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Abstract

By using the Vietnam Living Standard Surveys in 1992/93 and 1997/98, and the Vietnam Household Living Standard Surveys in 2002 and 2004, this paper describes the patterns of living arrangements for the elderly in Vietnam and examines the determinants of such arrangements during the past decade. We apply multinomial analysis techniques for these research purposes. The estimated results show that family structures in Vietnam have generally been maintained despite profound social and economic changes since Doi moi, as the proportion of elderly who were living with their children was high. The findings also indicate that the elderly's decisions about whom to live with depended on various factors, including age, gender, marital status, urbanity, and home ownership. Nevertheless, some undesirable trends are emerging, such as a decline of elderly dependent on others, and a rise in elderly living alone.

1. Introduction

Rapid declines in fertility rates and mortality rates as well as substantial improvements in health care systems have resulted in the growth of elderly populations around the world, and this trend is expected to continue in the coming years. With the definition of an elderly person as aged 60 years and over, the medium-variant population projections of the United Nations in 2004 shows that the number of elderly people will increase from 610 million in 2000 (or 10 percent of the world population) to around 1.9 billion people in 2050 (or 22 percent of the world population) (United Nations, 2005a). Population aging will especially impact developing countries in the coming decades as they grow old before becoming rich, and it poses various challenges to governments' public policies for protecting the elderly. Under such demographic changes, as well as profound social and economic changes stemming from modernization and urbanization, the traditional family support system has already declined in some developed countries, including Asia's most economically advanced ones, such as Japan and Taiwan (United Nations, 2005b). More importantly, supporting the elderly will become increasingly difficult in countries with underdeveloped social security systems (Karagiannaki, 2005; and Schwarz, 2005).

As one of the fastest growing economies in the world, Vietnam is also experiencing the changes just described. The medium-variant population projections of the United Nations (2005a) indicate that the elderly population in Vietnam will increase significantly from 7.5 percent of the whole population in 2005 to about 26 percent in 2050. Moreover, swift economic transformation since *Doi moi* has had significant impacts on all areas of society, and resulted in substantial improvements in living standards of the people, including the elderly.

However, while such remarkable successes have been widely acknowledged, many groups of elderly people are still living in poor and vulnerable conditions, as the majority of them are living in rural, isolated, and disadvantaged areas. Only a small percentage of the elderly in Vietnam are receiving public pensions, while others are living on their own and/or supported by family members (National Assembly's Committee for Social Affairs, 2006). In addition, a potentially worrisome issue for supporting the elderly is that the past decade observed a continuous decline in the number of elderly who lived as dependents, and a continuous increase in the number of elderly who lived alone or in households with only elderly (Giang and Pfau, 2007). Thus, any reduction in family support caused by the aforementioned trends will leave the elderly behind with various social and economic risks. Under these facts and figures, studies on the changes in patterns and determinants of the elderly living arrangements are extremely urgent, and they will help provide more appropriate policy orientations for the government in improving social welfare programs.

Even though the number of studies on living arrangements of the Vietnamese elderly has been increasing over the past decade, most of them just described the trends of living arrangements, and few of them explored the determinants of such arrangements. Therefore, this paper will address the gap, and it will seek to quantify the extent, the evolution, and the determinants of living arrangements for the elderly in Vietnam by using the Vietnam Living Standards Surveys in 1992/93 and 1997/98, and the Vietnam Household Living Standards Surveys in 2002 and 2004. Specifically, the paper will answer various relevant questions, such as how the elderly living arrangements have been changed, and what determinants lie behind these changes. We focus on a number of possible factors, including age, gender, educational attainment, marital status, areas and regions of residence, per-capita real expenditures, and home ownership.

The remainder of the paper is organized as follows. We will provide a review of relevant studies in Section 2. Then, in Section 3, we will present our methodology with a description of the data and variables. Strengths and limitations of data will also be discussed. The empirical results with policy implications will be presented in Section 4. The last section will provide some concluding remarks and directions for further studies.

Briefly, we find the following results.

- Male elderly were more likely than female elderly to live with their children, and they were less likely to live alone or with others.
- The elderly at more advanced ages were less likely than the younger elderly to live with their children. They tended to live alone or with a spouse.
- Educational qualifications were not an important factor for the elderly in deciding with whom they would live.
- Married elderly were less likely to live with their children.
- The urban elderly tended to live with their children, and they were less likely to live alone or with others.
- Significant differences existed between regions in Vietnam. Elderly in the north were less likely to live with children than those in the central regions, who in turn were less likely to live with children than those elderly in the south.
- Some elderly were employed, either in salaried work, in agriculture, or were self-employed. The majority of the working elderly were working in the

agriculture sector, and they were less likely to live with children in all comparisons, while the other working elderly did not show concrete trends.

- In general, the elderly living in households with higher per-capita expenditures were less likely to live with children, though we cannot be clear about causality since large households would naturally tend to have lower per-capita expenditures. This factor did not have clear impacts on the elderly living with others.
- Home ownership was a crucial factor for the elderly to decide their living arrangements. Elderly living in households where an elderly person owned the home were less likely to live with children or others.

2. A Review of Relevant Literature

The number of studies on the determinants of elderly living arrangements has been increasing substantially in recent years, particularly for developing countries, because of emerging concerns about aging population and social protection reforms. The data and analytical frameworks used in these studies have been quite varied. Martin (1989), with the 1984 survey data of the World Health Organization (WHO), uses logit estimation to analyze the determinants of whether elderly live with children or not in Fiji, Korea, Malaysia, and the Philippines. Multinomial logit estimation is then applied to compare “living alone” with “living with spouse,” “living with children,” and “living with others,” with the same explanatory variables in the logit model. For the same objectives, Mba (2002) uses data from the 1996 census in Lesotho to analyze four types of living arrangements, i.e. living alone; living with spouse only; living with spouse and children; and living with other relatives. The paper then uses logit estimation model for each of the living types to examine the impacts of various social and economic factors.

