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*Research Article*

**The impact of household structure on fertility:  
A study in Vietnam**

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## **The impact of household structure on fertility: A study in Vietnam**

**Nguyễn Hồ Anh Khoa<sup>1</sup>**

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### **Abstract**

#### **BACKGROUND**

A declining fertility rate and aging population are major challenges for Vietnam.

#### **METHODS**

This study utilizes panel data from the Vietnam Access to Resources Household Survey, conducted from 2008 to 2016, tracking 1,200 households over nine years. A fixed effects model was employed to control for unobserved factors, such as cultural traditions and fertility motivations, thereby addressing endogeneity issues commonly encountered in previous research.

#### **RESULTS**

The results indicate that the presence of grandparent(s) in a household has a positive impact on the number of children born (particularly when both grandparents are present), with estimates ranging from 0.0771 (95% CI: 0.0175 to 0.1368) for both grandparents to 0.1373 (95% CI: 0.0824 to 0.1922) overall. This effect is especially prominent in the Central Highlands and the Northern Midlands/Mountainous Area. In contrast, the effect is less pronounced in the Mekong River Delta, likely due to socioeconomic factors and data limitations.

#### **CONTRIBUTION**

This study highlights the importance of household structure in shaping fertility behavior and provides policy recommendations to support multigenerational households and promote sustainable fertility rates in Vietnam.

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## 1. Introduction

Since the 1990s, Vietnam's total fertility rate (TFR) has declined from the replacement level (2.09 births per woman) to below 2.0 births per woman in many urban areas. Vietnam's TFR in 2023 was approximately 1.91 births per woman, dropping to a record low of 1.91 in 2024. Fertility rates have continued to decline and are projected to decrease further in the coming years (General Statistics Office of Vietnam 2024).

Although this fertility rate is not exceptionally low compared to rates in developed countries, maintaining a sustainable fertility level has become an urgent challenge in the context of a rapidly aging population. Fertility rates play a crucial role in determining the growth rate and age structure of populations (White and Lindstrom 2005). The decline in fertility not only is a demographic issue but also has far-reaching social and economic consequences.

According to data from the Current Population Census 1989–2019 (Ruggles et al. 2024), over the past 30 years, the proportion of extended households in Vietnam has remained relatively stable at around 26% while nuclear households have decreased from about 50% to 42%. This shift is due to increases in single-person households (from 1.3% in 1989 to 10.5% in 2019) and childless married couples (from 3.5% to 11.5% in the same period), indicating diversification, although multigenerational living persists.

Building on these trends, previous studies have shown that household structure influences fertility behavior, particularly in terms of resource allocation and child care responsibilities. Extended family members, especially grandparents, not only provide financial support but also play a crucial role in child care, reducing the burden on parents and encouraging them to have more children (e.g., Sear, Mace, and McGregor 2003; Sear and Mace 2008; Sear and Coall 2011; Waynforth 2012; Mathews and Sear 2013; Thomese and Liefbroer 2013; Ji et al. 2015; Yoon 2017; Sear 2018). In contexts where such family support is limited, outsourcing housework through domestic help can similarly alleviate role incompatibility and facilitate transitions to higher parity, as seen in studies from Europe and Asia (Cheung and Kim 2022; Raz-Yurovich 2016). Young urban couples often opt for smaller nuclear families, focusing on individual economic development, leading to decisions to have children later or fewer children. Meanwhile, in rural areas, although multigenerational households are still common, they are also gradually changing under the influence of modernization and labor migration (Hirschman and Minh 2002).

According to Rutigliano (2020), societal attitudes toward not having children can have a complex impact on reproductive decisions. In places where individual values are highly regarded, childlessness is more readily accepted. However, support from grandparents might not be as crucial if society supports the choice of being childless. Conversely, in places where family policies are weak and societal attitudes do not

encourage childlessness, support from grandparents can become very significant in the decision to become parents.

This assessment could also be relevant in Vietnam, where the population is aging at one of the fastest rates globally (General Statistics Office of Vietnam and UNFPA 2021) and the birth rate has been steadily declining below replacement level (General Statistics Office of Vietnam 2024), indicating a changing social attitude toward not having children. Although Vietnam still upholds traditional values about family and children, perceptions on this issue are changing, especially in large cities. There, young couples often delay having children or decide against it due to economic factors, career considerations, and personal needs.

Furthermore, Vietnam still maintains traditional Confucian values (Hirschman and Loi 1996; Bélanger 2002; Tho 2016), especially in terms of family structures and societal pressures. So grandparents, in addition to providing child care support, also contribute to maintaining cultural pressure, leading women to have more children.

Childbearing in Vietnam is influenced by a complex interplay of socioeconomic, cultural, and policy factors (Dahl and Moretti 2004; Yen, Sukontamarn, and Dang 2020; Ngo 2020; Treleaven et al. 2016). Moreover, a recent study by Nguyen et al. (2023) highlighted the significant role of familial factors, such as coresidence with parents, in influencing the desire for additional children among women with one child. However, the impact of these factors may vary depending on individual characteristics and life circumstances, including potential constraining mechanisms like resource dilution in larger households, as tested empirically in this paper.

Currently, Vietnam's population policy, specifically Decision No. 588/QĐ-TTg, issued by the prime minister on April 28, 2020, focuses on encouraging childbearing to address the declining fertility rate while also addressing the issue of sex selection at birth (Prime Minister of Vietnam 2020). Although there have been measures to encourage second births in many provinces, the results have been limited. This raises questions about the underlying causes affecting the childbearing decisions of Vietnamese households.

Additionally, previous studies using time series or cross-sectional data often faced the issue of endogeneity due to the lack of control over unobserved factors, such as personal beliefs, cultural values, or intrinsic motivations regarding childbearing. To address this limitation, this study uses panel data from the Vietnam Access to Resources Household Survey (VARHS) combined with the fixed effects model (FEM). This method allows for controlling unobserved factors that are stable over time, thereby reducing endogeneity issues and increasing the reliability of the research results.

## 2. Literature review

Numerous international studies have demonstrated the role of grandparents and other relatives in influencing fertility outcomes, as summarized in reviews by Sear and Coall (2011) and Sear and Mace (2008). Sear, Mace, and McGregor (2003) investigated the impact of the presence of maternal and paternal grandparents in Gambia. The results indicated that the presence of the maternal grandmother increases the likelihood of women having children while the paternal grandmother has no significant effect; the paternal grandfather also has a positive impact but to a lesser degree. However, a study in the Netherlands by Thomese and Liefbroer (2013) showed that both sets of grandparents have a positive influence on women's decisions to have more children. This effect is stronger when the maternal grandmother is involved in child care, highlighting differences between the two sets of grandparents. Grandparental support in child care often serves as a supplementary measure when parents cannot fully access paid child care services. However, according to the authors, the involvement of grandparents does not entirely replace the use of paid child care services.

Additionally, Hank and Buber (2009) showed that grandparents frequently provide child care support in families where the mother works and children are preschool age. This finding suggests that in families with working mothers, the role of grandparents becomes essential in supporting the care of young children, alleviating parenting pressures, and facilitating the decision to have additional children. Similarly, Raz-Yurovich (2014) suggests that unpaid child care by grandparents, because it is less costly and more reliable than paid care, can contribute to higher fertility rates. While the study by Ji et al. (2015) in China found that both living with grandparents and receiving child care support from grandparents had no impact on the intention to have children, Yoon (2017) in South Korea showed that receiving help from either one's own parents or one's in-laws encourages women to have more children.

Mathews and Sear (2013) conducted research in the United Kingdom and found that women with more kin in their close social networks are more likely to enter motherhood (have a first birth) compared to those with fewer kin. The study also demonstrated that regular contact with relatives, through various means, has a positive effect on the decision to have children. Although Waynforth (2012), in a similar study in the United Kingdom, found no clear evidence that financial support from grandparents had a positive effect on childbearing decisions (and even found a negative effect in some cases), the study showed that help with child care and emotional support encouraged women's progression to a second birth, with child care also encouraging a third birth. This indicates that emotional and practical support from family is as crucial as material support—or even more crucial.

Both studies agree on the importance of close family relationships in supporting reproduction, but while Waynforth (2012) emphasizes the ambiguity of the impact from

financial and practical care support, Mathews and Sear (2013) clearly show that support from relatives, including child care and regular communication, is a significant factor in the decision to have a second child.

Overall, the supportive role of grandparents and other relatives in extended households has been confirmed in various studies (e.g., Snopkowski and Sear 2016; Sear 2018). Furthermore, Okun and Stecklov (2021), in Israel, showed that the death of grandparents can decrease the probability of having children, underscoring the importance of grandparental support not only during childbearing but also across generations, especially in societies with low fertility rates.

As noted earlier, this literature also accurately reflects the context of our study, where factors influencing fertility rates include population policies and the socioeconomic characteristics of women, particularly the cultural preference for sons in Vietnamese households (Dahl and Moretti 2004; Yen, Sukontamarn, and Dang 2020; Ngo 2020; Treleaven et al. 2016). Very few studies examine the relationship between living in an extended household structure and childbearing decisions. A recent study by Nguyen et al. (2023) using multivariate regression analysis indicated that living with parents is associated with the desire to have more children among women with one child but is not associated with the desire to have a third child among women with two children.

Although numerous international studies have pointed out the impact of household structure, specifically the presence of grandparents, on reproductive behavior, in Vietnam, research on this relationship is still very limited. Some studies suggest that the demand for informal child care by parents depends on the institutional context, such as the availability of formal child care services (Hank and Kreyenfeld 2003; Hank and Buber 2009; Aassve, Meroni, and Pronzato 2012), cultural differences in family practices and norms (Jappens and Van Bavel 2012), or societal attitudes toward childlessness (Rutigliano 2020). According to Sear, Mace, and McGregor (2003), differences in household structure as well as the impact of socioeconomic factors on reproductive behavior vary across regions.

This work also accurately reflects the context of our study, as Vietnam is a developing country with one of the fastest rates of population aging in the world (General Statistics Office of Vietnam and UNFPA 2021). At the same time, the total fertility rate has followed a decreasing trend and has fallen below the replacement level (General Statistics Office of Vietnam 2024). Urban–rural differences critically shape how grandparental support affects fertility in Vietnam. Rural areas maintain higher extended household rates and contribute to overall TFR trends (declining to 1.91 in 2024, with rural areas historically higher than urban areas due to traditional norms), amplifying grandparents' roles in coresidence and child care. In contrast, urban households show lower TFR amid urbanization, reducing coresidence and weakening effects (General Statistics Office of Vietnam 2024). Thus our rural findings may overestimate urban

impacts, warranting caution in national generalization. Moreover, Vietnam is still influenced by Confucian traditions (Hirschman and Loi 1996; Bélanger et al. 2003; Tho 2016), which may pose certain pressures on women regarding childbirth.

