



GENERAL STATISTICS OFFICE



UNITED NATIONS POPULATION FUND

THE 2014 VIET NAM INTERCENSAL POPULATION AND HOUSING SURVEY

POPULATION SEX-AGE STRUCTURE AND RELATED SOCIO-ECONOMIC ISSUES IN VIET NAM



VIETNAM NEWS AGENCY PUBLISHING HOUSE
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ABBREVIATIONS

CBR	Crude birth rate
GDP	Gross Domestic Product
GSO	General Statistics Office of Viet Nam
IMR	Infant mortality rate
IPS	Inter-censal Population and Housing Survey
MPI	Ministry of Planning and Investment
PHC	Population and Housing Census
SRB	Sex ratio at birth
TFR	Total fertility rate

PREFACE

The Viet Nam Intercensal Population and Housing Survey of 1/4/2014 was conducted according to Decision No. 1253/QĐ-TCTK dated 22 November 2013 issued by General Statistics Office of Viet Nam. This is the first Population and Housing Census carried out at the midpoint between two national censuses (the 2009 and the 2019 censuses). The aim was to systematically collect basic population and housing data in order to provide a foundation for research, evaluation and planning of programs and policies; development of policies, programs and targets; and to support broader socio-economic development planning in Viet Nam, especially related to population and housing issues.

In addition to the key indicators from the survey published in December 2014 and the Major Findings Report published in October 2015, other in-depth analyses have focused on issues such as the imbalance of the sex ratio at birth, the fertility rate, migration and urbanization, and the age-sex structure of the population. These reports provide further analysis and important information, while also offering policy recommendations related to these issues.

The monograph on **“the Population Sex-Age Structure and Related Socio-Economic Issues in Viet Nam: Evidence from the 2014 Intercensal Population and Housing Survey”** used data from the 2014 survey to provide updated information about these issues in Viet Nam for readers.

Results from the data analysis show that the age-sex structure of the population in Viet Nam is typical for the period of transition from high to low mortality and fertility. The analysis provides evidence related to important demographic issues such as the “demographic window of opportunity”, population ageing, youth, single elderly differences between regions and population groups, and factors that affect the sex-age structure.

The monograph also provides policy recommendations in order to meet the needs of a demographic change. These include taking advantage of the age-sex structure of population to improve young human resources for the economic development of the country, strengthening health and reproductive health care programs, and improving education and modern vocational training for youth as well as social security for the elderly.

The Viet Nam General Statistics Office (GSO) would like to express its special thanks to the United Nations Population Fund (UNFPA) for their financial and technical support to the 2014 Intercensal Population and Housing Survey, especially for data analysis and preparation of this monograph. We also would like to express our sincere thanks to Dr. Nguyen Viet Cuong from the National Economics University and Mekong Development Research Institute (MDRI), and Mr. Nguyen Van Phai, an independent consultant, for their great efforts in analyzing the data and developing this monograph.

We express our sincere thanks to UNFPA and GSO staffs for their cooperation and valuable comments during preparation and completion of this monograph.

We are honored to introduce this publication that provides an in-depth look into the population age-sex structure and socio-economic issues in Viet Nam. Analysis of results from the 2014 Intercensal Population and Housing Survey are currently a topic of interest among researchers, managers, policymakers and the society. We look forward to receiving your feedback and comments on this monograph to improve the quality of future GSO publications.

GENERAL STATISTICS OFFICE

EXECUTIVE SUMMARY

This monograph analyzes the status and trend of the age-sex structure of the population of Viet Nam using data from the 2014 Intercensal Population and Housing Survey (2014 IPS) conducted by GSO from 1 April 2014. Based on the results of the analysis, the monograph provides some policy recommendations focused on population and other related socio-economic issues.

Age structure

On April 1 2014, the population of Viet Nam was 90,493,352. The annual average population increase was nearly 941,000 people during the period 2009-2014. Over the three past decades the percentage of children aged 0-4 in the total population has decreased, from 14.6% in 1979 to 9.4% in 1999 and 8.2% in 2009. However, during the five years of 2009-2014, the percentage of children aged 0-4 increased slightly, to 8.3% in 2014, at an annual average rate of 0.02%. The percentage of youth aged 16-30 was 25.5% in 2014, a decrease of 2.3 percentage points compared with 2009.

Stable and low fertility rates, low mortality rates, and higher life expectancy during the past five years (2009-2014) explain why the population pyramid of Viet Nam in 2014 now has a typical aging shape.

The age-sex structure differs between urban and rural areas because there are urban/rural differences in fertility rates, life expectancy and migration. The percentage of the children aged 15-19 (both girls and boys) is higher in rural areas than in the urban areas. On the other hand, the percentage of people in the age group 25-69 years (both male and female) is lower in rural areas than urban areas. In addition, the percentage of the population aged 65 years and older is higher in rural areas compared to urban areas, and the proportion of elderly people living alone is also much higher in rural areas than in urban areas due to rural-urban migration of young people.

According to the results of the 2014 IPS, the regions that had the highest fertility rates were the Central Highland and Northern Midlands and Mountainous region. These areas also had the highest proportion of children aged 0-14. Three regions, including the Southeast, Mekong River Delta and Red River Delta, had the lowest fertility rates. These regions also had a low share of the population aged 0-14: 21.3%, 22.6% and 22.7%, respectively. The Mekong River Delta and Red River Delta had the highest proportion of the population aged 65 and older, at 8.9% and 6.8% respectively. The Central Highlands had the lowest share of the population aged 65 and older, at around 4.5%.

The Southeast region has a large migration inflow and also has the highest share of the population aged 15-64. Significant migration to this region explains why this region has a low mortality rate and a low proportion of the population aged 65 and older. On the contrary, with high levels of out-migration, the North and South Central Coast areas do not have high mortality rates and have a high proportion of population aged 65 and older (at around 8.2%).

The age pyramid of the Southeast region has the shape typical for the population

with low fertility and high in-migration, and these two factors typically last for a long time. The age pyramids of the Northern Midlands and Mountains, Red River Delta and Central Highland regions are typical of young populations; a pyramid with wide bars at the lower end and narrow bars at the higher end. Due to the fertility rate decline in the past five years, the bottom bars of the pyramid are quite narrow.

The Mong ethnic group had the highest fertility rate and the highest proportion of the population of children under 15 years of age. This group accounts for 42.5% of the total Mong population. “Other ethnic groups” and the Thai ethnic group ranked second and third in terms of fertility rates, and also rank second and third in terms of the proportion of children (29.9% and 27.2%, respectively). On the other hand, the Kinh people had the lowest fertility rate and also the lowest proportion of children in the population, at 23.1%, half of the rate of the Mong.

Ethnic groups that have a lower mortality rate will typically have a higher proportion of people aged 65 and older. The Kinh had the lowest mortality and a higher proportion of people aged 65 and older at 7.5%, while the Mong had the highest mortality rate and a lower proportion of people aged 65 and older, at just 3.2%.

Sex ratio

The sex ratio (the number of males per 100 females) in Viet Nam has been changing significantly over time. It has continuously increased in recent decades, from 94.2 in the Viet Nam Population Census of 1989 to 97.3 in the 2014 IPS.

There are obvious differences in the sex ratios of the country’s 63 provinces and cities in 2014. Low income provinces in regions such as the Central Highlands and Northern Mountainous area had a higher sex ratio than high income provinces in the Southeast and Red River Delta. However, the sex ratio of population of children under 15 years of age shows an opposite trend: the sex ratio for this population is higher in high income provinces than in low income provinces. This indicates that child sex selection may be occurring in higher income areas¹. People in these areas have better economic conditions as well as access to health centers that allow them to choose the sex of their child. These regions also have lower fertility, and therefore families want to have sons.

Demographic window of opportunity

The 2014 IPS indicates that Viet Nam has entered the “demographic window of opportunity”/population bonus period. It means that the ratio of working age people is double the dependency ratio (in other words, for every two people or more working, there is only one dependent person). As of 1 April 2014, 52 out of 63 provinces had reached the demographic window of opportunity, nine times as many provinces as in the 2009 Population and Housing Census. Although the other provinces do not have a demographic window of opportunity, their dependency ratio is not high.

Population aging and single elderly people

The aging index of Viet Nam has been increasing rapidly over the last 35 years. In

¹ According to the Law on the Protection, Care, and Education of Children, children prescribed as Vietnamese citizens under 16 years of age.

1979, for every 100 people under 15 years old, there were 16.6 people over 60 years old. After 20 years (1999), this ratio had increased by 1.5 times, so that by 2014 the index was 43.3, three times as many as in 1979. Among 10 ASEAN countries, Viet Nam's population aging index ranks third, just lower than Thailand and Singapore.

The percentage of single elderly people is increasing in Viet Nam. According to the 2014 IPS, the percentage of single elderly was 3.2% among people aged 60 and older, and 16.4% among people aged 80 and older. The percentage of single elderly in rural areas was higher than in urban areas, and the percentage of single elderly people in the Red River Delta and central regions of Viet Nam is higher than in other regions. The Southeast and Mekong River Delta had the lowest percentages of single elderly people. Throughout the country elderly women are more likely to live alone than elderly men.

Analysis of the 2014 IPS data also shows that there is a correlation between living alone and education level. The percentage of people with university or college graduation living alone is lower than the rate among people with lower levels of education. In addition, the study also indicates the correlation between elderly people living alone and living conditions (house and home facilities). Approximately 32.4% of elderly people aged 80 and older who belonged to the group with the lowest living conditions lived alone in 2014. This percentage was only 3.1% for the group with the highest living conditions. These results suggest that policies to support elderly people living alone should focus more on low income people.

Recommendations

The age-sex structure has changed significantly during the past three decades in Viet Nam, particularly over the last 10 years. Therefore, national and local socio-economic development policies should take into account these changes in order to cope with this trend, and to take advantage of the opportunities of demographic changes for the benefit of the country's development.

Specifically, family planning should be focused more on areas with young population structures and high dependency ratios, such as the Central Highlands and Northern Midlands and Mountains region, in order to respond to demographic changes, contribute to improving people's lives, and enhance conditions for the development of the local economy.

More attention should be paid to the problem of the child gender imbalance resulting from the tendency of parents to choose boys instead of girls. Out of the 63 provinces and cities, 24 provinces/cities had a very high sex ratio, above 110%, for the group of children aged 0-4. In addition to dissemination of messages about the negative effects of child sex selection, such as the resulting excess of men and social security problems in the future, there should be stronger sanctions to prohibit fetal sex disclosure and child sex selection methods.