DaVanzo and Chan (1994) provide logistic regression analysis to look for the determinants of living with adult children for the older Malaysians by using the Second Malaysian Family Life Survey between August 1988 and January 1989. Also being interested in the determinants for the Greek elderly to live with their children, Karagiannaki (2005) applies a probit model for five available cross-sectional data sets from the Greek Household Budget Surveys in 1974-1999. To compare gender differences, Chaudhuri and Roy (2007), using the 52nd round of national sample survey during July 1995-June 1996, provide logit estimation analysis of the determinants of living alone for the Indian elderly. Using the 1993 Indonesian Family Life Survey, Cameron (2000) estimates a model of residence choice for the Indonesian elderly parents. She uses a nested logit model to analyze various individual characteristics of both elderly and their children as determinants for the elderly to live alone or live with at least one child. Also, United Nations (2005b) provides an extensive analysis of the elderly living arrangements in more than 50 countries in all five continents by using various sources of data, such as the Demographic and Health Survey (DHS). Different types of living arrangements are considered, and the logistic estimation method is also applied to explore the determinants of living alone, which is a critical issue in many developing countries.

For the elderly people in Vietnam, Knodel *et al.* (2000) and Friedman *et al.* (2002) use data from two surveys conducted in the Red River Delta in 1996, and in Ho Chi Minh City (HCMC) and its six adjacent provinces in 1997 to explore gender differences between the elderly of these locations in receiving support from their children. Various types of living arrangements are examined by using the logistic estimation method. Barbieri (2006) also looks for the determinants of living with a child for all ever-married Vietnamese elderly by using a

logit model with data from the VLSS 1997/98 and 3-percent public use sample of the 1999 census.

Although the social and economic determinants of the elderly living arrangements in different countries are diverse, some common factors are found in these studies as follows. First, the age of the elderly is a controversial determinant of their living arrangements, depending on how it is considered in the analysis. DaVanzo and Chan (1994) find that none of the age variables are statistically significant when controlling other factors. Similarly, United Nations (2005b) shows that the likelihood of living alone is increased at advanced ages, but age does not always have a significant impact on this status when other possible factors are included. However, some studies demonstrate certain impacts of age on the elderly living status. For instance, the logit estimates in Martin (1989) show that age has a significantly negative effect on living with children in Fiji, Malaysia and the Philippines, meaning that getting older results in a lower likelihood for elderly in these countries to live with their children. Mba (2002) shows that the elderly in Lesotho, except the oldest elderly group (aged 80 and over), are generally more likely to live with young children than the older children. Also, Karagiannaki (2005) finds that the probability of living with other relatives for the Greek elderly increases almost linearly with age. The estimates from Barbieri (2006) show a lower likelihood for elderly at more advanced ages to co-reside with their children.

Second, gender is another controversial variable to explain decision of the elderly on living arrangements. Cameron (2000) finds that gender does not help to explain the situation of living alone in Indonesia when other factors in the model are controlled. This is the same as the findings of DaVanzo and Chan (1994) for the older Malaysians. However, Chaudhuri and Roy (2007) show that the Indian female elderly are almost 75 percent more likely to live alone than the Indian male elderly (2007: 11), and the rate is even higher when considering other factors, such as income quintile, property ownership, and economic independence. For the Vietnamese elderly, Barbieri (2006) finds that women are less likely than men to co-reside with a child, but the rate of co-residence varies with marital status. Friedman *et al.* (2002) show that, among the elderly living with an adult or married child, the married male and female elderly in the south have no difference, while the married male elderly in the north have a higher likelihood than their female counterparts.

Third, elderly with different marital statuses have diverse living patterns. Mba (2002) shows that widowed female elderly in Lesotho are most likely to live alone in comparison with other female groups with different marital statuses. Karagiannaki (2005) finds that unmarried elderly people in Greece are 12 percent less likely to live with children than their married counterparts, and widowed and divorced elderly are 23 percent more likely to live with children and other younger relatives than elderly couples (2005: 14). For the case of Vietnam, Barbieri (2006) discovers that married elderly are less likely than widowed, separated or divorced elderly to live with a child. In explaining these findings, most of the papers argue that such situations are common because women usually live longer than men, and marry men who are older than themselves, and thus, in comparison with men at the same age, women are more likely to be widowed and have older children.

Fourth, educational attainment has different impacts on living arrangements of the elderly in different countries, and there is a substantial difference between female and male elderly. Martin (1989) and Cameron (2000) find that education generally does not have a systematic effect on the decision of the elderly to live with children. However, Mba (2002) discovers that, in Lesotho, female elderly with secondary and higher education are more likely to live alone than their counterparts with primary education. Chaudhuri and Roy (2007), studying the Indian elderly, show that being illiterate is associated with a higher probability of living alone. In Vietnam, the literate elderly are found to have less likelihood of living with a

child than their illiterate counterparts (Barbieri, 2006). In its comparative study, United Nations (2005b) shows that, after control for effects of the other variables, education shows positive effects in 13 countries and negative effects in 14 countries (out of 69 countries in examination) on the probability of living alone for the elderly.

Fifth, living locations in rural and urban areas provide significant differences in the living arrangements of the elderly. One striking finding is that elderly residents of rural areas are more likely to live alone than their counterparts in urban areas (Mba, 2002; United Nations, 2005b; and Chaudhuri and Roy, 2007), and the likelihood to co-reside with a child (or children) is higher in urban than in rural areas (Cameron, 2000; Barbieri, 2006). A popular possible explanation for such situations in most of the studies is the larger housing costs in urban areas. In exploring the regional effect in Vietnam, Friedman *et al.* (2002) show that the predicted rate of co-residence with an adult or married child for the elderly in the south is higher than that of the elderly in the north. Even Barbieri (2006) demonstrates that the elderly in both central and south regions have more likelihood to live with a child than those in the north.

Sixth, income level and employment status, which are considered as financial sources of the elderly, are important determinants. In India, both male and female elderly with higher incomes are more likely to live alone (Chaudhuri and Roy, 2007). This finding is the same as Karagiannaki (2005) for the Greek elderly. However, DaVanzo and Chan (1994) find that the impact of income on the elderly's co-residence with children depends on their marital status, in which unmarried elderly with high income are less likely to live with their children than their married counterparts.