Previous studies, mostly using time series or cross-sectional data, often encountered endogeneity issues stemming from the lack of control for unobserved factors, such as personal views, cultural values, or intrinsic motivations regarding childbearing. These factors can influence both household structure and childbearing decisions, thus biasing research outcomes.

To address this limitation, this study utilizes panel data from VARHS combined with a fixed effects model. This method allows for the control of unobserved but time-stable factors. Analysis based on this data provides more accurate results about the impact of household structure on reproductive behavior, since fixed factors no longer act as confounders.

A unique aspect of this study compared to previous ones is that the observations are at the household level rather than the individual-woman level. This is because the dataset tracks the same households over time using unique household codes and focuses on rural areas, where the number of household members is quite large. Although tracking individual women over years can be prone to errors (such as the risk of duplicating the same woman), using the household as the unit of observation provides a more comprehensive evaluation of the impact of demographic and household economic factors on childbearing decisions. This approach allows us to capture interactions among family members and their influence on reproductive decisions instead of focusing solely on an individual.

### **3. Theoretical framework**

The cooperative breeding theory, proposed by Hrdy (2009), offers a novel perspective on human evolution and development. This theory posits that humans are among the few mammalian species practicing cooperative breeding, where the care and upbringing of offspring are not solely the responsibility of the mother but are supported by other members of the community, such as fathers, grandparents, relatives, or even non-kin individuals.

As reviewed earlier, numerous studies have demonstrated that support from grandparents and other family members alleviates the burden on women. Couples with close relationships with their parents, particularly their biological parents, are positively influenced in their likelihood of having additional children. Frequent contact with close relatives through various forms of interaction similarly has a positive impact. Beyond frequent communication, couples living with their parents, especially in extended

families with in-laws, tend to have more children compared to nuclear families (Sear, Mace, and McGregor 2003; Waynforth 2012; Mathews and Sear 2013; Thomese and Liefbroer 2013; Ji et al. 2015; Yoon 2017; Sear 2018).

This suggests that both material support and psychological support, as well as social cohesion, play vital roles in influencing reproductive behavior in modern contexts, where the costs of childrearing continue to rise. The cooperative breeding theory emphasizes that childrearing support from group members includes care for offspring (including by non-kin), the provision of food, protection, and education through social behaviors. Women often receive support from various sources, including immediate family and non-relatives, depending on who is willing and able to help (Mace and Sear 2005). In countries with well-developed child care services, women are likely to have higher fertility rates (Hank and Kreyenfeld 2003; Yakita 2019). Women with higher incomes, when supported by domestic helpers, can continue participating in the labor market, thereby increasing their likelihood of having more children (Cheung and Kim 2022).

The theory has particular significance in modern societies, where the costs of childrearing are rising, nuclear families are becoming more prevalent, and fertility rates are steadily declining. If humans evolved to rear children in a context of cooperative support among relatives, policies focusing exclusively on nuclear families could have detrimental consequences. The lack of appropriate external support for nuclear families may negatively affect the health and well-being of both parents and children while further reducing fertility rates (Hrdy 2009). Interactions with and support from grandparents, extended family members, and the broader community not only alleviate pressures on parents but also foster positive childbearing decisions, strengthen familial relationships, and nurture socially well-adjusted future generations.

Based on theoretical foundations and findings from previous empirical studies, we propose the hypothesis (H1) that an extended household structure (with the presence of grandparents) will have a positive effect on the number of children born in the household. This is particularly relevant in Vietnam's Confucian context, where multigenerational households persist.

Building on this, the cooperative breeding framework's relevance in Vietnam varies by urban–rural context. In rural areas, cooperative breeding thrives via higher coresidence and TFR (with rural rates at 2.08 contributing to the national rate of 1.91 in 2024), with grandparents providing intensive support amid agrarian lifestyles. In urban settings, a lower TFR (1.67 in 2024) and a shift toward nuclear families may reduce traditional coresidence, leading to greater reliance on distant aid or paid child care, potentially moderating these effects (General Statistics Office of Vietnam 2024). Thus H1 likely holds more strongly in rural contexts, where our analysis provides critical insights into these dynamics. In urban areas, policies such as subsidized child care could serve as alternatives to emulate kin support (Cheung and Kim 2022).

## **4. Methodology**

### **4.1 Data source**

VARHS is a panel dataset that collects information about households, providing data on the same households over multiple years. It is conducted to monitor households' access to resources and services, as well as changes in their economic and social conditions over time. The survey was first launched in 2002 to address the need for more detailed information on household resources and their interactions in Vietnam. Since 2006, the survey has been conducted biennially, focusing on approximately 3,000 rural households, representing the majority of the country's population. The VARHS dataset covers 12 provinces across three main economic regions: the North, Central, and South, specifically including Ha Tay (now part of Ha Noi), Lao Cai, Phu Tho, Lai Chau, Dien Bien, Nghe An, Quang Nam, Khanh Hoa, Dak Lak, Dak Nong, Lam Dong, and Long An.

VARHS was conducted in 2002 and 2006 and biennially from 2008 to 2018. However, due to data accessibility constraints, this study utilizes information from only 2008, 2010, 2012, 2014, and 2016 in the VARHS dataset to analyze changes in household structure and the number of children born over time. Thus the study assesses the impact of socioeconomic factors and family care support on fertility decisions within the same households over time.

### **4.2 Data sampling**

After screening the VARHS dataset, we retained a sample of 6,000 observations from 1,200 households tracked between 2008 and 2016. The data filtering process was conducted as follows: Based on information provided in the survey questionnaire, we excluded households with grandchildren where the household head and spouse were beyond reproductive age. These households were consistently classified as extended households (three or more generations living together, including the household head and spouse, their children, and their grandchildren). (See Figure A-1.)

The study uses household-level observations. To avoid missing childbearing decisions of women in the household other than the spouse of the head (siblings of the household head), we retained households that included both siblings of the head and grandchildren during the study period, assuming that these grandchildren might be the children of the head's siblings. This was done to comprehensively capture the childbearing decisions of the entire household.

For a balanced dataset, we retained only households that were fully present throughout the entire survey period, from 2008 to 2016, with surveys conducted every

two years. As a result, all households in the study sample appear five times in the data. Figure A-1 presents a diagram of family members based on their relationships to the household head. Table 7 summarizes the distribution of households across provinces and socioeconomic regions, including the percentage of male-headed households.

Additionally, to assess the variation in household structural changes essential for the fixed effects (FE) analysis later, we examined transition probabilities between nuclear and extended households overall and by socioeconomic region. Table 1 presents these probabilities, showing the number of transitions per region. While transitions are generally low (consistent with the stability of household structures in rural Vietnam), regions such as the Northern Midlands/Mountainous Area exhibit 48 transitions (16 nuclear to extended and 32 extended to nuclear), providing adequate within-household variation for the FE model. However, regions like the Mekong River Delta have fewer transitions (10), warranting caution in regional interpretations.

**Table 1: Transition probabilities of household structure (nuclear ↔ extended) by socioeconomic region**

	To nuclear household	To extended household	Total
<b>Red River Delta</b>			
From nuclear	918 (98.82%)	11 (1.18%)	929
From extended	27 (21.95%)	96 (78.05%)	123
Total	945	107	1,052
<b>Northern Midlands/Mountainous Area</b>			
From nuclear	962 (98.36%)	16 (1.64%)	978
From extended	32 (18.39%)	142 (81.61%)	174
Total	994	158	1,152
<b>North Central/Central Coastal Area</b>			
From nuclear	1,171 (98.99%)	12 (1.01%)	1,183
From extended	16 (21.92%)	57 (78.08%)	73
Total	1,187	69	1,256
<b>Central Highlands</b>			
From nuclear	714 (98.62%)	10 (1.38%)	724
From extended	12 (15.0%)	68 (85.0%)	80
Total	726	78	804
<b>Mekong River Delta</b>			
From nuclear	521 (99.43%)	3 (0.57%)	524
From extended	7 (58.33%)	5 (41.67%)	12
Total	528	8	536

Notes: Based on VARHS 2008–2016 panel data. Percentages are row-wise.

Source: Authors' calculations.

Finally, to examine potential impacts of internal migration on the analysis, we calculated exit rates (members present in wave  $t$  but absent in  $t + 1$ ) for reproductive-age women (15–44) and children ( $\leq$  age 14), as exits likely reflect migration given Vietnam's rural–urban labor flows (Coxhead, Cuong, and Vu 2015).

Overall, 20.72% of reproductive-age women exit between waves, but this percentage is lower post-birth (15.19% with a recent birth vs. 20.87% with no birth) and

lower in extended vs. nuclear households (17.93% vs. 40.53%), suggesting selective retention (e.g., births or grandparents reduce out-migration). Table 2 shows that child exits are 14.77%. Since the balanced panel retains only fully observed households, household-level attrition is zero, but individual exits could bias the results if they are tied to fertility (e.g., post-birth stability inflating effects). However, lower exits post-birth and in extended households suggest minimal bias against our positive findings. We discuss implications in “Limitations.”

**Table 2: Exit rates of reproductive-age women and children between waves, VARHS 2008–2016**

Group	Exit rate (%)
Overall reproductive-age women (aged 15–44).	20.72
By recent birth (no)	20.87
By recent birth (yes)	15.19
By household type (nuclear)	40.53
By household type (extended)	17.93
Overall children	14.77

Notes: Table based on 4,800 non-last-wave observations (1,200 households; four intervals). Exit = family member present in  $t$  but absent in  $t + 1$  (proxy for migration/attrition). Recent birth = FERT (actual number of children born) > 0 in  $t$ .  
 Source: Authors' calculations from VARHS individual-level data.