The fertility rate was low and stable during the last 15 years in most provinces of Viet Nam. The proportion of children at the ages of kindergarten and primary school did not increase significantly. However, when undertaking planning related to preschool and elementary schools, local authorities should pay attention to the number of immigrants, especially young women who are often accompanied or will marry and have children, to avoid a shortage of schools and teachers.

The increasing percentage of young people aged 16-30 in the total population, 25.5% in 2014, suggest that Viet Nam needs appropriate investment policies in order to create conditions for the development of youth and support for their contribution to the development of the country. Viet Nam now has a “demographic window of opportunity”, and this opportunity should last for more than 25 years. In the context of Viet Nam’s relatively low labor productivity, improving the quality of young workforce is therefore urgent. To contribute to improved labor productivity and to meet the needs of the labor market, the government should develop policies and vocational training programs to enhance the skills of workers, especially young and middle-aged laborers. Enhancing the quality of reproductive health services for young people is also essential.

Although the singulate mean age at marriage (SMAM) of Viet Nam’s population continues to rise there are still cases of early marriage before the minimum age stipulated by the law. In 2014, 2.2% of young men below the age 20 and 3.7% of young women under the age of 18 were married. Early marriage can cause people to drop out of school and miss employment opportunities. Early childbearing can affect maternal and child health negatively, and may also make it difficult for young couples to ensure living conditions for themselves and their children. The attention parents give to their children plays an important role in the successful education and marriages of children. The government should have policies and programs to address early marriage, including gender education for youth and dissemination of knowledge about the adverse impacts of early marriage, especially for people in rural and remote areas with a high density of ethnic minorities.

Population projections show that the proportion of elderly people will grow rapidly in the coming years in Viet Nam. The country faces the challenge of population aging; many elderly people have chronic diseases and/or are economically dependent on others. Social insurance and health insurance policies should be developed and modified to adapt to the trend of an aging population. The government should further develop the health strategy to respond to the trend of population aging, including the building of medical facilities to ensure health care for the elderly. Raising the retirement age and managing pension funds can be effective measures to ensure the affordability of insurance funds, thus ensuring social security for the elderly.

The issue of single elderly people also needs more attention. Migration of young people has led to an increasing number of the elderly people living alone. Members of households with dependent members and single elderly people tend to have little education and low living conditions. For these households, pensions to support the elderly and other type of support for poor children and ethnic minorities are essential.

In addition, because there are differences in the age-sex structure between rural and urban areas, and between different economic-geographic areas and ethnic groups, population policies must be designed according to the unique features of these population groups.

CHAPTER 1: INTRODUCTION

1.1. The necessity of research on the age-sex structure of the population of Viet Nam

Viet Nam has achieved remarkable economic growth since the implementation of economic reforms. The gross domestic product (GDP) growth rate has been decreasing in recent years, but still has reached an average of about 5% per year. Incomes, living standards, and the health of people have improved as the mortality rate has decreased and average life expectancy has increased. Population and family planning programs in Viet Nam have contributed to a decline in the fertility rate during the last three decades. At the same time, reduced mortality and increased life expectancy have caused the age-sex structure of the population to change remarkably. The proportion of middle-aged and elderly people has tended to increase. In 2009, the number of people aged 60 and older accounted for 10% of the population. Understanding the age-sex structure of Viet Nam's population is becoming increasingly important.

Age and sex are the two of the most important factors affecting human health, the economy, and human society in general. For each person, their education, health, income and other welfare indicators depend on their age and gender. According to the life-cycle theory, people tend to have high incomes during their young adult and middle ages, and then lower incomes when they become old and retire (Deaton, 1986; 2005). Thus, income and expenditures for most people depend to a large degree on their age.

From the macroeconomic perspective, the age structure of a country's population is a key factor related to economic growth. Different populations have different age-sex structures. The age-sex structure of the population is a key factor affecting a country's labor force, production efficiency, economic growth and GDP, as well as social insurance (Bloom et al., 2011). Thus, findings about the age-sex structure of population are very important for policy makers, especially for Viet Nam, a country in transition in terms of population and economic structure.

In 2014, Viet Nam's General Statistics Office (GSO) conducted the Intercensal Population and Housing Survey (IPS 2014). The 2014 IPS was a sample survey with a sample size of 5% of the total households in Viet Nam (1,121,850 households). The objective was to provide estimates of the size, structure and distribution of the population, as well as economic and social features at the provincial and district level. The information and data collected from the IPS 2014 can be used to analyze changes in the population over time for the whole country, for regions and for provinces to provide evidence for policymaking. Information from this analysis comprise an important input to the design and implementation of development programs, as well as social and economic strategies and policies, for various sectors for the period 2015-2020.

1.2. Objectives of the monograph

This monograph analyses the age-sex structure of the population of Viet Nam and analyzes selected issues related to children, youth and the elderly. The main objectives of this monograph include:

- To analyze the current situation, trends, and differences in the age-sex structure of Viet Nam's population, including the age-sex structure of the child, youth, and elderly populations by demographic, geographic and social-economic characteristics, using data from the 2014 IPS and other population and housing censuses of Viet Nam;
- To analyze education and schooling of children and youth, early marriage and divorce among youth, the situation of elderly people living alone in Viet Nam; and
- To provide policy recommendations on the age-sex structure and other issues related to children, youth and the elderly in Viet Nam, based on results of the data analysis.

1.3. Data

This monograph relies on the 2014 IPS. In addition, there are other data sources that were used in the analysis, including:

- Population and Housing Census 2009 (sample of 15%)
- Population and Housing Census 1999 (sample of 3%)
- Some data published on Viet Nam's population from 1979 and 1999

1.4. Methods

The monograph applies simple quantitative analytical methods widely used in population and socio-economic studies to describe and compare the age-sex structure of a population, and groups within the population, over time. The main analytical methods used are descriptive analysis presented in spreadsheets, charts, and population pyramids and maps.

The assessment of data quality mainly focuses on exact aging data. Therefore, the methods used include Whipple's index, Mayer's index and Uni's index. Component methods to update population projections are used to assess the accuracy of the data in terms of the age-sex structure, with adjustments made to the data when necessary.

The monograph uses logistic regression to estimate and analyze the correlation of individual outcomes, including schooling enrolment, educational attainment of children and youth, marital status, and elderly living alone, with selected demographic and socio-

economic variables. The software used for analysis and population are STATA, PAS, and SPECTRUM. The analytical methods are described in more detail in relevant sections below and in the annexes.

1.5. Outline of contents

The monograph is divided into five chapters (in addition to the Executive Summary, references and annexes). Chapter 1 is the introduction describing the objectives and methodology. Chapter 2 presents the assessment of data quality, as well as data corrections made in order to arrive at comparable estimates of the age-sex structure of the Vietnamese population over time. Chapter 3 presents a detailed analysis of the age-sex structure of the Vietnamese population. This chapter discusses, in addition to the age-sex structure and expectations for the future age-sex structure, the related topics of the dependence ratio, population aging, and migration trends. Chapter 4 presents an analysis of education for children and youth, youth marriage, and elderly people living alone using the logistic regression method. Finally, Chapter 5 summarizes the main findings of the monograph and provides some policy recommendations.

CHAPTER 2: ASSESSMENT OF DATA QUALITY

2.1. The quality of data on the age-sex population structure

Population data by age and sex are important for population projections, and serve as the basis for forecasts of socio-economic indicators such as the size and structure labor force, school enrollment, dependency ratios, etc. These data are also used to calculate demographic age-specific rates, such as the age-specific fertility rate, age-specific mortality rate, age-specific marriage rate, and age-specific migration rate. These indicators are, in turn, the basis for calculations of aggregate demographic rates such as the total fertility rate, life expectancy, and age at marriage. Therefore, the accuracy of population data by sex and age affects directly the accuracy of a range of other demographic indicators.

One type of common error related to age in population censuses, and in demographic surveys, is age heaping, which occurs most often for ages ending with the digit zero (0) or five (5). A simple index to assess this kind of error is Whipple's index, which is used to calculate the error by comparing the number of people reporting their age ending with the digit zero or five and the estimated number of people in these ages, with the assumption that the population is distributed uniformly by age (see: United Nations, 1990; Iwunor, 1993). Whipple's index ranges from 100 to 500. When the Whipple's index is 100, this indicates that no rounding exists for ages ending with zero or five. On the contrary, if all respondents report that their age ends with zero and five, Whipple's index will be 500.

The following standards are applied in evaluating the quality (accuracy) of responses on age based on Whipple's index:

- Less than 105: very accurate
- 105 to 110: relatively accurate
- 110 to 125: fair
- 125 to 175: bad
- > 175: very bad