Seventh, home ownership is also a popular factor in examination. Karagiannaki (2005) finds that home ownership has a significantly negative effect on co-residence of the Greek elderly with their children. Similarly, Chaudhuri and Roy (2007) discover that Indian widows with property have a higher likelihood of living alone. The Korean and Malaysian elderly are also exposed to this situation, as explained in Martin (1989).

In addition to these above factors, some studies also discuss a number of other determinants, such as the elderly's number of surviving children, the elderly's health status, and the number of years of living at the current residence. The impacts of these factors on the decisions of the elderly living arrangements vary across the countries, and depend on the elderly's socio-economic characteristics.

3. Methodology, Data and Variables

3.1. Methodology

In this paper, we will apply multinomial analysis techniques to explore the patterns and determinants of the elderly living arrangements in Vietnam during the past decade. We define elderly as those who are at least 60 years old, and an elderly household is one with at least one elderly. Three types of the elderly living arrangements will be examined, including (i) living alone or with a spouse only, (ii) living with children, and (iii) living with others, but no children. The possible determinants of these living arrangements, which will be presented later in this section, include age, gender, educational qualifications, areas and regions of residence, employment status, income, and home ownership. These explanatory variables will be used to show how the elderly who live with children and who live with others are different from the elderly who live alone or with a spouse only.

As indicated in several existing studies, e.g., Martin (1989) and Cameron (2000), it is worth noting that such division of elderly living arrangements needs to be considered carefully in elucidating the contrasting outcomes. For instance, Martin (1989) raised such

related questions as whether the elderly who are living alone or with other relatives are more likely to be destitute and without surviving children, and how demographic characteristics of the elderly's spouse can change the probability of the alternative living arrangements. Furthermore, a child plays different roles and has different statuses in an elderly household, such as he or she can be the household head or a dependent. Children can also be married or unmarried. Such differences can distinguish the elderly's decisions to live or not to live with a child (or children). Given limitations in each data set and inconsistencies between data sets, however, these issues will not be covered in this paper. Rather, it uses only individual and household characteristics of the elderly to pursue the research objectives.

3.2. Data and Variables

To pursue the research objectives, we will use the Vietnam Living Standard Surveys in 1992/93 and 1997/98 (namely VLSS1992/93 and VLSS1997/98, respectively), and the Vietnam Household Living Standard Surveys in 2002 and 2004 (namely VHLSS2002 and VHLSS2004, respectively). These surveys were conducted by the General Statistics Office of Vietnam (GSO) along with other international agencies, as a part of the World Bank's Living Standard Measurement Surveys (LSMS). Detailed descriptions of these surveys can be found in numerous research reports, such as Grosh and Glewwe (1998), GSO (2004 a, b), and World Bank (2000, 2001, and 2005).

The surveys are organized by household, but they also include some characteristics for individuals in the household, such as age, gender, relationship to the household head, marital status, working status, salary, health, and education. The surveys also provide identification of one's parent(s) if they lived in the household. This structure lets us identify the elderly people, as well as the households that include elderly people. Table 1 provides information on the sample sizes for the four surveys.

Table 1: Number of Households and Individuals in the V(H)LSS

<i>Year</i>	<i>Number of Households</i>	<i>Number of Individuals</i>
1992/93	4,800 (1,514)	24,068 (2,047)
1997/98	6,002 (2,121)	28,633 (2,860)
2002	29,530 (8,759)	132,384 (11,940)
2004	9,189 (2,784)	39,696 (3,806)

Note: The number of elderly households and the number of elderly people are in parentheses.

Source: Authors' calculations from VLSS 1992/93 & 1997/98, and VHLSS 2002 & 2004

At the household level, the surveys provide extensive data on sources of income, business and agricultural enterprises, detailed household expenditures, ownership of consumer durables, poverty incidence, poverty alleviation programs, wealth, and housing conditions. The households are representative of the entire Vietnamese population, both urban and rural, and across the regions, so we can observe changes in living arrangements of the Vietnamese elderly during the past decade as they experienced profound social and economic changes.

The data has some limitations. First, we generally only have information about relatives who live in the same household (particularly in the later surveys), and therefore it is difficult to identify other relatives who may be living nearby or migrating to other areas. The only exception to this problem is that we have information about all children living out of the household in VLSS1997/98. Second, besides wages, most income sources are only identified at

the household level, so it is not clear which member is the source of the income. Similarly, expenditure is also identified at household level, so we do not know who is spending. Wealth data are only available at the household level. These problems limit the analysis of intra-household sharing.

In the multinomial analysis, we will use the following independent variables to analyze the elderly living arrangements in Vietnam.

- (1) *Age of the elderly*: The elderly will be divided into three groups, including young elderly (aged 60-69); older elderly (aged 70-79), and oldest elderly (aged 80 and over). We will use the young elderly as the reference group.
- (2) *Gender of the elderly*: We will use female as the reference group in our analyses.
- (3) *Educational level of the elderly*: Many variables in these surveys can be representative for educational level of the elderly. For instance, Giang and Pfau (2007) use reading and writing ability of the elderly as proxy for education. In this paper, however, we will use the highest qualification obtained by an elderly to be indicator of his/her educational level. The educational levels include (i) no qualification; (ii) primary qualification; (iii) secondary qualification (including lower- and upper-secondary); (iv) vocational qualification (including vocational and technical training); and (v) higher qualification (including college, undergraduate, and post-graduate). The elderly group with no qualification will be the reference group.
- (4) *Marital status of the elderly*: In this paper, we will differentiate between the elderly who are married and the elderly who have other marital statuses (e.g., widowed, divorced, separated, and never married). The group of elderly with other marital statuses will be the reference group.
- (5) *Areas of residence*: We will consider the differences between elderly residents in rural and urban areas, in which rural areas will be the reference group.
- (6) *Regions of residence*: We will focus on three main regions of the country, i.e. the north (including Red River Delta, North East, and North West); the center (including North Central Coast, South Central Coast, and Central Highlands); and the south (including South East and Mekong River Delta). The central region will be the reference group.
- (7) *Employment status*: Since employment may be an appropriate proxy for economic independence of the elderly, we need to decompose the types of employment. Here we have three types: employment with salary or wage (or paid work), employment in the agriculture sector, and self-employment. In the empirical estimation, we use the group of elderly who were not working as the reference group.
- (8) *Household expenditure quintile*: As mentioned earlier, we do not have individual data about expenditures for the household members, including elderly, it is thus difficult to know who is spending. In this paper, we use per-capita real expenditure as a proxy for the economic capacity of each elderly household. The bottom expenditure quintile (or the poorest group) will be the reference group.
- (9) *Home ownership*: Households in which an elderly member owns the home against other households where this is not the case. The group of elderly who do not own the house will be the reference group.