## 4.3 Data analysis

### 4.3.1 Dependent variable

According to Morgan and Rackin (2010), the intention to have children, especially long-term intention, does not always correspond with actual childbearing behavior. Therefore this study uses the actual number of children born (FERT) as the dependent variable (Yoon 2017) instead of the desired number of children, as in previous studies in Vietnam (Yen, Sukontamarn, and Dang 2020; Treleaven et al. 2016; Nguyen et al. 2023), to directly reflect reproductive behavior. FERT is measured by the number of children under age 3 in the household at each survey time point (2008–2016), corresponding to the number of children born between survey rounds conducted every two years. Children who were recorded in one survey year are not counted again in subsequent years to avoid overlap and to capture new births only.

### **4.3.2 Explanatory variable**

Due to data limitations, we do not have specific information on grandparental involvement in child care within the household. Therefore we assume the presence of grandparent(s) in the household as a source of informal support that couples may access.

The main independent variable is household structure (HTYPE), defined as a binary variable that takes the value of 1 if one or more grandparent is present in the household (extended household) and 0 if there are no grandparents (nuclear household). Data are derived from the survey question “What is your relationship to the household head?” Responses such as “biological parents” or “parents-in-law” are used to identify the presence of grandparents (specifically the parents of the couple). We do not distinguish between maternal and paternal grandparents because the unit of observation in this study is the household (which may include more than one woman of reproductive age). In this context, it would be challenging to determine whether the grandparents are on the maternal or paternal side for each individual.

This study assumes that the individuals identified as the biological parents or parents-in-law of the household head (and spouse) are also the grandparents of all children in the household and that all coresiding families include these grandparents. To further examine the specific roles of grandparents, the study employs a multi-valued variable (H\_TYPE): 0 for living separately, 1 for living with the grandfather, 2 for living with the grandmother, and 3 for living with both grandparents. These categories are mutually exclusive: “Living with grandfather” (1) means the grandfather is present without the grandmother, “living with grandmother” (2) means the grandmother is present without the grandfather, and “living with both” (3) means both are present simultaneously (modeled as a distinct dummy category, not as an interaction term between grandfather and grandmother presence; reference: no grandparents [0]).

### **4.3.3 Control variables**

Control variables include the gender of children (CHILD), the proportion of employed women (EMP), the proportion of married women (MAR), the proportion of women with education, household income (INC), and household size (FAM). CHILD measures the presence of children aged 3–14 in the household and categorizes them into groups: no children, at least one boy, at least one girl, and at least one boy and one girl.

Since the analysis is at the household level, we use proportion variables to measure control variables related to women in the household, limiting these women to those of reproductive age (15–44 years old) and excluding daughters and granddaughters in the household. EMP is based on employment status in the past 12 months. Educational levels

are measured by the proportion of women with primary (PRI), lower secondary (SEC), and upper secondary education (HIGH). INC is based on total household income over the prior 12 months and converted into logarithmic form for analysis. FAM measures the number of household members (excluding newborn children) to account for the influence of the living environment.

To address potential resource dilution mechanisms, we include a household dependency ratio (DEP\_RATIO), defined as the number of dependents (children under 15 and adults over 64) divided by the number of working-age adults (15–64). This is interacted with HTYPE in robustness checks to assess if grandparental effects vary with caregiving burdens. For stratified analyses by household type, we define HH\_TYPE\_STRAT as a categorical variable: 0 for nuclear families, 1 for three-generation households (with at least one grandparent but no other extended relatives), and 2 for extended multigenerational households (with grandparents plus other relatives, such as siblings or great-grandparents). To incorporate regional variations, we include REGION as a categorical variable based on socioeconomic region (e.g., Red River Delta, Northern Midlands/Mountainous Area), which is used as a fixed effect or interaction in the model. Fixed characteristics such as religion, place of residence, or gender of the household head are not included in the FEM, as the model automatically excludes time-invariant factors to focus on analyzing within-group variations.

#### **4.3.4 Research model**

To analyze the impact of household structure on fertility behavior, we employ regression methods suitable for panel data. The two most common approaches are the fixed effects model and the random effects model (REM). FEM focuses on changes within households over time while effectively controlling for unobservable, time-invariant factors such as family traditions and cultural norms. This is particularly important in Vietnam, where these elements remain relatively stable yet significantly influence fertility decisions. On the other hand, REM assumes that the fixed factors are uncorrelated with the independent variables, allowing it to account for both within-household changes and cross-household differences. However, this assumption may not hold in the current study, as cultural and familial values are likely to correlate with other fertility determinants.

**Table 3: Summary of variable measurements**

Number	Variable	Measurement
Dependent Variable		
1	FERT	Number of children born after each survey wave (under 3)
Independent Variables		
2.1	HTYPE	Dummy variable measuring household structure (presence of grandparent = 1)
2.2	H_TYPE	Multinomial variable: Not living with any grandparent Living with grandfather Living with grandmother Living with both grandparents
Control Variables		
3	CHILD	Multinomial variable (child's gender): No child At least one son At least one daughter At least one son and one daughter
4	EMP	Proportion of employed women = number of employed women of reproductive age/total women of reproductive age
5	MAR	Proportion of married women = number of married women of reproductive age/total women of reproductive age
6	PRI	Proportion of women with primary education = number of women of reproductive age with primary education/total women of reproductive age
7	SEC	Proportion of women with lower secondary education = number of women of reproductive age with lower secondary education/total women of reproductive age
8	HIGH	Proportion of women with upper secondary education = number of women of reproductive age with upper secondary education/total women of reproductive age
9	INC	Natural logarithm of total net household income
10	FAM	Total number of household members excluding newborn child
11	DEP_RATIO	Dependency ratio = (number of dependents aged < 15 or > 64)/(number of working-age adults aged 15–64)
12	HH_TYPE_STRAT	Household type for stratification: 0 = nuclear families, 1 = three-generation households (with at least one grandparent), 2 = extended multigenerational households (with grandparents and other relatives such as siblings or great-grandparents)
13	REGION	Socioeconomic region: categorical variable based on province (e.g., Red River Delta, Northern Midlands/Mountainous Area)

*Notes:* All variables are derived from the VARHS 2008–2016 balanced panel (1,200 households, 6,000 observations). Proportions (e.g., EMP, MAR) are calculated for women aged 15–44, excluding daughters and granddaughters. FERT captures new births only (children under 3, excluding prior births from previous waves). DEP\_RATIO and HH\_TYPE\_STRAT are used in robustness checks. REGION is based on standard Vietnamese socioeconomic classifications.

Additionally, calculating the intraclass correlation coefficient (ICC) for the dependent variable gives a result of 0.0985. This indicates that approximately 9.85% of the total variance in the number of children born is due to differences across households while the remaining 90.15% is attributed to within-household changes over time. The greater internal variability supports use of the FEM. However, to ensure the appropriate model is selected, a Hausman test was conducted to validate the results. The Hausman test yielded a statistic of 345.5931 with 11 degrees of freedom and a p-value of 0.0000,

leading to rejection of the null hypothesis that the random effects model is consistent. Thus the fixed effects model is preferred and was adopted for our analysis.

Building on the variables described in Table 3 and drawing from prior literature on household structure and fertility (e.g., Nguyen et al. 2023; Downey 1995), we specify a fixed effects model to address time-invariant unobserved heterogeneity, such as cultural norms or intrinsic fertility preferences. The general model is as follows:

$$FERT_{it} = \beta_0 + \beta_1 HTYPE_{it} + \sum_{k=1}^3 \delta_k CHILD_{k,it} + \beta_3 EMP_{it} + \beta_4 MAR_{it} + \beta_5 PRI_{it} + \beta_6 SEC_{it} + \beta_7 HIGH_{it} + \beta_8 INC_{it} + \beta_9 FAM_{it} + \alpha_i + \gamma_t + \epsilon_{it},$$

where  $i$  indexes households and  $t$  indexes time periods (years);  $\alpha_i$  represents household fixed effects;  $\gamma_t$  captures year fixed effects to control for time-specific shocks (e.g., policy changes); and  $\epsilon_{it}$  is the idiosyncratic error term. CHILD is a categorical variable expanded into dummies ( $\sum_{k=1}^3 \delta_k CHILD_{k,it}$ ), with categories for sex composition (at least one son, at least one daughter, or at least one of each; reference: no children).

Table 3 summarizes the measurement and definitions of all variables in the model. We estimate the model using ordinary least squares (OLS) on demeaned data to implement household fixed effects. Results are presented with point estimates and 95% confidence intervals (clustered at the household level).

For robustness, we conduct several checks to address potential endogeneity, regional heterogeneity, resource dilution effects, and the skewed distribution of the dependent variable, as detailed in the “Robustness check” subsection. First, to mitigate reverse causality (e.g., births prompting grandparents to coreside), we lag the household structure variable (HTYPE) by one wave ( $t - 1$ ), using data from 2010 to 2016 ( $n = 4,800$ ). Second, we use a lead model, regressing current fertility on future household structure ( $t + 1$ ), using data from 2008 to 2014 ( $n = 4,800$ ), to probe reverse causation. Third, to account for regional variations, we include region fixed effects (REGION) and interact it with HTYPE, with regions grouped as Northern Midlands/Mountainous Area, North Central/Central Coastal Area, Central Highlands, and Mekong River Delta (reference: Red River Delta). Fourth, we interact DEP\_RATIO (dependency ratio, measuring dependents per working-age adult) with HTYPE to test resource dilution in high-burden households (Downey 1995). Fifth, we stratify the sample by HH\_TYPE\_STRAT (nuclear [ $n = 5,449$ ], three-generation [ $n = 476$ ], or extended multigenerational [ $n = 75$ ]) to examine if grandparental effects vary with household complexity. Finally, to address the skewed count nature of FERT, we estimate alternative specifications, including Poisson GLM (without entity fixed effects), conditional fixed effects Poisson (for the count outcome), and conditional fixed effects logit (for a binary “any birth” indicator). These checks align with the main findings, bolstering causal interpretations and policy

implications for multigenerational support in Vietnam's context (Hirschman and Minh 2002; Ngo 2020).

## **5. Empirical results**

### **5.1 Descriptive statistics**

This subsection summarizes the key characteristics of the panel data, distinguishing between overall statistics (capturing variability across the entire sample, including between- and within-unit differences) and within-unit statistics (focusing on changes over time after removing fixed between-unit effects). These insights are crucial for understanding the fixed effects models used later. The sample includes 6,000 household-year observations from 1,200 unique rural households over five waves (2008–2016).

