is no evidence suggesting that these missing values result from skip questions (e.g., when income is reported as zero) or previous loop questions. All respondents are asked about their income.

To address the comparability issue arising from the varying proportions and causes of missing data, this study recodes net household income into three categories of relative income rank

using quantiles, with missing values treated as a separate category. Specifically, household net income is divided into four groups: low income (bottom 30%), medium income (middle 30%), high income (top 20%), and missing (20%).

The sensitivity analysis shows that the inclusion or exclusion of the income variable in the model has no significant effect on the main results. Specifically, the estimated average marginal effect for the key independent variables remains stable in both direction and magnitude, and their statistical significance is unaffected. Furthermore, the model fit indices, such as the pseudo R-squared, Akaike Information Criterion (AIC), and Bayesian Information Criterion (BIC), exhibit only minimal changes, suggesting that the income variable does not substantially influence the explanatory power of the model. These findings suggest the robustness of the results and indicate that the observed relationships are not driven by income effects but rather reflect the underlying dynamics captured by the other explanatory variables included in the analysis.

Appendix 3 Mediation analysis of housing satisfaction

This appendix presents supplementary mediation analyses examining whether housing satisfaction mediates the relationship between homeownership and fertility intentions. We employ the Karlson-Holm-Breen (KHB) decomposition method with 1,000 bootstrap replications to obtain more robust and unbiased estimates, particularly in cases where the assumption of normality may not hold, such as in logistic regression models (Karlson & Holm, 2011).

Shown in Figure 10 below, we observed that the effect of homeownership is partially mediated by housing satisfaction. Specifically, homeownership was not significantly associated with fertility intentions in the total effect model as we also observed in the formal

analysis (*b* = .0689, p = 0.179, SE= 0.051, 95% CI [-0.032, 0.169]). However, after accounting for housing satisfaction as a mediator, the direct effect of homeownership became positively significant (*b* = 0.106, SE = 0.052, p = 0.042, 95% CI [0.004, 0.209]).

Further path diagram analysis shows that homeownership is positively associated with housing satisfaction (*b* = 0.999, SE = 0.035, p= 0.000, 95% CI [0.930, 1.068]), while housing satisfaction negatively associates with fertility intentions (*b* = -0.036, p = 0.004, SE=.0122, 95% CI [-0.0597, -0.012]). These results suggest that housing satisfaction acts as a suppressor, accounts for 65.07% of the total effect of homeownership on fertility intentions, masking the positive effect of homeownership on fertility intentions in the total effect model.

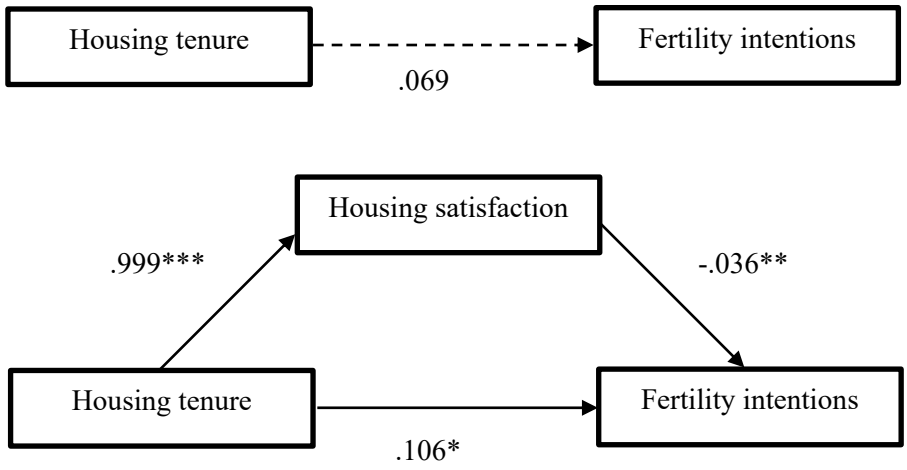

Figure 10. Mediation analysis results of housing satisfaction on the association between housing tenure and fertility intentions (N= 14,573)

Note: ***p<0.001, **p<0.01, *0.05. All covariates were controlled, including gender, education level, migrant background, partnership, country, parity, age group, and activity status.