4. Results and Analysis

Here we seek to explain the determinants of elderly living arrangements in Vietnam. Our discussion will firstly consider tabulations by various characteristics and then provide a detailed analysis with multinomial regression technique.

4.1. General Characteristics of the Vietnamese Elderly Population

Table 2 provides general information about the Vietnamese elderly for a number of characteristics.

Table 2: Characteristics of the Vietnamese Elderly Population
(Percentage of elderly across demographic categories)

<i>Year</i>	<i>1992/93</i>	<i>1997/98</i>	<i>2002</i>	<i>2004</i>
Age				
60 – 64	36.15	29.65	26.68	26.88
65 – 69	24.33	27.59	24.70	22.75
70 – 74	20.17	20.03	21.58	21.18
75 – 79	10.80	12.45	13.53	14.03
80 – 89	7.72	9.13	11.57	12.85
90 and older	0.83	1.15	1.94	2.31
Gender				
Male	43.19	41.93	42.79	41.58
Female	56.81	58.07	57.21	58.42
Marital Status				
Married	64.05	61.63	61.69	60.51
Widowed	33.90	35.81	36.44	36.99
Others (separated, divorced, never married)	2.05	2.56	1.87	2.50
Urban / Rural Status				
Urban	22.27	25.94	23.17	26.67
Rural	77.73	74.06	76.83	73.33
Region				
Red River Delta	23.95	23.78	25.35	25.78
North East	13.11	13.73	10.89	10.46
North West	1.83	1.73	2.13	1.93
North Central Coast	13.06	14.48	13.87	12.59
South Central Coast	10.89	8.68	9.79	9.93
Central Highlands	2.03	1.85	4.01	3.40
South East	13.61	15.55	14.03	15.36
Mekong River Delta	21.52	20.20	19.93	20.55
Education Qualification				
No	63.48	62.28	60.57	58.41
Primary	20.77	21.46	22.16	22.34
Secondary	11.47	12.34	12.53	12.61
Vocational	2.19	2.03	2.80	4.04
Higher	2.09	1.89	1.94	2.60

Source: Authors' calculations from VLSS 1992/93 & 1997/98, and VHLSS 2002 & 2004

We can observe that aging of the population in Vietnam has proceeded, as the percentage of the elderly population in the older groups (70 and over) grew over time, while the proportion

of the young elderly (60-69) was getting smaller. More specifically, the population aged 80 and older accounted for only 8.55 percent of the elderly population in 1992/93, but it accounted for 15.16 percent in 2004. Along with the aging process, we also could see an increasing percentage of female elderly (from 56.81 percent in 1992/93 to 58.42 percent in 2004) and widowed elderly (from 33.9 percent in 1992/93 to 36.99 percent in 2004).

By marital status, the majority of the elderly were married or widowed, while the percentage of the elderly with other marital statuses (divorced, separated, or never married) remained very small.

The data also show that the majority of the elderly were living in rural areas (over 70 percent), but this percentage decreased over time on account of increasing urbanization. Moreover, the data show that almost half of the elderly were living in the Red River Delta and the Mekong River Delta, where agriculture-based activities are still popular.

By educational qualification, more than half of the elderly population did not have any qualification, but this proportion decreased over time. The elderly with primary and secondary qualifications accounted for about 20 percent and 11 percent of the elderly population, respectively. The percentage of the elderly with vocational and higher qualifications was still small, but it increased over time. This trend reflects the fact that younger population with such qualifications became elderly across the surveys.

4.2. Patterns of Living Arrangements in the Elderly Households

Table 3 and Table 4 provide greater detailed information for three types of the elderly living arrangements: (i) living alone or with spouse; (ii) living with children; and (iii) living with others, but no children. Table 3 shows the percentage of each category of living arrangements for each value of independent variables, while Table 4 indicates the percentage held by each value of the independent variables for each category of living arrangements.

As can be seen in Table 3, during the past decade, more than 70 percent of the elderly in Vietnam were living with their children, and this percentage remained stable over time. At the same time, there was also an increase in the proportion of the elderly living alone or with spouse, especially the elderly at more advanced ages. For instance, among the elderly aged 80 and over, the proportion of the elderly living alone or with spouse increased from 8 percent in 1992/93 to 14.56 percent in 2004. For each category of living arrangements, the proportion of the elderly at more advanced age also tended to increase (Table 4).

By gender, Table 3 shows that the percentage of the male elderly living with children was always greater than their female counterparts, but the situation was opposite with the elderly living alone or with spouse. The results (not shown) indicate that the male elderly tended to live with spouse than to live alone, while the female elderly tended to live alone. In addition, Table 4 shows that the percentage of female elderly was always greater than that of the male elderly. These findings can be explained by the differences in marital patterns and life expectancies between males and females.

In terms of marital status, both the elderly who were married or in other marital statuses tended to live with their children. However, proportion of the married elderly living alone or with spouse was always higher than that of their counterparts. This comment is supported by both estimates from Table 3 and Table 4.