#### **5.1.1 Overall sample and key variables**

Table 4 presents descriptive statistics for the main variables. The average number of children under 3 years old (FERT) is low at 0.038 overall (SD 0.195), with within-household variation of 0.141, indicating modest changes in births over time within the same household. Household structure (HTYPE) shows that only 9.2% of observations are extended (mean 0.092, SD 0.289, within SD 0.132), reflecting predominantly nuclear families. Other controls include high proportions of married women (MAR mean 0.452) and employed women (EMP mean 0.237), moderate education levels (e.g., secondary mean 0.299), and average household size (FAM mean 3.834). The dependency ratio (DEP\_RATIO mean 0.380, within SD 0.273) suggests moderate caregiving burdens that may interact with structure. Overall, 144 births were observed across the panel (derived from transition probabilities in Table 6), aligning with Vietnam's low rural fertility context.

**Table 4: Descriptive statistics of variables**

Variable name	Type	Mean	Standard deviation	Min	Max
FERT	Overall	0.038	0.195	0.0	2.000
	Within		0.141		
HTYPE	Overall	0.092	0.289	0.0	1.000
	Within		0.132		
H_TYPE	Overall	0.183	0.593	0.0	3.000
	Within		0.267		
CHILD	Overall	1.792	1.182	0.0	3.000
	Within		0.530		
EMP	Overall	0.237	0.390	0.0	1.000
	Within		0.266		
MAR	Overall	0.452	0.431	0.0	1.000
	Within		0.219		
INC	Overall	10.861	0.953	0.0	14.772
	Within		0.538		
FAM	Overall	3.834	1.571	1.0	12.000
	Within		0.575		
PRI	Overall	0.094	0.266	0.0	1.000
	Within		0.160		
SEC	Overall	0.299	0.410	0.0	1.000
	Within		0.237		
HIGH	Overall	0.329	0.421	0.0	1.000
	Within		0.248		
DEP_RATIO	Overall	0.380	0.528	0.0	6.000
	Within		0.273		

Notes: Based on VARHS 2008–2016 balanced panel (1,200 unique households, 6,000 observations). Overall statistics include between- and within-household variation; within statistics reflect time series changes after removing household fixed effects. INC is log-transformed (natural log of total net household income; 0.0 indicates zero income cases). H\_TYPE is a multinomial extension of HTYPE (categories 0–3). All proportions are for women aged 15–44.

### 5.1.2 Dynamics in household structure and fertility

Household structures and fertility exhibit high stability over time. Table 5 shows transition probabilities for HTYPE across 4,800 intervals: 98.8% of nuclear households remain nuclear while 79.65% of extended households persist. Transitions from nuclear to extended are rare (1.2%), but when they occur, they may signal shifts in support needs.

Similarly, Table 6 highlights persistence in low fertility: 97.61% of households with zero additional children in one wave have zero in the next, with only 2.35% transitioning to one child. Among households with one child, 83.33% have no additional births, 16.67% have one more child, and 0% have two more children. Among those with two children, 100% have no further births. These patterns (144 additional births: 140

instances of one; two instances of two) underscore limited progression beyond small families.

**Table 5: Transition probabilities of household structure**

	Nuclear household	Extended household	Total
Nuclear household	4,286	52	4,338
	98.80%	1.20%	100%
Extended household	94	368	462
	20.35%	79.65%	100%
Total	4,380	420	4,800
	91.26%	8.74%	100%

Notes: Based on 4,800 transitions (1,200 households; four intervals) from VARHS 2008–2016, capturing shifts in grandparental presence. (HTYPE = 1 if biological parents or parents-in-law are present.) Counts are shown above percentages in every cell (including the totals row).

**Table 6: Probability of having an additional child from this period to the next (unit: household)**

Probability of childbirth	0 children	1 child	2 children	Total
0 children	4,494	108	2	4,604
	97.61%	2.35%	0.04%	100%
1 child	160	32	0	192
	83.33%	16.67%	0.0%	100%
2 children	4	0	0	4
	100.0%	0.0%	0.0%	100%
Total	4,658	140	2	4,800
	97.04%	2.89%	0.06%	100%

Notes: Based on 4,800 transitions (1,200 households; four intervals) from VARHS 2008–2016. FERT reflects net new births (children under 3, excluding prior children from previous waves), limited to 0–2 as observed in the data (no higher counts). Counts are shown above percentages in every cell (including the totals row).

### 5.1.3 Regional and compositional variations

Regional differences provide further context (Tables 7 and 8). The sample spans 12 provinces, with the Red River Delta comprising 21.92% of the observations (1,315) and with 82.21% male-headed households. Overall, 81.52% of households are male-headed, with higher numbers in mountainous areas (e.g., 95.26% in Lao Cai), possibly due to migration.

Extended structures vary regionally: In the Northern Midlands/Mountainous Area, 14.4% of households have grandparents (207 out of 1,440 observations); in the Mekong

River Delta, the number is only 1.9% (13/670), likely reflecting migration and nuclear family trends in the South. Overall, this results in 551 extended observations across the sample (9.2%), highlighting the rarity of multigenerational living and its potential influence on fertility in rural Vietnam.

Table 9 details relationships across 23,218 individual-level observations. Children appear in 48.21% of observations (11,194 observations; 89.58% of households) while grandparents are rare (0.13% of observations; 1.0% of households). About 2.58% of unique households have more than three generations, highlighting nuclear dominance but potential influence from extended ties. These descriptives reveal a rural sample with low fertility, stable nuclear structures, and regional variations in multigenerational living, setting the stage for examining grandparental effects on fertility in the following sections.

**Table 7: Distribution of household observations by province, socioeconomic region, and percentage of male-headed households**

Region	Province	Number of observations	(%)	Male-headed households (%)
Red River Delta	Ha Tay (Hanoi)	1,315	21.92	82.21
Northern Midlands/Mountainous Area	Dien Bien	210	3.5	92.38
	Lai Chau	235	3.92	92.34
	Lao Cai	190	3.17	95.26
	Phu Tho	805	13.42	78.14
North Central/Central Coastal Area	Khanh Hoa	180	3.0	77.22
	Nghe An	520	8.67	80.58
	Quang Nam	870	14.5	75.98
Central Highlands	Dak Lak	435	7.25	88.74
	Dak Nong	350	5.83	83.43
	Lam Dong	220	3.67	81.36
Mekong River Delta	Long An	670	11.17	76.57
Total		6,000	100.0	81.52

*Notes:* Based on VARHS 2008–2016 balanced panel (6,000 observations). Male-headed percentage computed from household head gender. Due to small sample sizes for households with specific grandparents (grandfather or grandmother), we use a binary dummy (HTYPE = 1 if any grandparent is present) rather than separating roles or analyzing by region individually.

**Table 8: Household structure by region**

Region	Without grandparent	With grandparent	Total observations	Total households
Red River Delta	1,172	143	1,315	263
Northern Midlands/Mountainous Area	1,233	207	1,440	288
North Central/Central Coastal Area	1,480	90	1,570	314
Central Highlands	907	98	1,005	201
Mekong River Delta	657	13	670	134

*Notes:* Regions grouped per standard Vietnamese socioeconomic classifications (VARHS 2008–2016 balanced panel). "With grandparent" corresponds to HTYPE = 1 (presence of biological parents or parents-in-law). Total observations: 6,000; unique households: 1,200.

**Table 9: Statistics on relationships within households**

Relationship with household head	Frequency (obs)	(%) (obs)	Cumulative (%) (obs)	Frequency (HH)	(%) (HH)
Household head	6,000	25.84	25.84	1,200	100.0
Spouse of household head	5,023	21.63	47.47	1,065	88.75
Children	11,194	48.21	95.68	1,075	89.58
Biological parents	529	2.28	97.96	160	13.33
Parents-in-law	81	0.35	98.31	44	3.67
Grandparents	30	0.13	98.44	12	1.0
Grandchildren	139	0.6	99.04	34	2.83
Siblings	185	0.8	99.84	58	4.83
Other relatives	31	0.13	99.97	15	1.25
No relation	6	0.03	100.0	3	0.25
3 generations				31	2.58
Total observations	23,218	100.0	100.0		
Total household-years	6,000				
Total unique households				1,200	100.0

Notes: Based on VARHS 2008–2016 balanced panel (23,218 individual-level observations across 6,000 household-years; 1,200 unique households). “Frequency (obs)” is at the individual level across waves; “Frequency (HH)” counts unique households with at least one such member; “3 generations” is based on the presence of grandparents or grandchildren alongside parents (indicating at least three generations).

## 5.2 Results and discussion

We checked correlations among independent variables and found no evidence of multicollinearity. The Hausman test supported use of the fixed effects model over random effects. Confidence intervals are based on errors clustered at the household level.

The FEM results, presented in Table 10, examine the association between household structure and the number of children under 3, controlling for unobserved time-invariant factors. The estimate for living with grandparents (HTYPE) is 0.1373 (95% CI: 0.0824 to 0.1922), suggesting a positive association with additional births. For child gender (CHILD), having at least one son is associated with 0.0086 (95% CI: 0.0021 to 0.0151), having at least one daughter is associated with 0.0038 (95% CI: –0.006 to 0.0137), and having both genders is associated with 0.023 (95% CI: 0.0158 to 0.0303). The proportion of married women shows an estimate of 0.0589 (95% CI: 0.027 to 0.0908). For employed women the estimate is –0.0323 (95% CI: –0.0537 to –0.0109).

Education levels have positive estimates: primary 0.0348 (95% CI: –0.0024 to 0.072), secondary 0.0208 (95% CI: –0.0089 to 0.0505), high school 0.0508 (95% CI: 0.0262 to 0.0754). Household income is 0.0115 (95% CI: 0.0023 to 0.0208), and size is –0.0633 (95% CI: –0.0781 to –0.0485). These estimates account for year fixed effects and are robust to clustering at the household level. While the positive grandparental

association aligns with cooperative breeding theory, it should be interpreted alongside potential dilution effects from dependency ratios (explored in robustness checks).

Additionally, observations from the data reveal cases where changes in the household head result in shifts in household structure. Specifically, parents often transfer household headship to their children when the latter get married. These newly established households tend to have a higher likelihood of childbearing, meaning the household will often see an increase in the number of newborns (see Figure A-2).