Figure 2.1. Values using Whipple’s index by year, Viet Nam, 1989-2014

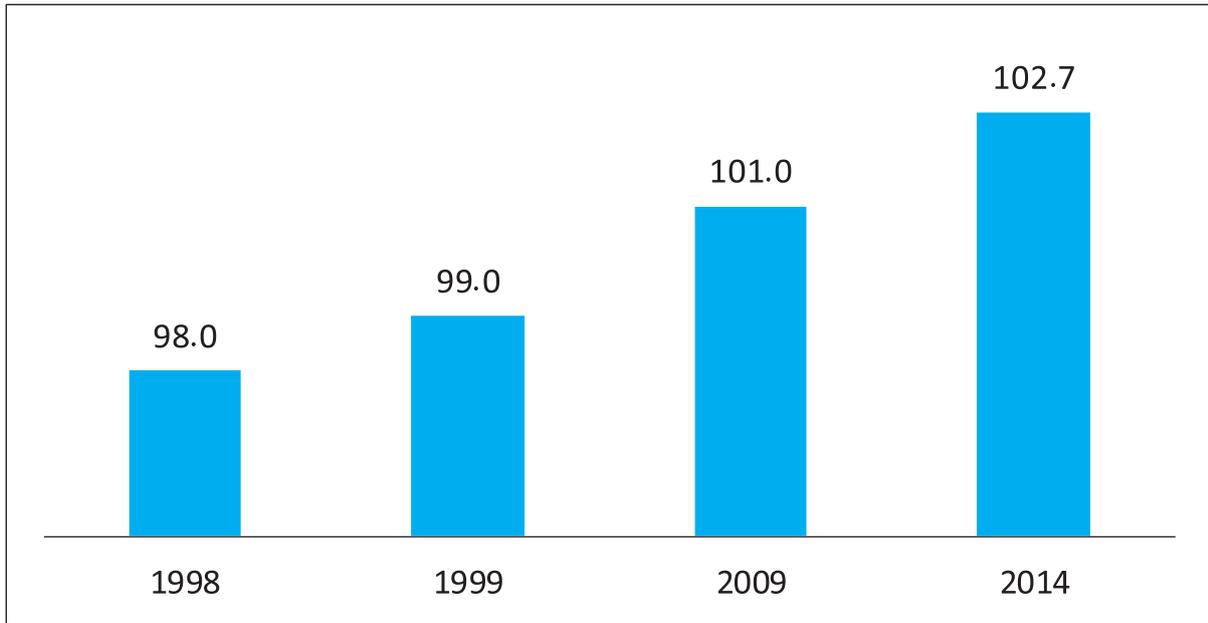
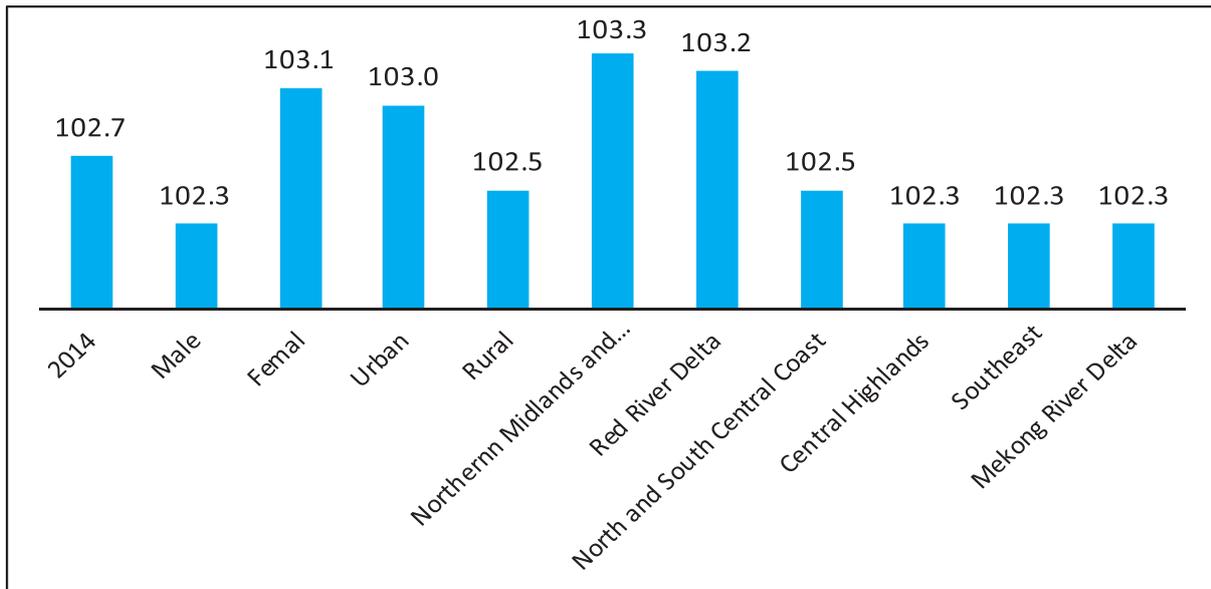


Figure 2.1 presents Whipple’s index from the Viet Nam population censuses since 1989 and from the 2014 IPS. The results indicate that almost no rounding to zero or five is found in the age data from these censuses and surveys in Viet Nam. According to the Whipple’s standard, the responses on age in the population censuses in Viet Nam from 1989 to 2009 can be regarded as “very accurate”. The Whipple’s index calculation from the 2014 IPS is higher than estimates from the three previous censuses, but is still regarded as “very accurate”.

Figure 2.2. Values of Whipple’s index by sex, urban/rural residence, and geographic regions, Viet Nam 2014



The Whipple’s index does not allow determination, in a population census, of which ending digits are preferred when respondents state their age. Myer’s blended

index, together with respondents' age-specific indicators, can show whether there is any other ending digit preferred by respondents in population census data. The value of Myer's blended index can range from zero to 90. The higher the value of Myer's index is, the more preference there is for certain digits.

The Myer's blended index values in the population censuses in Vietnam are very low and have progressively improved over time (see Table 2.1). The Myer's blended index value was highest in the 1979 Population and Housing Census, at 4.1. The value was reduced to 3.5 in the 1989 Population and Housing Census and to 2.8 in the 1999 Population and Housing Census. The Myer's blended index value in the 2009 Population and Housing Census was higher by only 0.1 compared to the 1999 Population and Housing Census. These values are considered very small compared to the full range of this index (from 0 to 90). Even the Myer's blended index value in the 2014 IPS is only equal to 1.29, less than half of the value in the 2009 Population and Housing Census. In short, age heaping at ages ending with 0 or 5 in population censuses and surveys in Viet Nam is negligible.

Table 2.1 presents the Myer's index values by the ending digits for age for the population censuses in Viet Nam in 1989, 1999, 2009 and the 2014 IPS. These values indicate whether any specific age is preferred in the responses. These age-specific index values ranges from 0 to 10. In the numeric range from 0 to 9, if the value is 0, there is neither preference nor avoidance of any age ending with the number. If any value is higher than zero (positive), preference at the age ending with that number exists. If the value is less than zero (negative) there is an avoidance of age response for that number.

Table 2.1. The Myer's blended index and digit preference in the Viet Nam censuses 1989-2009 and IPS 2014

Ending digit	1979	1989	1999	2009	2014
0		-0.2	-0.1	-0.1	0.2
1		-0.2	-0.2	-0.3	0.3
2		-0.5	-0.3	-0.4	-0.3
3		-0.1	-0.1	-0.1	0.5
4		0.2	0.2	0.1	0.3
5		-0.1	-0.1	0.1	-0.2
6		0.3	0.5	0.5	-0.2
7		-0.7	-0.7	-0.4	-0.3
8		0.8	0.6	0.7	-0.2
9		0.5	0.1	0.1	-0.1
Blended index	4.1	3.5	2.8	2.9	1.3

Data in Table 2.1 indicate that in the three censuses of 1989, 1999, 2009 the ending digit for age that had the highest frequency was 8, followed by the ending digit of 6. The least frequent ending digit was 7, followed by the ending digit of 2. Meanwhile, in the 2014 IPS, the ages that had the highest frequency were those ending in 3, while the least frequent ages ended in 9.

One of the reasons why respondents often report their ages ending with 8 in censuses is because the population censuses in Viet Nam are conducted in years ending with 9 and age is determined by questions asking the year in which the respondents were born. When asked for the year they were born, many of the respondents tend to report being born in a year ending in zero (e.g., 1930, 1940, 1950), particularly those who do not remember their age precisely. Since the census takes place on April 1 in a year ending in 9 (1989, 1999, 2009), when age is calculated, about three quarters of those who declared being born in the years ending with 0 will have their age recorded as ending with 8, and the remaining quarter will have their age recorded as ending with 9.

In the 2014 IPS, ages ending with 3 were also popular due to rounding and the phenomenon of recalling the year of birth as ending in 0, as described above for the regular population censuses. Specifically, the preferred ending digit in the 2014 IPS was 3 because the census was conducted on April 1 of 2014 and thus when age was computed, the majority (three quarters) of those saying their birth year ended in 0 were documented as having an age ending with 3.

Although there is a slight preference for year of birth ending in 0, this preference does not affect the quality of the aggregated data for 5-year age groups, because a 5-year age group includes both a redundant group (people with last digit of age equal to 0), and the shortage group (people with last digits of age equal to 9 and 1).

Another index used by demographers to assess the quality of uniform distribution is the Age-Sex Accuracy Index (UNI) (United Nations 1990). This index reflects the accuracy of the population structure by sex and 5-years age groups. This index includes sex ratio points (SRS) and age ratio scores for each gender: ARM for men and ARSF for women. These indicators are calculated for all 5-year age groups from 0 to 74 years old. The composite index JS – the accurate indicator of age-sex distribution of population - is calculated using the formula:

$$JS = 3 * SRS + ARSM + ARSF$$

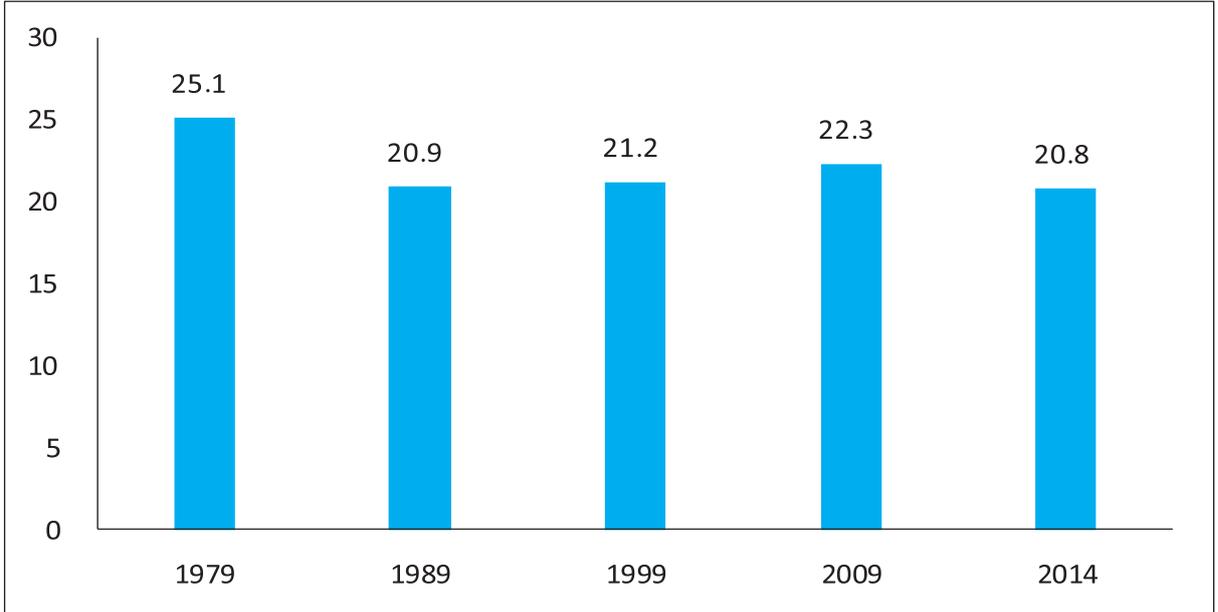
Standards for quality of sex and 5-year age group distribution data using this index are:

- <20: Accurate
- 20 to 40: Inaccurate
- >40: Very inaccurate

In general, the UNI index is used to assess the quality of data on population distribution by sex and 5-year age groups prior to making population projections, specifically to help determine whether or not there is a need for adjusting data prior to making projections.