Table 3: Statistical Summary of the Indicators
(Break-down of each category of living arrangements across independent variable values)

<i>Living Arrangements</i>	<i>1992/93</i>			<i>1997/98</i>			<i>2002</i>			<i>2004</i>		
	Living Alone or Couple	Living with Children	Living with Others	Living Alone or Couple	Living with Children	Living with Others	Living Alone or Couple	Living with Children	Living with Others	Living Alone or Couple	Living with Children	Living with Others
Number of elderly	2,047			2,860			11,940			3,806		
% of the elderly population	13.58	77.43	8.99	16.36	76.80	6.84	17.43	76.74	5.83	19.34	76.37	4.29
Age												
60-69	11.55	81.58	6.87	14.48	79.17	6.35	14.83	80.51	4.66	16.99	78.82	4.18
70-79	19.09	70.03	10.88	21.45	70.75	7.80	22.04	74.76	3.19	24.70	72.69	2.61
80 over	8.00	74.86	17.14	11.22	73.81	14.97	12.31	75.22	12.47	14.56	76.95	8.49
Gender												
Male	13.46	79.41	7.13	15.44	76.63	7.93	16.10	78.65	3.25	19.42	76.59	4.00
Female	13.67	75.92	10.40	17.04	75.20	7.76	18.17	77.07	4.76	19.28	76.23	4.48
Marital Status												
Married	16.25	76.96	6.79	19.18	74.96	5.86	20.61	76.23	3.16	23.44	73.91	2.95
Other Statuses	8.83	78.26	12.91	11.97	77.12	10.90	13.17	80.16	6.67	13.20	80.64	6.16
Area												
Urban	8.67	83.11	8.22	12.92	79.85	7.23	14.07	80.36	5.58	15.27	77.32	7.42
Rural	14.97	75.83	9.20	17.92	75.33	6.75	19.83	76.98	3.19	20.63	76.08	3.29
Region												
North	18.07	74.93	7.00	22.74	69.65	7.61	20.74	73.73	5.53	21.52	74.21	4.27
Central	16.57	73.14	10.29	15.02	76.44	8.54	15.79	74.16	10.06	23.31	71.50	5.19
South	6.62	84.79	8.59	21.43	71.26	7.31	12.73	80.78	6.49	13.49	82.94	3.57
Educational Qualification												
No	13.44	79.92	6.65	14.73	78.95	6.32	15.42	79.04	5.54	18.69	76.91	4.40
Primary	16.19	78.78	5.04	18.64	76.89	4.47	19.07	76.67	4.26	21.35	75.07	3.58
Secondary	16.28	79.07	4.65	18.31	73.19	8.50	20.94	72.33	6.73	21.49	72.83	5.68
Vocational	16.73	74.55	7.73	18.97	70.69	10.34	21.54	68.12	10.34	21.91	69.27	8.82
Higher	18.33	72.50	9.17	20.81	70.41	8.78	22.31	68.10	9.59	22.16	67.71	10.13

Table 3: Statistical Summary of the Indicators (cont'd)

Expenditure Quintile												
Bottom	10.71	78.30	10.99	10.19	81.48	8.33	14.57	80.61	4.81	15.49	80.86	3.65
Quintile 2	15.66	76.77	7.57	16.17	76.17	7.66	17.31	77.99	4.69	18.22	78.59	3.19
Quintile 3	16.90	76.37	6.73	17.37	75.51	7.12	19.46	75.40	5.14	21.24	75.60	3.16
Quintile 4	17.59	74.88	7.53	19.67	73.83	6.51	20.32	74.97	4.71	22.22	74.03	3.75
Top	18.88	74.01	7.11	21.14	72.74	6.12	20.28	73.49	6.23	24.46	70.74	4.80
Employment												
Paid Work	19.61	74.51	5.88	15.48	73.81	10.71	6.54	75.20	18.26	25.32	66.23	8.45
In Agriculture	20.84	72.11	7.05	23.03	72.97	4.00	7.14	70.45	22.42	28.29	69.51	2.20
Self-employment	13.64	77.84	8.52	17.60	75.66	6.74	7.18	73.34	19.48	27.62	69.61	2.77
Not working	9.29	80.68	10.03	13.12	77.12	9.76	4.13	83.04	12.83	12.75	81.88	5.37
House Ownership												
Yes	3.64	84.72	11.64	22.47	76.30	1.23	6.42	76.98	16.60	22.07	75.15	2.79

Source: Authors' calculations from VLSS 1992/93 & 1997/98, and VHLSS 2002 & 2004

Table 4: Statistical Summary of the Indicators
(Break-down of the independent variable values across each category of living arrangements)

Living Arrangements	1992/93			1997/98			2002			2004		
	Living Alone or Couple	Living with Children	Living with Others	Living Alone or Couple	Living with Children	Living with Others	Living Alone or Couple	Living with Children	Living with Others	Living Alone or Couple	Living with Children	Living with Others
Number of elderly	2,047			2,860			11,940			3,806		
% of the elderly population	13.58	77.43	8.99	16.36	76.80	6.84	17.43	76.74	5.83	19.34	76.37	4.29
Age												
60-69	51.44	63.72	46.20	50.64	59.78	46.43	36.21	53.21	47.81	43.61	51.22	48.47
70-79	43.53	28.02	37.50	42.31	30.12	32.14	45.45	33.71	37.91	44.97	33.51	25.47
80 over	5.04	8.26	16.30	7.05	10.10	21.43	18.34	13.08	14.18	11.42	15.27	26.06
Gender												
Male	42.81	44.29	34.24	39.96	42.80	42.86	24.35	43.16	46.27	41.58	41.52	38.65
Female	57.19	55.71	65.76	60.04	57.20	57.14	75.65	56.84	53.73	58.42	58.48	61.35
Marital Status												
Married	76.62	63.66	48.37	71.37	60.19	45.54	66.93	60.41	80.78	73.51	58.45	58.28
Others	23.38	36.34	51.63	28.63	39.81	54.46	33.07	39.59	19.22	26.49	41.55	41.72
Area												
Urban	14.13	23.75	21.76	24.57	31.55	40.63	16.95	23.39	20.95	19.02	24.39	41.74
Rural	85.87	76.25	78.24	75.43	68.45	59.37	83.05	76.61	79.05	80.98	75.61	58.26
Region												
North	51.08	37.16	29.89	47.22	31.23	33.04	42.53	38.20	49.15	44.57	38.91	39.88
Central	31.29	24.86	29.35	32.69	26.29	24.10	29.12	26.08	32.59	32.34	25.11	32.52
South	17.73	37.98	40.76	20.09	42.48	42.86	28.35	35.72	18.26	23.09	35.98	27.60
Educational Qualification												
No	58.28	61.82	64.38	54.19	47.92	51.34	73.25	70.70	60.25	57.34	62.77	55.21
Primary	27.61	23.96	19.18	31.71	34.53	28.89	15.72	16.92	20.70	21.20	18.03	16.04
Secondary	8.58	7.44	8.48	10.04	12.73	13.39	7.48	7.99	10.67	13.72	12.52	17.18
Vocational	4.30	4.48	6.59	2.35	2.89	2.68	2.01	2.69	5.19	5.57	4.27	6.59
Higher	1.23	2.30	1.37	1.71	1.93	3.70	1.54	1.70	3.19	2.17	2.41	4.98