**Table 10: FEM estimation results**

	Number of children under 3
Living with grandparent(s) (ref: nuclear household)	0.1373 (0.0824 to 0.1922)
Sex of children (ref: no children)	
– At least 1 son	0.0086 (0.0021 to 0.0151)
– At least 1 daughter	0.0038 (–0.006 to 0.0137)
– At least 1 son and 1 daughter	0.023 (0.0158 to 0.0303)
Proportion of married women	0.0589 (0.027 to 0.0908)
Proportion of employed women	–0.0323 (–0.0537 to –0.0109)
Proportion of women with:	
– Primary education	0.0348 (–0.0024 to 0.072)
– Secondary education	0.0208 (–0.0089 to 0.0505)
– High school education	0.0508 (0.0262 to 0.0754)
Household income	0.0115 (0.0023 to 0.0208)
Household size	–0.0633 (–0.0781 to –0.0485)
Constant	0.0362 (0.02 to 0.0523)
<b>Observations</b>	6,000
<b>Households</b>	1,200
<b>Individual FE</b>	Yes
<b>Year FE</b>	Yes
<b>R-squared</b>	0.068

Notes: Based on VARHS 2008–2016 balanced panel. Confidence intervals (95%) in parentheses, clustered at household level.

This situation leads to a transformation of household structure from nuclear (comprising only the household head and their children) to extended (including the parents of the household head, the household head, and the household head’s children). However, this shift in household structure is primarily driven by the life cycle factor and does not align with the research objective of this study, which is to examine whether the presence of a caregiver in the household influences childbearing decisions before and after such support is available.

As a result, the study proceeds to filter out households where both the household head and household structure changed simultaneously during the observation period. The findings are presented in Table 11.

The results of the FEM after the second screening indicate that the presence of grandparent(s) in a household positively influences the number of children born in the household, after controlling for socioeconomic and demographic factors, with coefficients of 0.0328 (grandfather 95% CI:  $-0.0152$  to  $0.0809$ ), 0.0248 (grandmother 95% CI:  $0.0109$  to  $0.0388$ ), and 0.0771 (both 95% CI:  $0.0175$  to  $0.1368$ ). Note that these coefficients reflect mutually exclusive categories: The grandfather effect isolates households with only the grandfather present (no grandmother); the grandmother effect isolates households with only the grandmother (no grandfather); and the effect of both isolates households with the simultaneous presence of a grandfather and a grandmother (as a separate dummy, not an interaction term; reference: no grandparents). In other words, when grandparents are present, the number of children in the household increases compared to when the household does not include grandparents. This supports the hypothesis proposed by the study.

**Table 11: FEM estimation results with detailed household structure**

	Number of children under 3
Household structure (ref: no grandparents)	
– Living with grandfather	0.0328 ( $-0.0152$ to $0.0809$ )
– Living with grandmother	0.0248 ( $0.0109$ to $0.0388$ )
– Living with both	0.0771 ( $0.0175$ to $0.1368$ )
Sex of children (ref: no children)	
– At least 1 son	0.0058 ( $-0.0007$ to $0.0123$ )
– At least 1 daughter	0.0016 ( $-0.0084$ to $0.0116$ )
– At least 1 son and 1 daughter	0.0186 ( $0.0111$ to $0.0261$ )
Proportion of married women	0.0616 ( $0.029$ to $0.0943$ )
Proportion of employed women	$-0.0334$ ( $-0.0549$ to $-0.012$ )
Proportion of women with:	
– Primary education	0.03 ( $-0.0078$ to $0.0678$ )
– Secondary education	0.0167 ( $-0.0128$ to $0.0463$ )
– High school education	0.0459 ( $0.0217$ to $0.0701$ )
Household income	0.0109 ( $0.0016$ to $0.0201$ )
Household size	$-0.0559$ ( $-0.07$ to $-0.0419$ )
Constant	0.0356 ( $0.0193$ to $0.0519$ )
<b>Observations</b>	6,000
<b>Households</b>	1,200
<b>Individual FE</b>	Yes
<b>Year FE</b>	Yes
<b>R-squared</b>	0.058

Notes: Post-filtering for simultaneous head and structure changes. Confidence intervals (95%) in parentheses, clustered at household level.

Compared to the previous study in Vietnam by Nguyen et al. (2023), which focused only on a general analysis of whether couples live with their parents (the grandparents of

their children), the current research takes a further step by distinguishing and evaluating the specific roles of each individual within the household. This differentiation clarifies the impact of each person, specifically the grandfather and the grandmother, on the number of children in the household, providing a more detailed view of the influence of multigenerational family structures on reproductive behavior.

The presence of the grandfather shows a slightly larger positive association ( $\beta = 0.0328$ , 95% CI:  $-0.0152$  to  $0.0809$ ) compared to the presence of the grandmother ( $\beta = 0.0248$ , 95% CI:  $0.0109$  to  $0.0388$ ). Although the difference in impact is minor, this suggests that the grandfather often contributes through functions such as financial support, managing significant tasks, and directing family activities while the grandmother focuses more on child care and daily household support. Both roles are important in providing couples with the reassurance needed to expand their family size.

Notably, when both grandparents are present in the household, the impact on the number of children born in the household is strongest, with a coefficient of  $\beta = 0.0771$  (95% CI:  $0.0175$  to  $0.1368$ ). This finding is similar to that of Thomese and Liebroer 2013, which shows that the greater the number of grandparents actively involved in the lives of their grown children, the greater the likelihood that the grown children will have another child. This highlights the essential role of multigenerational family structures, where grandparents contribute not only materially but also emotionally, creating a more favorable environment for couples to consider having more children.

This finding aligns with the cooperative breeding theory (Hrđy 2009), which posits that extended family members, including grandparents, play crucial roles in supporting child care, alleviating financial and psychological burdens for parents. The result also reflects the reality of Vietnamese society, where families have been significantly influenced by modernization and urbanization while maintaining strong traditional values. The presence of grandparents not only reduces the child care burden on parents but also facilitates their decision to have more children, especially in households living with grandmothers in rural areas, where urbanization progresses more slowly and multigenerational family models remain common. Families in these areas often live together across generations, offering dual benefits: preserving traditional values and supporting young couples in childrearing. Grandparents' support not only reduces the burden of child care but also creates a more stable nurturing environment, enabling parents to have more children without financial or time-related concerns.

This finding is consistent with the study by Nguyen et al. (2023) in Vietnam, which found that women living with their parents are more likely to desire additional children than are those living independently. It also aligns with results from other studies worldwide showing that extended families, especially with support from grandparents, increase the likelihood of women having more children (e.g., Sear, Mace, and McGregor

2003; Sear and Mace 2008; Sear and Coall 2011; Waynforth 2012; Mathews and Sear 2013; Thomese and Liefbroer 2013; Ji et al. 2015; Yoon 2017; Sear 2018).

Women living with their parents not only receive support in child care but also face pressure from Confucian norms (Hirschman and Loi 1996; Bélanger 2002; Tho 2016), leading them to have more children to meet family expectations and uphold ancestral traditions. Bryant (2002), in a study related to patriarchy and fertility in Vietnam, pointed out that in patriarchal families, especially in rural areas, there is strong pressure to have sons to continue the family line. This suggests that beyond practical support, the presence of grandparents also reinforces cultural pressure, pushing women to have more children, particularly sons.

The control for the gender of existing children (aged 3–14) shows a positive association with new births, strongest for both sons and daughters ( $\beta = 0.023$ , 95% CI: 0.0158 to 0.0303), suggesting that households in active reproductive phases continue having children. The stronger positive for sons alone ( $\beta = 0.0086$ , 95% CI: 0.0021 to 0.0151) than for daughters alone ( $\beta = 0.0038$ , 95% CI:  $-0.006$  to 0.0137) may reflect son preference, allowing continuation of the family line while reducing urgency for more daughters, consistent with gender bias in Vietnam, where sons reduce further births (Dahl and Moretti 2004; Nguyen et al. 2023).

The results indicate that women's employment reduces fertility ( $\beta = -0.0323$ , 95% CI:  $-0.0537$  to  $-0.0109$ ). As the proportion of employed women of reproductive age increases, families tend to have fewer children. This supports the theory of opportunity costs, where working women face greater trade-offs in childbearing, aligning with findings from prior research (Treleaven et al. 2016; Wang and Famoye 1997; Yoon 2017). Outsourcing housework can mitigate these trade-offs and promote second births, as evidenced in Germany (Raz-Yurovich 2016) and similar contexts, such as Hong Kong (Cheung and Kim 2022). Conversely, the proportion of married women positively affects fertility ( $\beta = 0.0589$ , 95% CI: 0.027 to 0.0908), reflecting Vietnam's cultural emphasis on marriage as a cornerstone of reproductive decisions. Traditional norms that link childbearing to marriage further reinforce this relationship (Do and Fu 2010).

Educational attainment plays a role, with the proportion of women of reproductive age with secondary education showing a positive association with fertility ( $\beta = 0.0208$ , 95% CI:  $-0.0089$  to 0.0505) while primary and high school levels are also positive ( $\beta = 0.0348$ , 95% CI:  $-0.0024$  to 0.072;  $\beta = 0.0508$ , 95% CI: 0.0262 to 0.0754). This may reflect the stability of primary education as a minimum standard and the lower variability in high school education within the sample (see Table 4). Secondary education, however, marks a transitional stage, where women become more aware of the financial and caregiving demands of additional children.

Household size negatively impacts fertility ( $\beta = -0.0633$ , 95% CI:  $-0.0781$  to  $-0.0485$ ), consistent with the findings of Waynforth (2012). Larger households face

higher economic pressures and caregiving demands, prompting families to reconsider expanding further. Women in such households often shoulder greater responsibilities, reducing their inclination to have more children.

Household income shows a small positive association ( $\beta = 0.0115$ , 95% CI: 0.0023 to 0.0208), contrasting with some studies due to contextual differences. For example, Wang and Famoye (1997) found a negative relationship between household income and fertility in the United Kingdom. This discrepancy may reflect differences in socioeconomic contexts between countries. Additionally, limited income variability within the sample and other controlled factors, such as child gender, employment, and household size, may overshadow the effect of household income.

We also conducted an analysis by socioeconomic region, building on the descriptive statistics in Table 8 and the transition probabilities in Table 1, which show marked regional differences in grandparent coresidence (e.g., 14.4% in the Northern Midlands/Mountainous Area vs. 1.9% in the Mekong River Delta). Stratification, estimating separate FEMs for each region, allows for region-specific associations and accounts for varying socioeconomic contexts, providing clearer insights than pooled models while avoiding collinearity issues in interactions (explored in “Robustness check”).