Figure 2.3 shows the difference in the UNI index calculated for the population censuses conducted from 1979 to 2009 and the 2014 IPS. The figures show that for all five censuses and the IPS, the values of the UNI index are higher than 20 points. The 2014 IPS has the lowest UNI index value at 20.8 points, while the highest is the 1979 census at 25.1 points.

Figure 2.3. UNI index values, Viet Nam, 1979-2014



The results indicate that the degree of accuracy of the age and sex data in the censuses and 2014 IPS in Viet Nam, according to international classification, is not high. However, the relatively high UNI index values are, to a large degree, the consequence of war. This indicator developed by the UN for estimating the accuracy age-sex data is based on the assumption of the age and sex structure of a normal population. However, Viet Nam’s population was affected seriously by wars that impacted the age and sex structure of the current population, especially the age groups of 50 years old and higher. The sex ratio as well as the age ratio is quite unusual for these age groups in Viet Nam. In the 2014 IPS, the level of accuracy for these indicators was also affected in part by provisions of respondents (to be presented in the next section).

2.2. Adjustments to the age-sex structure of the population based on the 2014 IPS

The size and structure of the population, including the age-sex structure, depends on the respondents sampled in the survey. Therefore, when comparing the age-sex structure of different populations, it is important to pay attention to the differences in respondents among censuses and surveys.

The 2014 IPS, unlike previous full censuses that sampled from the entire population, did not interview people in the army and police force, as well as other the specific groups of people (as defined below). Therefore, to compare the age-sex structures between previous censuses and the 2014 IPS, it is necessary to adjust the age-sex structure of the 2014 IPS.

There are some methods for adjusting the data from the 2014 IPS, including:

- ***Adjusting the data based on differences in the age-sex structure between full and sampled populations in censuses.***

Based on the difference between the population estimated for each age group from the 2014 IPS and the population enumerated from the full censuses in 1989, 1999 and 2009, the age groups of the 2014 IPS can be adjusted according to the following formula:

$${}_5P_x^{IPSdc} = {}_5P_x^{IPSS} \frac{{}_5P_x^{tbTD}}{{}_5P_x^{tbm}}$$

In which:

- ${}_5P_x^{IPSdc}$ = Adjusted population of age group x, x+5 in the IPS;
- ${}_5P_x^{IPSS}$ = Population of age group x, x+5 collected in the IPS;
- ${}_5P_x^{tbm}$ = Average sample population in age group x, x+5 of the three censuses 1989, 1999 and 2009;
- ${}_5P_x^{tbTD}$ = Average comprehensive population in age group x, x+5 of the three censuses 1989, 1999 and 2009.

The shortcoming of this method is that it only provides an adjustment for the shortage of the population in the 2014 IPS due to not including the army and police, but it does not address the shortage of specific people who were not covered in the 2014 IPS.

A second method for adjusting the data from the 2014 IPS is to:

- ***Adjust based on the difference between the projected age-sex structure and the 2014 IPS age-sex structure.***

As is well known, given the size of Viet Nam’s population, the level of international migration is negligible; after five years, the population for the age group of 5 years and over is only affected by mortality, while the age of children in the 0-4 age group is affected by fertility (specifically the age-specific fertility rate, or ASFR) and mortality of children under 5 years of age. Therefore, it is possible to use 2014 IPS data to make projections about the population by component method, and thus determine changes in the population structure by age group.

After the end of the 2009 census, based on the results of the census, the General Statistics Office (GSO) conducted a population projection by component method. The results of this projection were announced in 2011 (GSO, 2011). The population of Viet Nam on April 1 2009 was found to be 85,847,000 people, while on April 1 2014 the population was estimated to be 90,654,400. Thus, compared with the total population of 90,493,400 people estimated directly from the 2014 IPS, the projected figure was higher by only 161,000. This difference is due to the difference between predicted fertility and mortality rates and actual fertility and mortality rates. However, this difference is very small, less than 0.2% of the population.

Another method for adjusting the data from the 2014 IPS is to:

- ***Adjust based on the age-sex structure of the population of people living in areas managed by the army, police and foreign affairs ministry in the 1989 census.***

In four population censuses that have been conducted in the country, only in the 1989 population census was population data published by sex and age, under two categories: i) the entire population, and ii) the population excluding people in “special groups”. There are three special groups: people in areas managed by the Ministry of Defense, Ministry of Police and Ministry of Foreign Affairs. Using data on the total number and age-sex structure of the entire population minus the corresponding figures for the sectors of the population without the three special groups, we can estimate the number and age-sex structure of the three special groups. We can project the size of these special groups over time and add these groups to the population surveyed in the 2014 IPS. The limitation of this approach is that it does not provide information on the differences in the number of people and age-sex structure of the three special groups between 1989 and 2014.

Another alternative approach to adjusting the data from the 2014 IPS is to:

- ***Adjust based on the age-sex structure of the population from the 2009 census and fertility and mortality figures in surveys conducted in the last five years (2009-2014).***

Under this method, the adjusted age-sex structure in 2014 is based on the age-sex structure of the 2009 census and fertility and mortality figures collected during the five years from 2009 to 2014. This is a widely method used by the United Nations and demographers to update population projections. It should be noted that this correction is only applied to the country’s population and is only used to analyze the changing age-sex structure over time. The results obtained in this way (calculated by GSO) are presented in Table 2.2.

Table 2.2. Age-sex structure of population in the 2014 IPS adjusted based on the age structure in the 2009 census and fertility and mortality figures collected in surveys conducted in the last five years (2009-2014)

Age group	Proportion of each sex			Proportion of total population		
	Male	Female	Both sex	Male	Female	Both sex
0-4	8.89	7.77	8.33	4.38	3.94	8.33
5-9	8.18	7.33	7.75	4.03	3.72	7.75
10-14	7.71	7.08	7.39	3.80	3.59	7.39
15-19	8.17	7.59	7.87	4.03	3.85	7.87
20-24	10.03	9.45	9.73	4.94	4.79	9.73
25-29	9.33	9.01	9.17	4.60	4.57	9.17
30-34	8.53	8.37	8.45	4.21	4.25	8.45
35-39	7.52	7.33	7.42	3.71	3.71	7.42
40-44	7.11	6.94	7.02	3.51	3.52	7.02
45-49	6.35	6.42	6.39	3.13	3.26	6.39
50-54	5.51	5.97	5.74	2.72	3.03	5.74
55-59	4.23	4.92	4.58	2.09	2.49	4.58
60-64	2.74	3.35	3.05	1.35	1.70	3.05
65-69	1.89	2.33	2.11	0.93	1.18	2.11
70-74	1.34	1.88	1.61	0.66	0.95	1.61
75-79	1.07	1.65	1.36	0.53	0.84	1.36
80+	1.40	2.61	2.01	0.69	1.32	2.01
	100.00	100.00	100.00	49.31	50.69	100.00

Table 2.3 shows that the age indicators obtained by this method are more consistent with the actual trend (evident in census data) compared to the other methods described above. Therefore, the data on the age-ex structure of Viet Nam's population obtained by this method was used to compare data of age-sex structure over time in Chapter 3.

Table 2.3. Age structure and dependency ratio, Vietnam 1989-2014

	1989	1999	2009	2014
Proportion of population under 15 year of age	39.2	33.1	24.5	23.5
Proportion of population 15-64	56.1	61.1	69.1	69.4
Proportion of population 65 and over	4.7	5.8	6.4	7.1
	100	100	100	100
Dependency ratio				
Elderly dependency ratio	69.8	54.2	35.4	33.8
Child dependency ratio (65+)	8.4	9.4	9.3	10.2
Total dependency ratio	78.2	63.6	44.7	44

CHAPTER 3: THE AGE - SEX STRUCTURE OF THE POPULATION OF VIETNAM

3.1. The age-sex structure

3.1.1. Changes in the age-sex structure of the population in Viet Nam from 1979 to 2014

As discussed in Chapter 2, since the population measured by the national censuses and the 2014 IPS differ, analysis of the age-sex structure of the country's population presented in this report is based on adjusted data to better estimate the structure of the entire population. For the analysis of the age-sex structure of specific groups, unadjusted data was used.

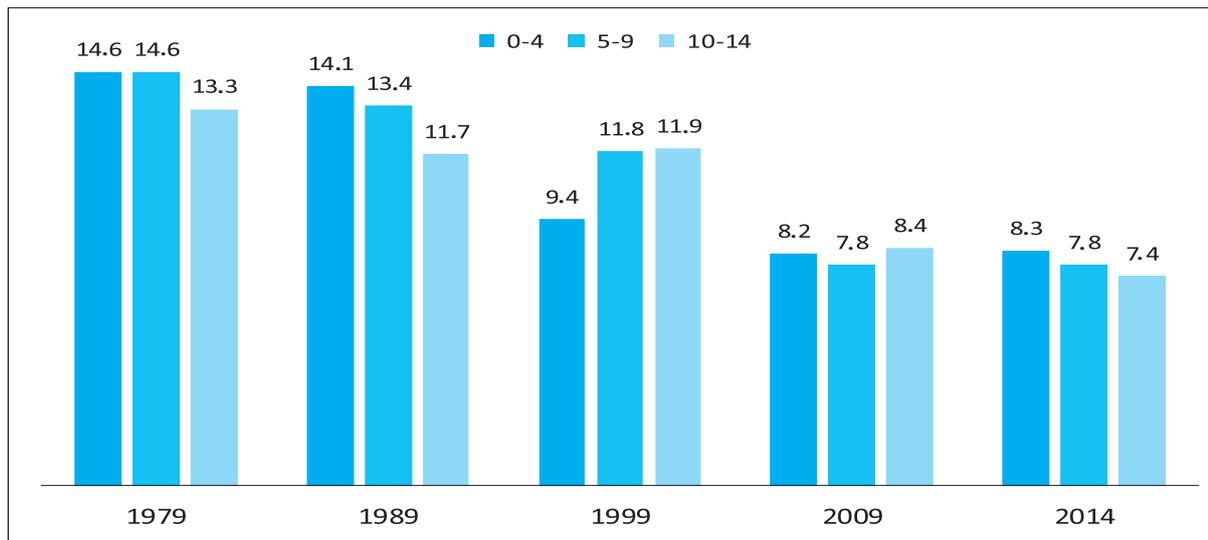
Table 3.1 presents the age-sex structure of the population from the 2014 IPS by 5-year age groups. The figures show that the decrease in fertility was negligible over the past five years, and therefore the proportion of the population aged 0-4 was almost unchanged compared with the age group of 5-9, though the number of males in the latter group even increased by 0.58 percentage points.