Table 4: Statistical Summary of the Indicators (cont'd)

Expenditure Quintile												
Bottom	14.03	17.98	21.74	9.40	16.24	16.07	16.80	20.68	17.56	16.17	21.36	17.18
Quintile 2	22.30	19.18	16.30	16.24	16.51	16.07	19.57	22.07	19.85	18.61	20.33	14.72
Quintile 3	22.30	20.57	15.22	19.44	19.88	15.18	20.34	20.14	20.60	22.83	20.57	15.34
Quintile 4	22.30	20.88	17.39	27.78	22.51	19.20	20.80	21.31	21.09	23.10	20.67	18.40
Top	19.07	21.39	29.35	27.14	24.86	33.48	22.50	17.80	20.90	19.29	17.06	34.36
Employment												
Paid Work	3.60	2.40	1.63	2.78	2.86	4.02	3.70	2.97	3.33	5.30	3.51	3.98
In Agriculture	50.00	30.35	25.54	45.51	31.13	16.52	50.54	34.86	36.24	54.08	33.64	33.02
Self-employment	8.63	8.64	8.15	10.04	9.32	8.04	11.86	8.52	10.45	13.59	8.67	6.13
Not working	37.27	58.61	64.68	41.67	56.69	71.42	33.90	53.65	49.98	27.03	54.18	56.87
House Ownership												
Yes	91.01	63.28	17.93	93.59	68.59	12.50	89.06	74.64	16.38	95.38	75.40	14.11

Source: Authors' calculations from VLSS 1992/93 & 1997/98, and VHLSS 2002 & 2004

Among the elderly living in urban areas, the percentage of those living with children was predominant. The proportions of the elderly living alone or with spouse in both urban and rural areas increased over time (Table 3). The majority of elderly living alone or with spouse were living in rural areas, but the proportion of rural elderly in this category declined over time (Table 4). This status was due to the fact that most of the elderly in Vietnam are still living in rural areas, and urbanization has been in progress.

In all three main regions, most of the elderly were living with their children, and this proportion fluctuated over the decade. Also, in all regions, the proportion of the elderly living alone or with spouse increased over time, while that of the elderly living with others tended to decrease. The south had the highest proportion of elderly living with children, while the north and the center had significantly lower proportions of such elderly. The estimates by category in Table 4 shows that the vast majority of the elderly living alone or with spouse were in the northern and central regions, though the results (not shown) indicate that proportions of the elderly population in these regions were relatively equal over time. One possible explanation for the situation may be the strong exodus of the young people from rural to urban areas, and from the northern and central regions to the southern region with flourishing industrial zones, and this could result in the elderly being left behind to live alone, with spouse, or with others, rather than with children.

Decomposition of educational qualifications for the elderly in different categories of living arrangements in Table 3 provides interesting trends. While the majority of the elderly people were living with their children, the proportion decreased with increasing educational levels in favor of elderly living alone or with spouse. In other words, the elderly with higher educational levels were more likely to live alone or with spouse than to live with children.

Similar trends are also observed with five expenditure quintiles as the percentage of elderly living with children declined as per-capita real expenditures increased. Again, elderly were more likely to live alone or with spouse for higher expenditure quintiles.

The estimates for employment of the elderly in Table 3 show that the elderly living with children accounted for a large proportion of the elderly working (more than 70 percent), regardless working types. This finding indicates that the elderly were playing important roles in these households, and in many cases it could be more reasonable to think of the children as dependents rather than vice versa (Giang and Pfau, 2007). Moreover, among working elderly, the elderly living alone or with spouse, and the elderly living with others accounted for merely 20 percent and 10 percent, respectively. By each category of living arrangements, Table 4 indicates that the percentage of the elderly working for pay was relatively small, and it did not vary significantly over time. Most of the elderly were working in the agriculture sector. The elderly who were self-employed accounted for less than 10 percent of the elderly population in each living arrangement category. About half of the elderly were not working.

The statistics also indicate that more than 70 percent of the elderly living with children were living in homes owned by an elderly person (Table 3). By each category of living arrangements, about 90 percent of the elderly living with alone or with spouse were the owners of the current home, while a very small percentage of the elderly living with others were the home owners.

4.3. Determinants of the Elderly Living Arrangements: Multinomial Logit Results

To explore in greater detail the living arrangements of the elderly in Vietnam, as mentioned, we use multinomial logit estimation to compare three outcomes: living alone or with spouse; living with children; and living with others, but no children. The group of elderly living alone or with spouse will be our comparison group.