Table 12 presents the FEM estimation results stratified by region, indicating that the presence of grandparents in the household has a positive impact on the number of children born, but the degree of impact varies across regions.

**Table 12: Impact of living with grandparents by region**

Region	Living with grandparents (ref: not living with grandparents)	Obs	Number of households	R-squared
Red River Delta	0.092 (-0.017 to 0.201)	1,315	263	0.058
Northern Midlands/Mountainous Area	0.159 (0.067 to 0.251)	1,440	288	0.080
North Central/Central Coastal Area	0.085 (-0.010 to 0.179)	1,570	314	0.056
Central Highlands	0.222 (0.042 to 0.402)	1,005	201	0.114
Mekong Delta	0.199 (-0.051 to 0.449)	670	134	0.107

Notes: Stratified FEMs with 95% confidence intervals in parentheses, clustered at household level. Controls and year FE are included.

The greatest effect is observed in the Central Highlands, with a coefficient of  $\beta = 0.222$  (95% CI: 0.042 to 0.402), followed by the Northern Midlands/Mountainous Area, with  $\beta = 0.159$  (95% CI: 0.067 to 0.251). These estimates should be interpreted cautiously given varying transition rates (see Table 1). For instance, the Central Highlands has 22 transitions, providing some variation, while the Mekong River Delta has only 10, potentially reducing reliability. In the Red River Delta and the North Central/Central Coastal Area, the coefficients are  $\beta = 0.092$  (95% CI: -0.017 to 0.201) and  $\beta = 0.085$  (95% CI: -0.010 to 0.179), respectively. In the Mekong River Delta, the coefficient is 0.199 (95% CI: -0.051 to 0.449), with the CI including 0, possibly due to

the limited number of observations and transitions, as the sample was collected from only one province (Long An), which reduces the representativeness of the region as a whole.

These differences reflect the unique socioeconomic and cultural contexts of each region. In the Central Highlands and the Northern Midlands/Mountainous Area, where traditional agricultural practices and close-knit family cultures prevail, multigenerational household models are still dominant. Grandparents in these regions provide labor and child care support while exerting cultural pressure to encourage additional childbearing to sustain family lineage. Particularly, the traditional culture of certain ethnic minority communities in the Central Highlands reinforces tightly bonded family values.

In the Red River Delta, despite rapid urbanization and modernization, the role of grandparents remains influenced by long-standing traditional values, especially Confucian ideologies that emphasize family lineage (Hirschman and Loi 1996). However, this influence diminishes as nuclear families become more prevalent. Meanwhile, in the Mekong River Delta, rapid economic transitions, large-scale labor migration, and uneven urbanization contribute to the region's lowest fertility rates in the country. Data collection in this region is limited to Long An Province, a highly industrialized area influenced by the southeastern region, reducing the representativeness and statistical significance of the findings.

These baseline and detailed findings provide a foundation for the robustness checks that follow, which further test the stability of the grandparent effect under alternative specifications and potential biases.

## **5.3 Robustness check**

### **5.3.1 Lagged grandparents' presence**

To address potential endogeneity, such as reverse causality, where births might prompt grandparents to coreside, we lag the household structure variable (HTYPE) by one wave ( $t - 1$ ). We use data from 2010–2016 (dropping 2008), reducing observations to 4,800. Results are shown in Table 13.

The lagged estimate for living with grandparents is 0.007 (95% CI:  $-0.033$  to  $0.046$ ), attenuated compared to the baseline  $0.137$  (95% CI:  $0.082$  to  $0.192$ ). The CI now includes 0, indicating reduced precision, possibly due to smaller sample or timing dynamics. However, the positive direction holds, suggesting that grandparental presence may have a persistent but weaker prospective association with fertility. Other estimates, such as for child gender (e.g., both son and daughter:  $0.016$  [95% CI:  $0.010$  to  $0.023$ ]) and education, remain similar but with wider CIs. This check highlights the importance of timing in household–fertility links, with baseline results potentially capturing immediate effects.

These findings are robust to the lag, though attenuated, and inform policy by emphasizing proactive family support structures. This prospective test supports causal interpretations, aiding policies on stable family structures (Ngo 2020). Note that lagging reduces sample size and power, potentially underestimating effects.

### 5.3.2 Lead model for reverse causation

To complement the lagged test and directly probe reverse causation (e.g., births prompting grandparents to coreside), we use a lead model, regressing current fertility (FERT at  $t$ ) on future household structure (HTYPE\_lead at  $t + 1$ ). We use data from 2008–2014 (dropping 2016;  $n = 4,800$ ). Results are in Table 14.

**Table 13: FEM estimation results with lagged household structure**

	Number of children under 3
Lagged living with grandparents (ref: nuclear household, lagged)	0.0068 (−0.0326 to 0.0461)
Sex of children (ref: no children)	
– At least 1 son	0.0073 (0.0013 to 0.0133)
– At least 1 daughter	0.0025 (−0.0075 to 0.0126)
– At least 1 son and 1 daughter	0.0163 (0.0098 to 0.0229)
Proportion of married women	0.0553 (0.0164 to 0.0941)
Proportion of employed women	−0.0178 (−0.0401 to 0.0045)
Proportion of women with:	
– Primary education	0.0002 (−0.0395 to 0.0398)
– Secondary education	0.0097 (−0.0224 to 0.0419)
– High school education	0.0414 (0.0142 to 0.0685)
Household income	0.0026 (−0.0074 to 0.0125)
Household size	−0.0369 (−0.0518 to −0.0219)
Constant	0.0009 (−0.0107 to 0.0126)
<b>Observations</b>	4,800
<b>Households</b>	1,200
<b>Individual FE</b>	Yes
<b>Year FE</b>	Yes
<b>R-squared</b>	0.028

Notes: Based on VARHS 2010–2016 subset. Confidence intervals (95%) in parentheses, clustered at household level. Controls (CHILD, MAR, etc.) included but not shown for brevity.

The estimate for future living with grandparents is 0.0851 (95% CI: 0.022 to 0.148), positive and excluding 0, indicating that higher fertility is associated with a subsequent extended structure. This suggests some reverse causation, where births may drive coresidence (e.g., grandparents moving in to provide child care). Combined with the attenuated lagged results, this points to bidirectional dynamics, with the baseline

contemporaneous effect potentially capturing both directions. The sample drop (to 4,800 in both models) and low transitions (Table 1, Table 5, Table 8) may contribute to imprecision, as noted in “Limitations.” Other controls remain consistent (e.g., both son and daughter: 0.0220 [95% CI: 0.014 to 0.030]). This enhances reliability by quantifying reverse effects, informing policies on post-birth family support (Mulder and Gillespie 2024).

### 5.3.3 Regional variations

To incorporate regional heterogeneity, as suggested, we add socioeconomic region (REGION) as a fixed effect and interact it with HTYPE. Regions are grouped: Northern Midlands/Mountainous Area, North Central/Central Coastal Area, Central Highlands, and Mekong River Delta (reference: Red River Delta). Results are in Table 15.

**Table 14: FEM estimation results with lead household structure**

	Number of children under 3
Future living with grandparent (ref: nuclear household, lead)	0.0851 (0.022 to 0.148)
Sex of children (ref: no children)	
– At least 1 son	0.0087 (0.001 to 0.016)
– At least 1 daughter	–0.0003 (–0.010 to 0.009)
– At least 1 son and 1 daughter	0.0220 (0.014 to 0.030)
Proportion of married women	0.0529 (0.012 to 0.094)
Proportion of employed women	–0.0392 (–0.065 to –0.014)
Proportion of women with:	
– Primary education	0.0542 (0.008 to 0.100)
– Secondary education	0.0385 (0.001 to 0.076)
– High school education	0.0556 (0.025 to 0.087)
Household income	0.0113 (–0.000 to 0.023)
Household size	–0.0703 (–0.088 to –0.053)
Constant	0.0310 (0.015 to 0.047)
<b>Observations</b>	4,800
<b>Households</b>	1,200
<b>Individual FE</b>	Yes
<b>Year FE</b>	Yes
<b>R-squared</b>	0.072

*Notes:* Based on VARHS 2008–2014 subset. Confidence intervals (95%) in parentheses, clustered at household level. Controls included.

The main estimate for living with grandparents is 0.193 (95% CI: 0.017 to 0.369), but interactions indicate moderation: –0.057 (95% CI: –0.247 to 0.134) in the Northern Midlands/Mountainous Area, –0.088 (95% CI: –0.287 to 0.112) in the North

Central/Central Coastal Area, and 0.023 (95% CI: -0.275 to 0.321) in the Mekong River Delta. The Central Highlands interaction is unavailable due to collinearity. These numbers suggest that the positive grandparental association is stronger in the Central Highlands and northern areas, consistent with socioeconomic factors like rural traditions, but is weaker or offset in delta regions, possibly due to modernization or data limitations.

This analysis complements the stratified analysis in Table 12, providing a more integrated view of moderation. These regional nuances inform targeted policies, such as supporting multigenerational households in high-effect areas. This interaction approach highlights the need for region-specific fertility policies, as evidenced by Vietnam’s two-child policy impacts (Ngo 2020).

**Table 15: FEM estimation results with region interaction**

	<b>Number of children under 3</b>
Living with grandparents (ref: nuclear household)	0.1932 (0.0172 to 0.3692)
Interaction terms (HTYPE * REGION) <sup>a</sup>	
– Northern Midlands/Mountainous Area	-0.0569 (-0.2476 to 0.1338)
– North Central/Central Coastal Area	-0.0875 (-0.2874 to 0.1124)
– Central Highlands	N/A
– Mekong River Delta	0.0231 (-0.2745 to 0.3207)
<b>Observations</b>	6,000
<b>Households</b>	1,200
<b>Individual FE</b>	Yes
<b>Year FE</b>	Yes
<b>R-squared</b>	0.069

Notes: Based on full VARHS panel. Confidence intervals (95%) in parentheses, clustered at household level. N/A indicates omission due to collinearity. Controls (CHILD, MAR, etc.) included but not shown for brevity.

<sup>a</sup>Reference region implied (e.g., Red River Delta).

### 5.3.4 Dependency ratio and resource dilution

To test potential resource dilution from caregiving demands, we include the dependency ratio (DEP\_RATIO) as a control and interact it with HTYPE. This measures dependents per working-age adult, assessing if grandparental support diminishes in high-burden households (Downey 1995). Results are in Table 16.