Table 3.1. Age-sex structure of the population, Viet Nam, 2014

Age group	Male	Female	All
0-4	8.89	7.77	8.33
5-9	8.18	7.33	7.75
10-14	7.71	7.08	7.39
15-19	8.17	7.59	7.87
20-24	10.03	9.45	9.73
25-29	9.33	9.01	9.17
30-34	8.53	8.37	8.45
35-39	7.52	7.33	7.42
40-44	7.11	6.94	7.02
45-49	6.35	6.42	6.39
50-54	5.51	5.97	5.74
55-59	4.23	4.92	4.58
60-64	2.74	3.35	3.05
65-69	1.89	2.33	2.11
70-74	1.34	1.88	1.61
75-79	1.07	1.65	1.36
80+	1.40	2.61	2.01
Total	100	100	100

The proportion of children aged 0-4 was slightly higher than the 5-9 age group (8.33% versus 7.75%). The proportion of children in the population has decreased remarkably over time. Figure 3.1 shows that at the time of the 1979 census, the proportion of children in the 0-4 age group accounted for 14.6% of the population, but in the 1999 census this figure was only 9.4%. The proportion of children 0-4 years continued to decline further to only 8.3% in 2009.

Figure 3.1. Age-sex structure of children aged 0-14 in Viet Nam, 1979-2014



In the period 1979-2009, the proportion of children aged 5-9 years old fell from 14.6% in 1979 to 7.8% in 2009, with an annual average decline of 0.23 percentage points. The proportion of children aged 5-9 fell the most during the 10 years from 1999 to 2009, from 11.8% in 1999 to 7.8% in 2009, an average annual decrease of 0.4 points.

Figure 3.2 shows that the population pyramids of the age-sex structure of the population of Vietnam over four population censuses, from 1979 to 2009 and the 2014 IPS. The results show that the age-sex structure of the population in Viet Nam has changed significantly over the past three decades.

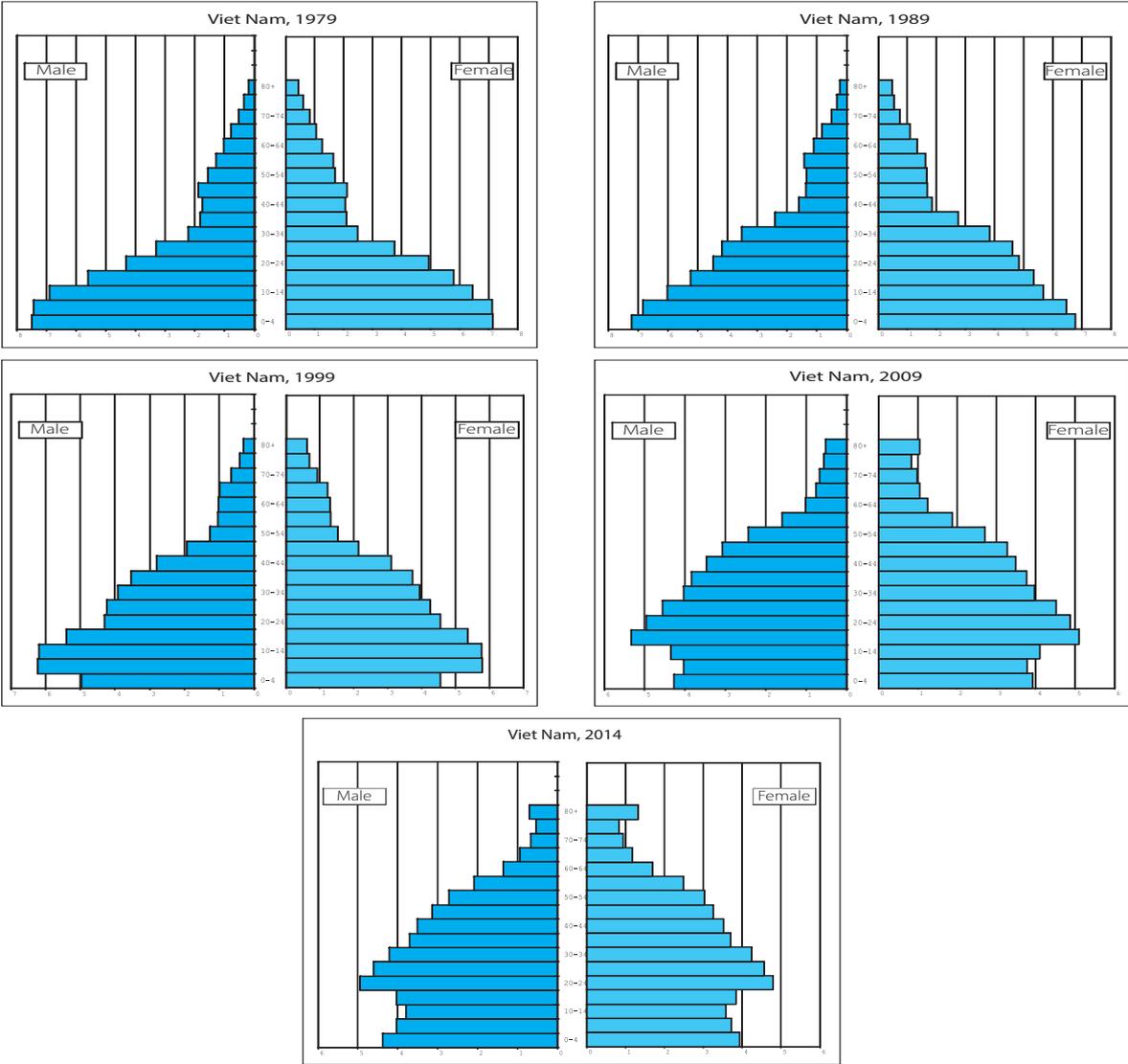
The population pyramids in 1979 and 1989 have a similar shape and characterize a population with relatively high fertility and mortality, especially the 1979 population pyramid. The bars at the bottom of these two pyramids are larger than the other bars, showing clearly the impact of wars on the age structure of the population. The body of the 1979 pyramid narrowed dramatically compared to previous population estimates of the population for the three age groups of 30-34, 35-39 and 40-44. In the 1989 pyramid, the sudden narrowing takes place in the three age groups of 40-44, 45-49 and 50-54. These are the age groups from who were strongly affected by the war against America during 1960 to 1975. However, it can be seen that the population pyramid in 1989 had narrowed more slowly than in population pyramid for 1979, reflecting the fact that mortality decreased more quickly in the years before this census compared to the years before the 1979 census. Both the population pyramids for 1979 and 1989 characterize the pyramid shape of a young population.

The pyramids of Viet Nam's population in 1999 and 2009 reflect a dramatic reduction in fertility, especially the population pyramid in 2009. The bar at the bottom of the 2009 population pyramid had narrowed significantly compared with the age group 5-9 because the fertility rate during the period 1994-1999 decreased significantly compared with the previous five years. According to the 1999 census, the total fertility rate (TFR) of period from 1989 to 1994 was 3.27 children per women, while the TFR

during the period 1994 to 1999 was only 2.45². In the 2009 population pyramid, the three bars in the bottom corresponding to the three age groups of 0-4, 5-9 and 10-14 are narrower than three bars above which correspond to the age groups of 15-19, 20-24 and 25- 29. This is because the birth rate in the 15 years before the 2009 census (1994-2009) decreased faster than the preceding 15 years (1979-1994).

The population pyramid of Vietnam in 1999 is typical for a period of demographic transition in which the fertility and mortality rates drop quickly. The population pyramid in 2009 is relatively typical for a population at a later stage of demographic transformation, with low fertility and mortality and the beginning of population aging. The consequences of wars on the age pyramid becoming fainter and are only discernible in the population aged 60-64.³

Figure 3.2. Population pyramid of the country, Vietnam, 1979-2014



² GSP (2001), 1999 Population and Housing Census. Census Monograph on Marriage, Fertility and Mortality in Viet Nam: Level, Trends and Differentials. Statistical Publishing House, Ha Noi, 2001. Page 46

³ GSO (2010).

Because the fertility rate has stabilized at a low level in the last five years (2009-2014), in the population pyramid of Viet Nam in 2014 the bottom bar (representing the age group of 0-4) is slightly wider than the next bar (representing 5-9 year olds), but it is still narrow. Low mortality and high life expectancy have made the body of the pyramid narrower and more like a drum-shaped tower. The proportion of the population aged 80 years or over was significantly higher in 2014 compared to previous censuses. The pyramid of Viet Nam's population in 2014 reflects an aging population (see also the 2014 IPS Major Findings report).

Population age and sex structure of Viet Nam in 2014 shows that the percentage of young population (aged 16-30 according to Youth Law in 2005) was 25.5%, increased by 2.3 percentage points as compared to that in 2009.

3.1.2. Differences in the age-sex structure between urban and rural populations

The age-sex structure of the population depends on fertility, mortality and migration. The differences in these three demographic rates between urban and rural areas are often very large. The TFR of rural areas is often greater than in urban areas. In 1989 and 1999, the TFR in rural areas was higher than in urban areas by a factor of 1.5 to 2. In the years from 2009 until 2014, this difference has been smaller but still in the range of 20% to 30% higher in rural areas.