**Table 5a: Results of the multinomial logit estimation for living arrangements
“Live with Children” vs. “Live Alone or with Spouse”**

<i>Independent Variables</i>	<i>1992/93</i>		<i>1997/98</i>		<i>2002</i>		<i>2004</i>	
	<i>Odds ratio</i>	<i>P>z</i>						
<i>Gender</i>								
Female (<i>ref.</i>)	1.000		1.000		1.000		1.000	
Male	1.765	0.001	1.511	0.002	1.219	0.087	1.556	0.000
<i>Age</i>								
Age 60-69 (<i>ref.</i>)	1.000		1.000		1.000		1.000	
Age 70-79	0.242	0.000	0.368	0.000	0.405	0.000	0.358	0.000
Age 80+	0.310	0.001	0.526	0.007	0.408	0.000	0.366	0.000
<i>Education</i>								
No (<i>ref.</i>)	1.000		1.000		1.000		1.000	
Primary	0.771	0.214	0.937	0.628	1.326	0.069	0.970	0.799
Secondary	0.525	0.067	1.391	0.135	0.770	0.264	1.149	0.408
Vocational	0.996	0.993	1.064	0.874	0.398	0.009	0.841	0.451
Higher	1.763	0.496	0.945	0.904	0.395	0.023	1.367	0.318
<i>Marital Status</i>								
Others (<i>ref.</i>)	1.000		1.000		1.000		1.000	
Married	0.532	0.001	0.715	0.014	0.473	0.000	0.653	0.000
<i>Areas</i>								
Rural (<i>ref.</i>)	1.000		1.000		1.000		1.000	
Urban	1.407	0.112	1.623	0.001	1.738	0.000	1.426	0.004
<i>Regions</i>								
Centre (<i>ref.</i>)	1.000		1.000		1.000		1.000	
North	0.639	0.007	0.657	0.001	0.764	0.017	0.937	0.542
South	3.012	0.000	2.752	0.000	1.739	0.000	2.062	0.000
<i>Employment</i>								
Not working (<i>ref.</i>)	1.000		1.000		1.000		1.000	
Paid Work	0.587	0.190	0.780	0.470	0.462	0.003	0.459	0.000
Agri. Work	0.543	0.000	0.761	0.033	0.284	0.000	0.485	0.000
Self-employment	0.782	0.341	0.851	0.396	0.515	0.000	0.546	0.000
<i>Expenditure Quintile</i>								
Bottom (<i>ref.</i>)	1.000		1.000		1.000		1.000	
Quintile 2	0.566	0.018	0.564	0.008	0.862	0.319	0.755	0.057
Quintile 3	0.575	0.020	0.509	0.001	0.737	0.041	0.597	0.000
Quintile 4	0.482	0.003	0.365	0.000	0.676	0.009	0.538	0.000
Top	0.412	0.001	0.277	0.000	0.405	0.000	0.390	0.000
<i>House Ownership</i>								
No (<i>ref.</i>)	1.000		1.000		1.000		1.000	
Yes	0.127	0.000	0.137	0.000	0.153	0.000	0.149	0.000
Constant	137.322	0.000	73.778	0.000	77.941	0.000	73.045	0.000
No. observations	2,047		2,860		11,940		3,806	
Prob > chi2	0.0000		0.0000		0.0000		0.0000	
Log likelihood	-1234.475		-1648.2815		-6462.896		-2081.2084	
Pseudo R ²	0.1206		0.1833		0.1726		0.1696	

Source: Authors' calculations from VLSS 1992/93 & 1997/98, and VHLSS 2002 & 2004

**Table 5b: Results of the multinomial logit estimation for living arrangements
“Live with Others” vs. “Live Alone or with Spouse”**

<i>Independent Var.</i>	<i>1992/93</i>		<i>1997/98</i>		<i>2002</i>		<i>2004</i>	
	<i>Odds ratio</i>	<i>P>z</i>						
<i>Gender</i>								
<i>Female (ref.)</i>	1.000		1.000		1.000		1.000	
Male	1.542	0.077	2.243	0.000	0.747	0.023	1.659	0.040
<i>Age</i>								
<i>Age 60-69 (ref.)</i>	1.000		1.000		1.000		1.000	
Age 70-79	0.412	0.000	0.248	0.000	0.803	0.071	0.168	0.000
Age 80+	0.697	0.375	0.495	0.030	1.429	0.033	0.361	0.001
<i>Education</i>								
<i>No (ref.)</i>	1.000		1.000		1.000		1.000	
Primary	0.469	0.032	0.508	0.003	1.727	0.001	0.791	0.456
Secondary	0.330	0.073	1.249	0.536	1.087	0.738	1.481	0.304
Vocational	1.874	0.291	1.481	0.536	0.769	0.474	1.266	0.620
Higher	0.839	0.892	2.796	0.106	0.826	0.660	4.594	0.007
<i>Marital Status</i>								
<i>Others (ref.)</i>	1.000		1.000		1.000		1.000	
Married	0.376	0.000	0.621	0.037	0.955	0.000	0.605	0.050
<i>Areas</i>								
<i>Rural (ref.)</i>	1.000		1.000		1.000		1.000	
Urban	1.044	0.884	1.548	0.080	1.378	0.030	1.803	0.024
<i>Regions</i>								
<i>Centre (ref.)</i>	1.000		1.000		1.000		1.000	
North	0.387	0.000	0.546	0.011	0.772	0.037	0.460	0.001
South	1.978	0.012	2.748	0.000	0.857	0.278	1.190	0.517
<i>Employment</i>								
<i>Not working (ref.)</i>	1.000		1.000		1.000		1.000	
Paid Work	0.554	0.397	1.142	0.816	0.636	0.116	0.911	0.839
Agri. Work	0.576	0.021	1.136	0.624	0.589	0.000	0.745	0.281
Self-employment	1.047	0.902	0.994	0.986	0.714	0.047	0.507	0.094
<i>Expenditure Quintile</i>								
<i>Bottom (ref.)</i>	1.000		1.000		1.000		1.000	
Quintile 2	0.431	0.012	0.630	0.168	1.128	0.471	0.867	0.665
Quintile 3	0.386	0.005	0.589	0.116	1.057	0.742	0.739	0.361
Quintile 4	0.401	0.007	0.422	0.008	1.009	0.958	0.767	0.424
Top	0.612	0.146	0.439	0.020	0.844	0.357	1.050	0.894
<i>House Ownership</i>								
<i>No (ref.)</i>	1.000		1.000		1.000		1.000	
Yes	0.124	0.000	0.008	0.000	0.084	0.000	0.005	0.000
Constant	24.827	0.000	22.413	0.000	3.457	0.000	16.857	0.000
No. observations	2,047		2,860		11,940		3,806	
Prob > chi2	0.0000		0.0000		0.0000		0.0000	
Log likelihood	-1234.475		-1648.2815		-6462.896		-2081.2084	
Pseudo R ²	0.1206		0.1833		0.1726		0.1696	

Source: Authors' calculations from VLSS 1992/93 & 1997/98, and VHLSS 2002 & 2004

Table 5a and 5b show the odds ratios to compare the reference group with other relevant groups. When the odds ratio is greater than unity, the relevant group(s) will provide a

higher probability than the reference group. Conversely, an odds ratio, which is smaller than unity, shows that the relevant group(s) will provide lower probability than the reference group.