The estimate for living with grandparents is 0.122 (95% CI: 0.067 to 0.177), DEP\_RATIO 0.061 (95% CI: 0.037 to 0.084), and the interaction is -0.043 (95% CI: -0.117 to 0.032). The negative interaction implies that higher dependency may dilute the positive grandparental association on fertility, as resources are spread across more dependents. However, the CI includes 0, suggesting that this effect is not precisely estimated. Other controls remain consistent with the baseline (e.g., high school education

0.073 (95% CI: 0.046 to 0.100). This provides nuanced support for constraining mechanisms, though data limits (e.g., no room-based density) are noted in “Limitations.” This dilution effect echoes the negative household size coefficient in baseline models (−0.063, 95% CI: −0.0781 to −0.0485), indicating resource constraints in larger households (Nguyen et al. 2023). This check enhances the analysis by empirically testing dilution, informing policies on family support in high-dependency contexts. These insights advocate for policies alleviating resource burdens in multigenerational families, such as targeted subsidies (Ngo 2020).

**Table 16: FEM estimation results with dependency ratio interaction**

	Number of children under 3
Living with grandparents (ref: nuclear household)	0.1219 (0.0672 to 0.1766)
Dependency ratio	0.0608 (0.0374 to 0.0842)
Interaction: HTYPE * DEP_RATIO	−0.0426 (−0.1169 to 0.0317)
Sex of children (ref: no children)	
– At least 1 son	0.0071 (0.0007 to 0.0134)
– At least 1 daughter	−0.0001 (−0.0098 to 0.0096)
– At least 1 son and 1 daughter	0.0205 (0.0137 to 0.0272)
Proportion of married women	0.0361 (0.0023 to 0.0698)
Proportion of employed women	−0.0358 (−0.0573 to −0.0143)
Proportion of women with:	
– Primary education	0.0566 (0.0169 to 0.0964)
– Secondary education	0.0446 (0.0124 to 0.0768)
– High school education	0.0732 (0.046 to 0.1004)
Household income	0.0128 (0.0035 to 0.022)
Household size	−0.0631 (−0.078 to −0.0482)
Constant	0.0295 (0.013 to 0.0461)
<b>Observations</b>	6,000
<b>Households</b>	1,200
<b>Individual FE</b>	Yes
<b>Year FE</b>	Yes
<b>R-squared</b>	0.079

Notes: Based on VARHS full panel. Confidence intervals (95%) in parentheses, clustered at household level. Controls (CHILD, MAR, etc.) included but not shown for brevity.

### 5.3.5 Stratified by household type

To further test resource dilution, we stratify the FEM by household type (HH\_TYPE\_STRAT): nuclear (0), three-generation (1; with grandparents but no other extended relatives), and extended multigenerational (2; with grandparents plus others).

This test estimates models separately, assessing if grandparental effects vary with structure complexity (Downey 1995). Results are in Table 17.

In nuclear households (n = 5,449), the estimate for living with grandparents is 0.123 (95% CI: 0.069 to 0.177). The effect strengthens in three-generation households (n = 476): 0.208 (95% CI: 0.106 to 0.310). In extended multigenerational households (n = 75) it is 0.086 (95% CI: -0.253 to 0.425), with a wide confidence interval that includes zero due to the small sample size. This pattern suggests the strongest support in simpler three-generation setups and weakening effects in more complex extended households, consistent with resource dilution. Other controls (for example, the positive effect of the proportion of married women) remain consistent across subsamples, though precision varies with subsample size. This stratification bolsters evidence for the supportive role of grandparents in simpler extended structures, with dilution effects appearing in more complex ones, although these findings are limited by the small subsample sizes. The dilution in extended households aligns with the baseline negative household size effect, reflecting resource strains in Vietnam’s evolving family structures (Hirschman and Minh 2002). These results support policies promoting optimal multigenerational arrangements to boost fertility.

**Table 17: Stratified FEM estimation results by household type**

	Nuclear	Three-Generation	Extended
Living with grandparents (ref: nuclear household)	0.1228 (0.069 to 0.1766)	0.2081 (0.1063 to 0.3098)	0.086 (-0.253 to 0.4249)
Sex of children (ref: no children)			
– At least 1 son	0.0036 (-0.0024 to 0.0096)	0.0805 (0.0325 to 0.1284)	0.1793 (-0.0915 to 0.4502)
– At least 1 daughter	0.0032 (-0.0065 to 0.0129)	0.044 (-0.0128 to 0.1007)	0.069 (-0.2482 to 0.3861)
– At least 1 son and 1 daughter	0.0177 (0.0106 to 0.0248)	0.0995 (0.0422 to 0.1569)	0.1175 (-0.0482 to 0.2832)
Proportion of married women	0.0608 (0.0315 to 0.0902)	0.0012 (-0.1667 to 0.169)	0.3674 (-0.0996 to 0.8343)
Proportion of employed women	-0.0318 (-0.0532 to -0.0103)	-0.0358 (-0.1033 to 0.0318)	-0.0426 (-0.4038 to 0.3187)
Proportion of women with:			
– Primary education	0.0286 (-0.0077 to 0.0648)	0.1116 (-0.0737 to 0.2968)	0.2367 (-0.3997 to 0.8731)
– Secondary education	0.0161 (-0.0132 to 0.0455)	0.0773 (-0.0625 to 0.217)	0.1462 (-0.3438 to 0.6363)
– High school education	0.0454 (0.0205 to 0.0703)	0.0944 (-0.0077 to 0.1965)	0.1756 (-0.3462 to 0.6974)
Household income	0.0135 (0.0041 to 0.0229)	-0.0032 (-0.0386 to 0.0323)	-0.0738 (-0.257 to 0.1094)
Household size	-0.0608 (-0.076 to -0.0456)	-0.0953 (-0.1489 to -0.0416)	-0.0132 (-0.1262 to 0.0997)
Constant	0.041 (0.0244 to 0.0576)	-0.0562 (-0.1178 to 0.0054)	-0.0252 (-0.322 to 0.2717)
<b>Observations</b>	5449	476	75
<b>Individual FE</b>	Yes	Yes	Yes
<b>Year FE</b>	Yes	Yes	Yes
<b>R-squared</b>	0.066	0.104	0.183

Notes: Based on VARHS full panel, stratified by *HH\_TYPE\_STRAT*. Confidence intervals (95%) in parentheses, clustered at household level. Controls (CHILD, MAR, etc.) included but not shown for brevity.

### 5.3.6 Alternative specifications for skewed dependent variable

The dependent variable (FERT) exhibits a highly skewed count distribution, with most observations at 0, some 1s, and a few 2s, potentially introducing bias in OLS estimates, as OLS assumes normality and can be inefficient for non-negative count data with excess 0s (Cameron and Trivedi 2013). To assess robustness, we estimated alternative models: a Poisson GLM (without entity fixed effects), a conditional fixed effects Poisson for the count outcome, and a conditional fixed effects logit for a binary “any birth” indicator (FERT > 0). As summarized in Table 18, the coefficient for extended household structure (HTYPE) remains positive across specifications (e.g., OLS FE: 0.1373 [95% CI: 0.0824 to 0.1922]; conditional logit: 2.8991 [95% CI: 1.7996 to 3.9987]), consistent with baseline results. However, conditional models drop to 168 households (840 observations) due to limited within-household fertility variation, reducing power and potentially inflating or attenuating estimates. While reinforcing the direction of the effect, this underscores challenges with rare-event outcomes in limited-wave panels, as discussed in “Limitations.” Future high-frequency data could address this.

**Table 18: Effect of extended household structure on fertility across alternative models**

Model	Coefficient	95% CI lower	95% CI upper
OLS FE (main model)	0.1373	0.0824	0.1922
Poisson GLM (no entity FE)	0.7572	0.3903	1.1240
Conditional Poisson FE (count outcome)	2.0845	1.2552	2.9138
Conditional logit FE (binary any birth outcome)	2.8991	1.7996	3.9987
<b>Observations<sup>a</sup></b>	840 (conditional models); full panel otherwise		
<b>Households<sup>a</sup></b>	168 (conditional models); 1,200 otherwise		
<b>Individual FE</b>	Yes (where applicable)		
<b>Year FE</b>	Yes		

*Notes:* All models include controls for child parity (CHILD), marital status (MAR), employment (EMP), education levels (PRI, SEC, HIGH), income (INC), family size (FAM), and year fixed effects. Poisson coefficients represent log rate ratios; logit coefficients represent log odds ratios. Conditional models use a reduced sample with within-group variation.

Source: Authors' calculations from VARHS data.

<sup>a</sup> Based on notes for conditional models; main model uses full panel.

## 6. Conclusion

Currently, Decision No. 588/QĐ-TTg has proposed various measures to encourage childbirth, including financial support, reproductive health care services, and reducing economic burdens (Prime Minister of Vietnam 2020). However, the results of this study reveal that the role of grandparents in multigenerational households, a critical factor in

Vietnam's cultural context, has not been adequately addressed in existing policies. The presence of grandparents in a household not only supports child care but also plays a crucial role in preserving cultural values and conveying fertility-related expectations, such as the desire to have sons to continue the family lineage, as evidenced by the positive association with son presence in our models (Treleaven et al. 2016; Tho 2016).

The regional analysis reveals differences in the impact of grandparents on fertility behaviors across regions. In the Central Highlands and the Northern Midlands/Mountainous Areas, grandparents' presence has the strongest positive effect (e.g., coefficients of 0.222 [95% CI: 0.042 to 0.402] and 0.159 [95% CI: 0.067 to 0.251], respectively), reflecting the traditional cultural values and close family bonds in these areas (General Statistics Office of Vietnam and UNFPA 2021). Meanwhile, regions such as the Red River Delta and the North Central/Central Coastal Area show moderate positive effects (0.092 [95% CI: -0.017 to 0.201] and 0.085 [95% CI: -0.010 to 0.179]), influenced by urbanization and the growing prevalence of nuclear families (Hirschman and Minh 2002). In the Mekong River Delta, although the coefficient is positive (0.199 [95% CI: -0.051 to 0.449]), the CI includes 0, partly due to data limitations and the unique socioeconomic characteristics of the region.