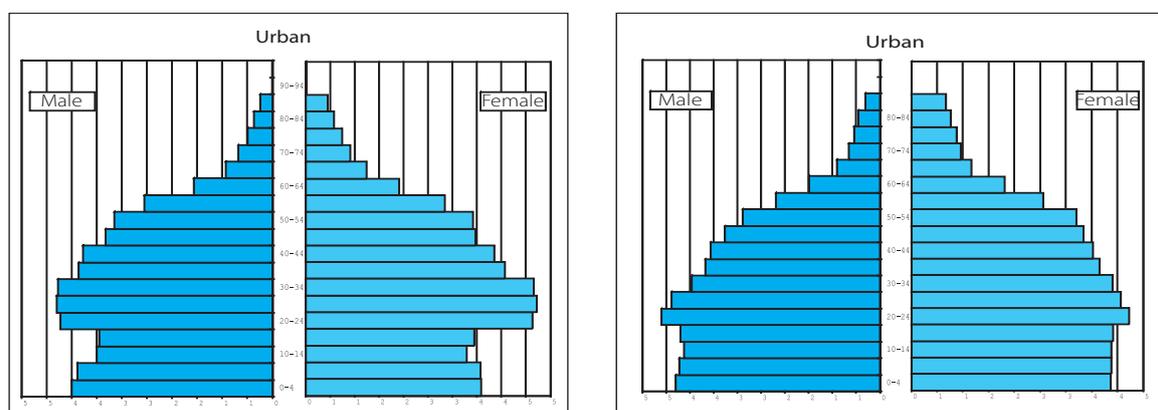
Table 3.2 shows the proportion of the population by sex and age groups in both urban and rural areas of Viet Nam in 2014. Analysis shows that the difference in fertility between the two regions has affected the sex-age structure of the youth group. Because fertility in rural areas is higher than that in urban areas, the proportion of young population groups is higher in rural areas than in urban areas. However, differences in mortality rates between the two regions has affected the age-sex structure of middle-aged and elderly groups in the opposite direction, especially for the groups of people aged 25 to 69. The proportion of the population in all age groups is lower in rural areas than in urban areas, for both males and females. The proportion of people in the age group from 15 to 39 was comparatively high, especially in urban areas, due to the impact of migration. As we will see in the age-sex structure of migrants, migrants aged 15-39 account for a huge proportion of all migrants. According to data from the 2014 IPS, the proportion of male migrants in the three age groups of 20-24, 25-29 and 30-34 was 8.5%, 19.3% and 15.0%, respectively. Similarly, the proportion of female migrants in the three groups of females aged 20-24, 25-29 and 30-34 was 28.1%, 23.4% and 11.9%, respectively. The elderly proportion aged 65 years and above in rural areas is higher than in urban areas mainly because of rural-urban migration of young people. There is a growing trend of more single elderly people living in rural areas.

Table 3.2. The proportion of the population by sex, age and by urban and rural areas, Viet Nam, 2014

Age group	Urban			Rural		
	Male	Female	All	Male	Female	All
0-4	8.23	6.97	7.58	8.63	7.69	8.16
5-9	8.01	6.96	7.47	8.49	7.72	8.11
10-14	7.20	6.40	6.78	8.30	7.72	8.01
15-19	7.10	6.70	6.89	8.43	7.79	8.11
20-24	8.69	9.00	8.85	9.25	8.42	8.83
25-29	8.84	9.18	9.02	8.82	8.09	8.46
30-34	8.81	9.06	8.94	7.97	7.76	7.86
35-39	7.96	7.93	7.94	7.39	7.26	7.32
40-44	7.78	7.48	7.63	7.15	7.01	7.08
45-49	6.84	6.75	6.79	6.57	6.64	6.60
50-54	6.50	6.65	6.58	5.80	6.37	6.09
55-59	5.25	5.53	5.39	4.41	5.08	4.75
60-64	3.22	3.72	3.47	3.01	3.59	3.30
65-69	1.92	2.42	2.18	1.83	2.33	2.08
70-74	1.40	1.78	1.60	1.32	1.92	1.62
75-79	1.01	1.46	1.24	1.09	1.74	1.42
80-84	0.76	1.12	0.94	0.90	1.53	1.22
85+	0.50	0.89	0.70	0.61	1.33	0.98

Figure 3.3 illustrates differences in the age-sex structure of Viet Nam’s population in 2014 between urban and rural areas. The population pyramid for the urban population shows a narrowing trend in the bottom section, representing a falling fertility rate, similar to the pyramid for the entire country’s population. However, the population pyramid of urban areas is significantly affected by the migration flow from rural to urban areas: due to rural-urban migration of young people, the share of young people in urban areas has increased over time. This has resulted in a rising proportion of the population in the age groups of 20-24 and 25-29 living in urban areas. The urban population band is largest for the age group 20-24, while the band in the rural population pyramid is largest for the age group 15-19. This phenomenon is consistent with the 2009 census pyramid representing urban and rural populations.

Figure 3.3. Urban and rural population pyramids, Viet Nam in 2014



3.1.3. Differences in age-sex structure between regions

Because fertility, mortality and migration levels are different in the different geographical regions of the country, the age-sex structure of the population of these regions is also very different. Table 3.3 shows the Southeast region has with the lowest TFR in the country, followed by the Mekong River Delta and the Red River Delta. The Central Highlands has the highest TFR, followed by the Northern Midlands and Mountains⁴.

There are also differences in mortality between regions. The Central Highlands has the highest mortality rate (life expectancy at birth is the lowest, at 72.5 years), followed by the Northern Midlands and Mountains (life expectancy is 73.4 years). The Southeast region has the lowest mortality rate (life expectancy at birth is the highest, at 78.3 years), and the Red River Delta and Mekong River Delta also have low mortality rates, with a life expectancy of around 77 years.

Among the six geo-economic regions, the Northern Midlands and Mountains, North and South Central Coast and the Mekong River Delta regions have experienced net negative out-migration rates over the past three years, while the Southeast has had a net positive in-migration rate.

These differences in fertility, mortality and migration have had a significant impact on the structure of the age-sex population by socio-economic region. Table 3.3 presents the structure by three large age groups of the population in the regions of Viet Nam.

Table 3.3. Proportion of population by socio-economic region, sex, and age group, Viet Nam, 2014

	Male			Female			All		
	0-14	15-64	65+	0-14	15-64	65+	0-14	15-64	65+
Whole country									
Northern Midlands and Mountains	27.5	67.6	4.9	25.4	67.0	7.6	26.5	67.3	6.2
Red River Delta	24.4	68.2	7.3	21.0	68.7	10.4	22.7	68.5	8.9
North and South Central Coast	24.8	68.7	6.5	22.3	67.8	9.9	23.5	68.3	8.2
Central Highlands	29.8	66.5	3.7	28.3	66.3	5.4	29.0	66.4	4.5
Southeast	22.7	73.1	4.2	19.9	73.8	6.3	21.3	73.5	5.2
Mekong River Delta	23.6	71.0	5.4	21.6	70.2	8.1	22.6	70.6	6.8

Table 3.3 indicates that the regions with the highest fertility – the Central Highlands and Northern Midlands and Mountains – also had the largest proportion of the population aged 0-14. The proportion of people in this age group among the total population in these two regions was 29.0% and 26.5%, respectively. The Southeast, Mekong River

⁴ GSO (2013), 2013 Annual Population and Family Planning Change Survey. Major findings, Ministry of Planning and Investment

Delta and the Red River Delta had the lowest birth rates and the lowest proportion of people in the age group 0-14, with the corresponding proportion of 21.3%, 22.6% and 22.7%, respectively.

The Red River Delta and Mekong River Delta are the regions with the highest proportion of the population aged 65 and older, at 8.9% and 6.8%, respectively. The Central Highlands has the lowest proportion of people aged 65 and older, at around 4.5%. Differences in life expectancy and migration trends are the primary causes of differences in the age structure among the regions.

The Southeast, the region with the highest level of in-migration, also had the highest proportion of the population aged 15-64 (73.5%). High in-migration also reduced the proportion of the population aged 65 and older to only 5.2%. However, high levels of out-migration has raised the proportion of the population aged 65 years and above in the North and South Central Coast, to very high levels, up to 8.2%.

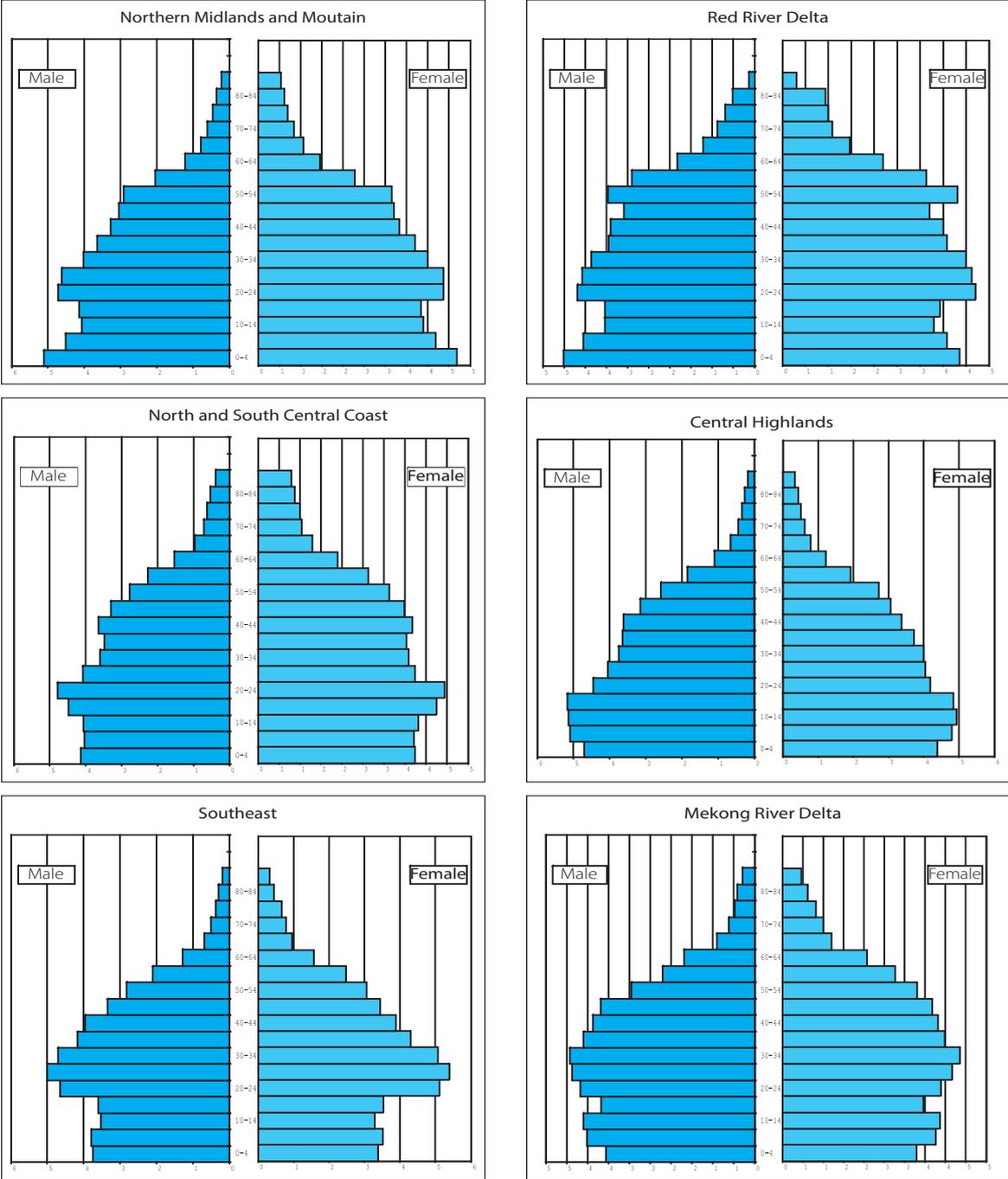
The population pyramids in Figure 3.4 show the influence of fertility, mortality and migration rates on the age-sex structure of the population in the regions of Viet Nam. Among the six regions, the population pyramid for the Southeast has the most distinctive shape. It is the narrowest at the bottom, particularly the bands representing the age groups 10-14 and 15-19, while the middle sections are large on both sides (representing men and women), especially the 25-20 age group. After the age group of 55-59, the body of pyramid is narrows quickly. This shape of the pyramid of the Southeast represents a population with low fertility and high levels of in-migration, and both factors have occurred over a long period in Viet Nam. The four bottom bars are very narrow, representing a low birth rate for at least two decades. The body of pyramid, however, representing the population aged approximately age 20 to 54, is affected by migration as the majority of migrants are of working age. A survey on internal migration in 2004 found that "more than 50% of the migrants said they moved to a new place to find work". According to this survey, 69% of men and 71% of women migrated to Ho Chi Minh City, the major city in the Southeast region, for employment⁵.