In addition, we also provide the p-value for each estimate. The p-value indicates the statistical significance for whether a group is different from the reference group. We generally conclude that there is a statistically significant difference if the p-value is less than 10 percent, or 0.1.

All the odds ratios for the gender factor in both Tables 5a and 5b are statistically significant. Table 5a indicates that the male elderly were more likely than their female counterparts to live with children.

The estimated odds ratios for the age groups of 70-79 and 80 and over demonstrate that the elderly at more advanced ages were more likely than their younger counterparts to live alone or with spouse. The findings for the elderly living with others are similar, except for the group of elderly aged 80 and over because the odds ratio of this group is not statistically significant. It might be that, as the elderly were getting older, their children were also getting older, and moving out of the house to look for a job, or get married and live separately from the elderly. The result (not shown) that the percentage of elderly living with their grandchildren increased over time could in part elucidate the situation. To support this argument more concretely, though, we need to explore further with the individual characteristics of the elderly's children.

In general, the odds ratios for all educational qualifications shown in Table 5a and Table 5b are not statistically significant. It means that education was not an important factor for the elderly to make decisions on living with their children or with others in comparison with living alone or with spouse.

The estimated odds ratios for the variable representing marital status in both Table 5a and Table 5b show that the married elderly were less likely than their counterparts (separated, divorced, widowed, or never married elderly) to live with children or live with others. In other words, the married elderly were more likely than other elderly to live alone or with spouse.

Except the survey 1992/93, all the odds ratios for the urban variable in both tables are greater than unity and statistically significant. They indicate that the urban elderly were less likely to live alone or with spouse. Instead, they were more likely to live with children or others.

By economic regions, in Table 5a, three out of four odds ratios for the northern regions, and all odds ratios for the southern regions are statistically significant, but those of the north are smaller than unity, while those of the south are greater than unity. The same findings hold in Table 5b, but to a lesser degree of significance. These results imply that the northern elderly might be more likely than the central elderly to live alone or with spouse, while the southern elderly were less likely to than the central elderly to live alone or with spouse. It is difficult to explain these findings clearly, but burgeoning domestic and international migration and the strong development of industrial and service sectors in the south could be attributed to the situation.

In terms of employment, in Table 5a, all the odds ratios for the variable representing the elderly working in agriculture-related activities are statistically significant, while only some of odds ratios for the variables representing the elderly working for paid work or self-employment are statistically significant. It generally means that the elderly working in the agriculture sector were more likely to live alone or with spouse than other elderly who were not working. The estimated results in Table 5b, however, did not show concrete conclusions for the differences between the elderly living with others with the elderly living alone or with spouse.

Most of the odds ratios for the expenditure quintiles in Table 5a, except the one for quintile 2 in the survey 2002, are smaller than unity and statistically significant. This means that the elderly living in the household with higher per-capita real expenditure were more likely to live alone or with spouse than to live with children. Regarding to this variable, the estimated results to compare the elderly living with others and those living alone or with spouse show that these elderly groups were not significantly different in living arrangements.

All the odds ratios for the variable representing home ownership in both Tables 5a and 5b are smaller than unity, and statistically significant at 1 percent significance level. They imply that the elderly households where an elderly owned the current house were more likely to live alone or with spouse. It is true that housing plays an important role as valuable property for the elderly to decide with whom they would live.

5. Concluding Remarks

Undergoing rapid social and economic changes, an aging society produces a potential concern for public policy, particularly the welfare policies for the elderly. By using VLSS 1992/93, VLSS1997/98, VHLSS 2002, and VHLSS 2004, we examined the patterns and the determinants of the elderly living arrangements in Vietnam, paying attention to various individual and household characteristics of the elderly, including age, gender, marital status, areas and regions of residence, employment, expenditure, and home ownership. We applied multinomial analysis techniques for the research objectives.

We found that, despite swift social and economic changes, living arrangements of the elderly families remained strong in Vietnam, as there was a high proportion of elderly people still living with their children. However, this proportion decreased gradually over time, and it was compensated by an increase in the proportion of the elderly living alone or with spouse. The multinomial analyses show that the elderly at more advanced ages were more likely to live alone or with spouse, and less likely to live with their children. While this could be an indicator that increased wealth has led to greater independence for the elderly, we have reason for concern, because elderly living alone or with spouse also tended to work less and be more rural, which could make them vulnerable to hardships.

Educational levels of the elderly and per-capita real expenditure of the elderly households have been improved over the past decade. Moreover, the majority of the working elderly were living with their children. In this sense, the elderly could be considered as independents, rather than dependents, in their households. Though, overtime increases in the proportions of the elderly living alone or with spouse, and the elderly living with others imply that the elderly were probably left behind due to strong exodus of young people from rural to urban areas, and from north to south. This calls for more attention from the government in making social policies to protect the elderly in such cases.

Even though this paper provides a number of findings about living arrangements of the elderly in Vietnam, as well as policy implications for the government, it could not avoid some limitations. The paper only analyzed the determinants of the elderly living arrangements by using the individual and household characteristics of the elderly. Moreover, it did not distinguish between dependent and independent elderly, as they must have different roles in their households. Other important factors, such as individual characteristics of the elderly's spouse and children, also need to be considered. These drawbacks will be mitigated in subsequent research.

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