Fertility adjustment policies need to be designed in accordance with the characteristics of each region. In areas such as the Central Highlands and the Northern Midlands/Mountainous Areas, where fertility rates are still above replacement level (around 2.43 in 2019), policies should focus on maintaining the multigenerational family model through financial and social support without directly encouraging higher fertility (General Statistics Office of Vietnam 2019). In contrast, in regions with low fertility rates, such as the Red River Delta, the North Central/Central Coastal Area, and the Mekong Delta (around or below 2.09), specific measures like reducing health care and education costs, providing direct financial support, and promoting work-life balance are necessary to alleviate economic pressure on couples (Ngo 2020). In urbanizing areas with declining multigenerational households, encouraging the outsourcing of housework, such as through subsidies for domestic help, could serve as an alternative to grandparental support, drawing from evidence in other low-fertility settings (Cheung and Kim 2022; Raz-Yurovich 2016). Public communication campaigns and region-specific research on the role of grandparents should be implemented simultaneously to achieve sustainable fertility rates and promote socioeconomic development in Vietnam. Future studies could explore more recent data to refine these insights amid ongoing demographic shifts.

## 7. Limitations

Our study also has some limitations that could not be addressed. First, as mentioned earlier, we lack specific information about grandparents' support in child care. We assume that coresiding grandparents serve as a source of informal child care. However, according to Mulder and Gillespie (2024), in Belgium, daughters are more likely to move closer to their mothers during their first pregnancy, and mothers are more likely to move closer to their daughters when their daughters' children are older than 2.5. This implies that the presence of parents in the household could be a result of the decision to have children rather than merely a factor influencing it. This reverse causality poses a challenge in analyzing the relationship between household structure and fertility. To the best of our knowledge, existing studies on the relationship between household structure, grandparental support, and women's fertility behavior have yet to fully address this issue. While our robustness check using a lagged household structure variable partially mitigates this concern by testing prospective effects, the attenuated results highlight the need for caution in causal interpretations. Furthermore, the lead model regressing current fertility on future household structure provides direct evidence of bidirectional dynamics, with a positive coefficient suggesting that births may prompt subsequent coresidence (e.g., for child care support). This complements the lagged analysis, reinforcing the potential for reverse causation while supporting the overall reliability of our panel fixed effects approach under data constraints.

Additionally, as shown in Table 1, transition probabilities between nuclear and extended households are generally low, with some regions exhibiting very few changes (e.g., only three nuclear-to-extended transitions in the Mekong River Delta). This limited within-household variation may reduce the statistical power of the fixed effects model, particularly for regional subsamples, and could lead to less reliable estimates. While the overall sample provides sufficient transitions for national-level analysis, the regional heterogeneity results should be viewed as suggestive rather than definitive. Future studies with larger samples or more frequent panel waves could better capture these dynamics.

Regarding internal migration, Vietnam experiences significant rural–urban labor flows, often involving young women moving for employment, which can split households and affect structures (UNFPA Vietnam 2025; Coxhead, Cuong, and Vu 2015). As a household-level panel, individual exits (proxied for migration) are captured via absence in subsequent waves, while sampled households remain if the head persists. Exit rates presented in Table 2 show that reproductive women migrate at 20.72%, but less in the case of a recent birth (15.19% vs. 20.87%) or in extended households (17.93% vs. 40.53% nuclear), suggesting parenthood/gender ties: Births may anchor women (e.g., for child care), and grandparents may buffer out-migration. Children exit at 14.77%, potentially understating fertility if high-fertility families are more likely to retain their

children in the household (i.e., experience fewer child exits). This selective retention could mildly upward-bias grandparental effects if migration is parenthood-related, though low overall transitions mitigate severe bias. Despite our efforts, the limitations of the available data make it difficult to find a solution. For instance, we reviewed several large-scale secondary datasets, including the Vietnam Current Population Survey (CPS). While the CPS provides information on reasons for migration of household members to their current residences within the prior five years, it lacks details about migration to support children in childbirth. Most reasons for migration are related to marriage, family moves, employment, and so on. Therefore, although the dataset does not provide the specific information we require, the recorded reasons for migration suggest that the likelihood of grandparents moving in to support child care may not be common in Vietnam's context. Future work with migration-linked data could refine these insights.

Furthermore, the skewed distribution of FERT and challenges with fixed effects models for rare events are addressed through alternative specifications in the "Robustness check" section (see Table 18). While these confirm the positive direction, the sample reduction in conditional models highlights data constraints, warranting caution in interpretations.

Turning to broader data constraints, we also attempted to identify suitable exogenous instrumental variables. However, fertility behavior is a complex phenomenon influenced by both macro- and micro-level factors, making it challenging to find an appropriate instrument to determine causality between household structure and fertility decisions, as noted in broader demographic research (Okun and Stecklov 2021; Sear and Coall 2011). Nonetheless, by utilizing the panel dataset VARHS and the fixed effects model, we have attempted to provide more accurate estimates in addressing part of the endogeneity.

Although this study uses the VARHS dataset from 2008–2016, which remains one of the best panel datasets currently available in Vietnam, offering reliable and detailed information on households over an extended period, fertility behavior, especially the impact of household structure and grandparents' roles, tends to change gradually rather than abruptly. However, recent changes in the socioeconomic and policy landscape, such as Decision No. 588/QĐ-TTg in 2020, may influence fertility behavior. Despite this policy's aim to encourage childbearing and adjust fertility rates, Vietnam's total fertility rate has continued to decline, reaching a historic low of 1.91 children per woman in 2024, with projections indicating further decreases (General Statistics Office of Vietnam 2024). This suggests that future research should utilize more recent datasets, such as post-2020 census data or updated household surveys, to verify and extend the findings of this study amid ongoing demographic shifts.

It should be noted that the VARHS dataset primarily focuses on rural areas, which may not fully capture the dynamics of the entire country, especially urban areas, where

nuclear families are more prevalent and fertility rates are even lower (Ngo 2020). In particular, grandparental effects are likely weaker in urban areas due to low coresidence, migration-induced distance, and reliance on formal child care, as implied by urbanization trends (General Statistics Office of Vietnam 2024). Our rural findings (stronger in traditional regions like Central Highlands) are generalizable to Vietnam's 65% rural population but are only suggestive for urban areas; overgeneralization risks understating nuclear family challenges. Future surveys incorporating urban samples could verify whether the positive effect of grandparental coresidence on fertility also holds in urban areas. Additionally, due to data limitations, this study has not thoroughly analyzed the specific role of grandparents in providing child care or financial support within households. Barriers include our inability to determine the actual level of support grandparents provide or the impact of their health on their capacity to offer such support, factors that could moderate the observed effects (Hank and Buber 2009). Due to the absence of housing details like the number of rooms or living areas, we relied on household size as a proxy for density, which may underestimate crowding effects in rural homes; future surveys incorporating these metrics could refine density controls.

We believe that these limitations create opportunities for future research in Vietnam to address these gaps, such as through qualitative studies on grandparental involvement or longitudinal surveys incorporating urban samples and detailed support measures, to provide more accurate estimates.

## **8. Ethical statements**

### **8.1 Ethical approval**

This study utilizes data from the Vietnam Access to Resources Household Survey (VARHS), collected by UNU-WIDER as part of the project Structural Transformation and Inclusive Growth in Vietnam. The original data collection adhered to ethical standards required by the relevant funding and research institutions. As this study is a secondary analysis of anonymized, publicly available data, no additional ethical approval was required.

### **8.2 Informed consent**

The data used in this study come from VARHS, a publicly accessible dataset. It is presumed that informed consent was obtained by the original researchers in accordance

with ethical standards at the time of data collection. Since this study involves secondary analysis of anonymized data, no new consent was necessary.

### **8.3 Disclosure about the use of generative AI**

Grok (built by xAI) was used as an assistive tool for proofreading, grammar checking, and improving textual clarity in the manuscript. No original content was generated by the AI.

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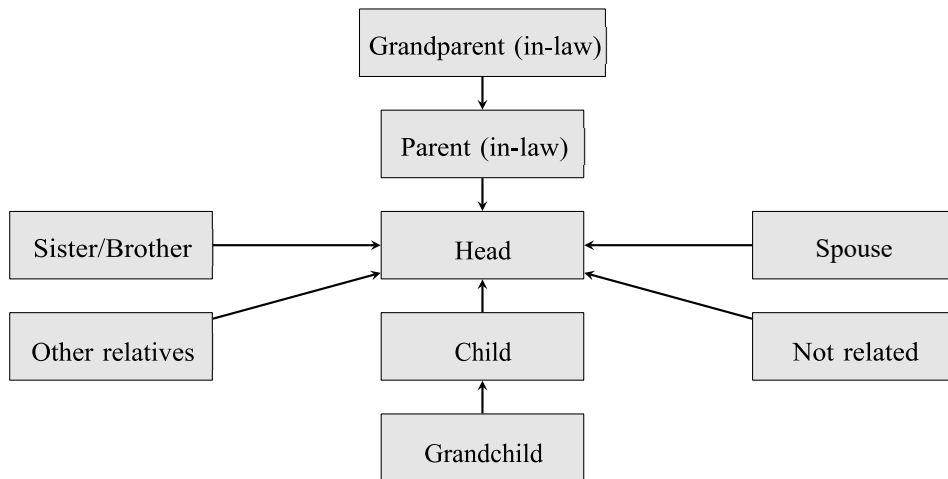
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## Appendix

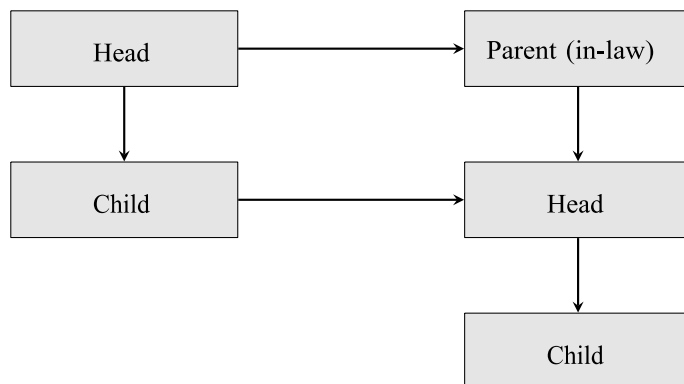
**Figure A-1: Diagram of relationships within a household**



*Note:* All relationships are defined relative to the household head, based on responses to the VARHS survey question on relationship to the head.

*Source:* Authors' own illustration.

**Figure A-2: Case of household head change and a household structure change**



*Note:* The illustration shows a common case in which household headship is transferred (e.g., upon marriage), simultaneously changing the household from nuclear to extended.

*Source:* Authors' own illustration.