The two population pyramids of the Northern Midlands and Mountains and Central Highlands regions characterize a young population, with a relatively wide bottom section and a narrow top. The Central Highlands population is much younger than the population in the Northern Midland and Mountains. The three bars corresponding to the age groups 5-9, 10-14 and 15-19 of the Northern Midlands and Mountains are much narrower than the bar of the age group representing people aged 20-24 years. In comparison, the three corresponding bars in the population pyramid of the Central Highlands are very large, and only the bottom bar in the pyramid is a little narrower. This reflects low fertility rates in the Central Highlands during the past five years. The peak of the population pyramid of the Central Highlands is narrower than the peak of the Northern Midland and Mountains pyramid. This reflects the high mortality rate in the Central Highlands. The population pyramid of the Mekong River Delta region has

⁵ GSO (2005).

a narrow bottom and shape overall, representative the low fertility rate in the Mekong River Delta during the last five years.

Figure 3.4. Population pyramids by socio-economic regions, Viet Nam, 2014



On the other hand, the shape of population pyramid of the Red River Delta is very different. Because the fertility rate during 1994-1999 and 1999-2004 decreased very fast, the size of the bars corresponding to the two generations of age groups 10-14 and 15-19 narrowed significantly. Moreover, the decreasing of the population in the reproductive ages in the period 1994-2004 (about 30-44 years old in 2014) also contributed to reducing the number of births in this period.

The population pyramid of North Central and South Central Coast is the only pyramid which is narrowed quickly in three groups 25-29, 30-34 and 35-39 but then expanded in the age group 40-44 years old. This happens to both male and female. Among six socio-economic regions, North and South Central Coast have the lowest proportion of the 30-34 age group.

3.1.4. Differences in the age-sex structure between provinces and cities

Due to differences in fertility, mortality and migration rates among provinces and centrally administered cities, the age-sex structure and population pyramids are very different among provinces. The age-sex structure of Viet Nam’s provinces can be divided into three typical types:

The provinces with fertility, high mortality and low migration are primarily the highland provinces such as Lai Chau, Ha Giang, and others in the north, and Kon Tum in the south. The population pyramid of these provinces shows a modern, young population.

Figure 3.5. Population pyramids of Ha Giang, Lai Chau and Kon Tum provinces, 2014

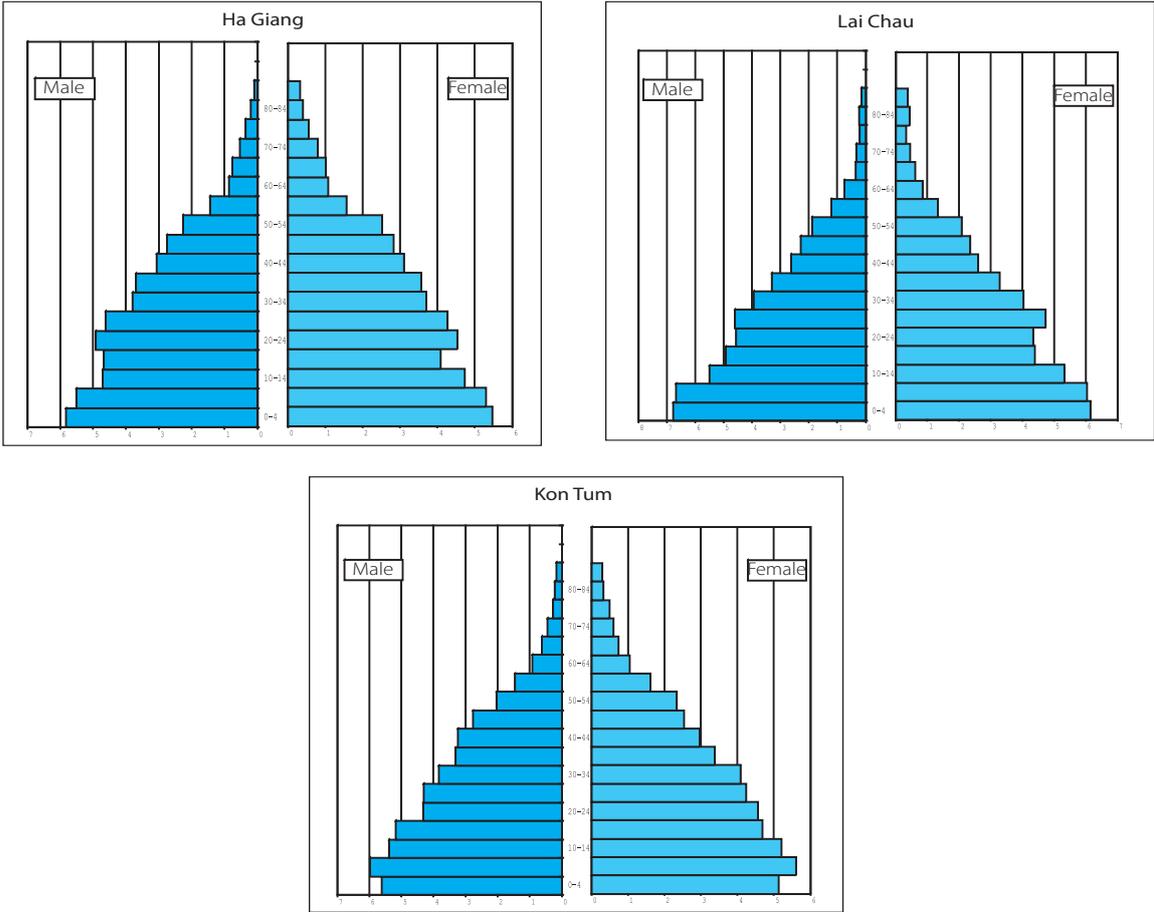


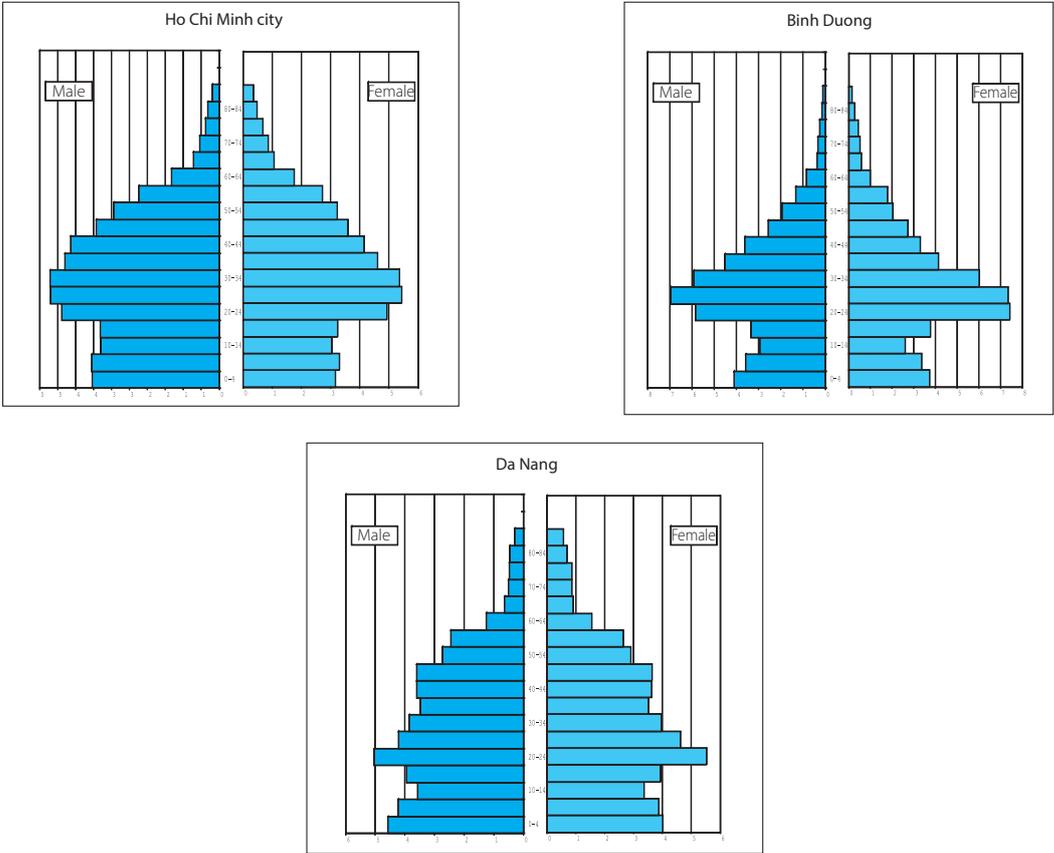
Figure 3.5 shows three age pyramids illustrating the age-sex structure of the population of Ha Giang, Lai Chau and Kon Tum provinces. Ha Giang had a TFR of 2.51 for the 12 months prior to 1 April 2014 (the date the 2014 IPS was carried out). In terms

of mortality, Ha Giang had an infant mortality rate (IMR) of 34.2 per thousand, lower than only Lai Chau (43) and Kon Tum (39). Ha Giang had a net migration rate in the 12 months prior to 1 April 2014 of -3.6 per thousand, with in-migration and out-migration equal to 5.1 and 8.7 per thousand, respectively. Like other populations with high fertility and mortality rates, the population pyramids of Ha Giang, Lai Chau and Kon Tum are triangular, with a wide bottom section and narrowing very rapidly at the top, reflecting a young population.

The provinces/cities which had low fertility and mortality but high positive net-migration include Ho Chi Minh City, Binh Duong and Da Nang City. Ho Chi Minh City had a TFR of 1.39 in the 12 months prior to the 2014 IPS, and an IMR of 7.9 per thousand, lower than the average level for the country. Ho Chi Minh City had a net migration rate in the 12 months prior to the survey of 5.5 per thousand, based on in-migration and out-migration rates of 16.9 and 12.1 per thousand, respectively.

Binh Duong Province had slightly higher fertility and mortality rates than Ho Chi Minh City (TFR of 1.44 and an IMR of 9 per thousand in 2014). However, this province had a net migration rate over the five years prior to the survey of 20.3 per thousand. This is the nation’s highest net migration rate – four times higher than the corresponding rate for Ho Chi Minh City. The rate of in-migration and out-migration for the population of Binh Duong was 239.7 and 34.3 per thousand, respectively.

Figure 3.6. Population pyramid of Ho Chi Minh City, Binh Duong Province and Da Nang City, 2014



The population pyramids of Ho Chi Minh City and Binh Duong Province are very narrow at the bottom, especially that of Binh Duong. The bottom sections of the two population pyramids are narrow, not only due to low birth rates but also from high out-migration. The proportion of the population aged 15-19 years old and younger has decreased due to these factors. Like the bottom, the top of the pyramids of Ho Chi Minh City and Binh Duong are quite narrow, not due to low life expectancy but because of in-migration. Unlike most other provinces and cities, the population age group of 20-24 in both Ho Chi Minh City and Binh Duong accounted for the highest proportion of the total population in 2014.

However, the two population pyramids of Ho Chi Minh City and Binh Duong province have different characteristics as well. The population of 25-29 year olds in Ho Chi Minh City has decreased a slower pace than in Binh Duong. People have moved to Ho Chi Minh City for many reasons: studying, work, retirement, family, etc. Thus, there is a large variation in the age of migrants moving into the city. In Binh Duong people have moved to the province to seek employment primarily, especially to work in industrial zones and export processing zones, and these in-migrants are mostly of a young age. As a result, among migrants to the province of Binh Duong, the 20-24 and 25-29 age groups represent a very large proportion.

3.1.5. Differences in the age-sex structure between ethnic groups

Since the 2014 IPS was a sample survey, it is only representative for the seven ethnic groups with a population of one million or more. These groups include the Kinh, Tay, Thai, Muong, Khmer, Nung and Mong. The other ethnic groups are collectively referred as “other ethnic groups”. As is the case with the national population, the age-sex structure of ethnic groups is not affected by internal migration. It is only affected by fertility and mortality. The main differences in fertility and mortality, as well as trends over time, result in differences in the age-sex structure of different ethnic groups.

Table 3.4. Proportion of population of major ethnic groups by three large age groups and sex, Viet Nam, 2014

Ethnic groups	0-14			15-64			65+		
	Male	Female	All	Male	Female	All	Male	Female	All
Kinh	24.4	21.8	23.1	69.6	69.3	69.5	6.0	8.9	7.5
Tay	24.9	23.7	24.3	70.5	69.2	69.8	4.6	7.1	5.9
Thai	29.5	27.2	27.2	66.6	67.1	66.9	3.9	5.7	4.8
Muong	26.4	24.9	24.9	69.8	67.8	68.8	3.8	7.3	5.5
Khmer	26.4	24.2	24.2	68.7	68.3	68.5	5.0	7.5	6.3
Nung	26.3	25.7	25.7	69.5	66.8	68.1	4.3	7.5	5.9
Mong	43.3	42.5	42.5	54.2	53.5	53.9	2.4	4.0	3.2
Other	31.5	29.9	29.9	64.1	64.3	64.2	4.4	5.8	5.1

The Mong had the highest fertility rate in 2014, and also the highest proportion of children aged 0-14. Table 3.4 shows that this age group accounted for 42.5% of the Mong population. The “other ethnic groups” and Thai ethnic group had the second and the third highest fertility rates. They also had the second and the third highest proportion of the population aged 0-14 (29.9% and 27.2%, respectively). On the other hand, the Kinh had the lowest fertility rate and also the lowest proportion of children aged 0-14, only 23.1%, around half the rate of the Mong.

Ethnic groups with a lower mortality will tend to have a high proportion of people aged 65 and older, and vice versa. Table 3.7 shows that the Kinh, who had the lowest mortality rate, also had a relatively high proportion of the population aged 65 and older, at 7.5% in 2014, while this proportion for the Mong, who had the highest mortality, was only 3.2%.

Figure 3.7 shows the population pyramids of seven ethnic groups with populations of one million and higher, and the “other ethnic groups”. The pyramid of Mong most clearly illustrates the impact of very high fertility and mortality on the shape of the population pyramid. Due to high fertility, the bottom of the Mong pyramid is very wide, while due to high mortality, the pyramid itself is very sharp (narrow at the top).

The population pyramids of the other three ethnic groups have wide bottom bars that are almost equal, meaning that in the past 15 years the fertility rate has only decreased slightly. Because of high mortality, the other ethnic groups also have a narrow pyramid structure.

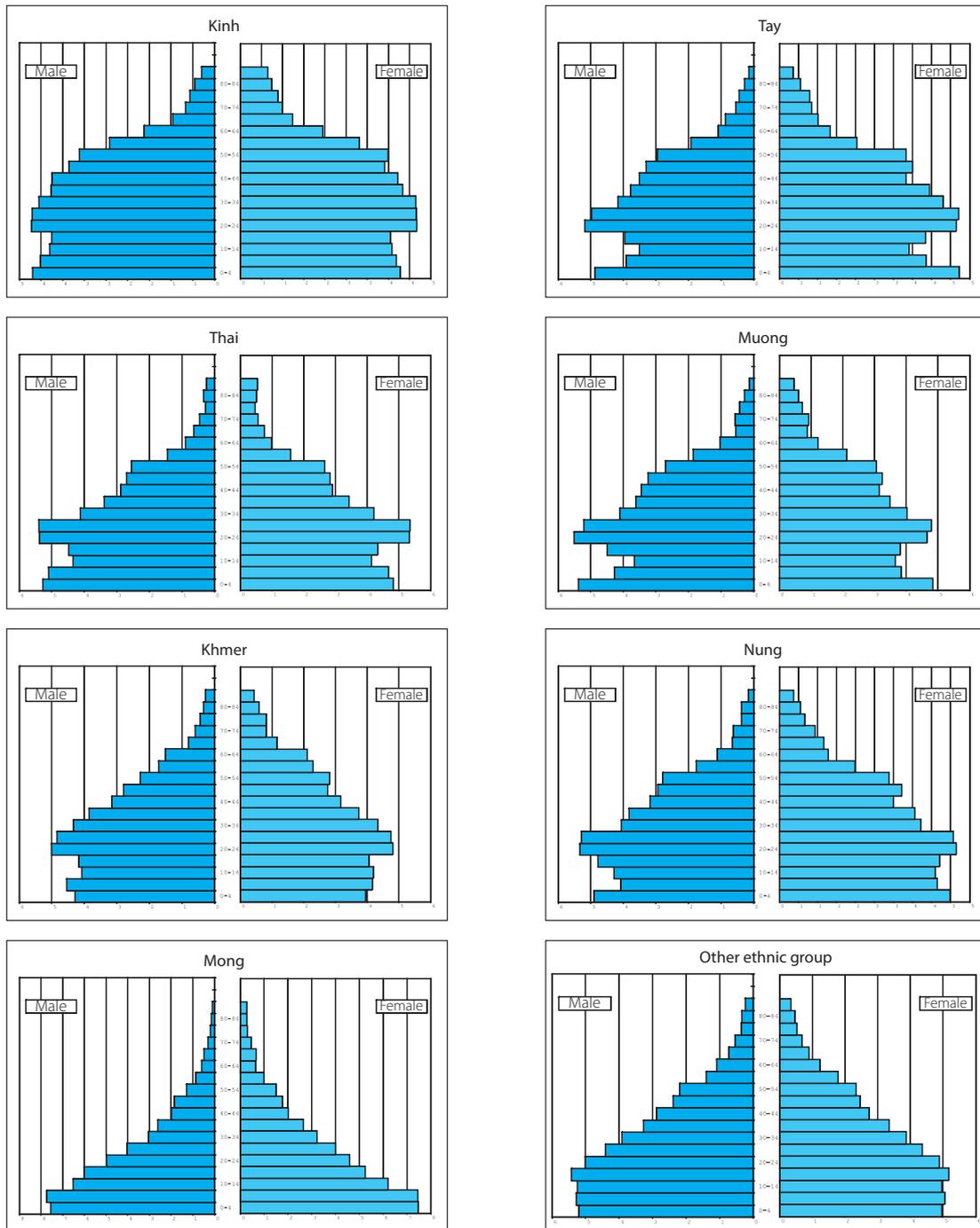
In the eight population pyramids of ethnic groups with populations of 1 million or more, the population pyramids of the Tay, Muong, Nung have bars in the bottom section that are much wider than the bars near the top. This is because fertility in the recent five-year period increased compared to the previous five-year period.

The Kinh, who make up 86% of the country’s population, have the population pyramid similar to that of the whole country. Because the fertility rate of the Kinh has decreased for the past twenty years, the four bars at the bottom are almost equal. The mortality rate among the Kinh is low, and as a result the population pyramid of the Kinh has narrow bars near the top. From the age group of 60-64 and above, the pyramid starts to narrow.

The population pyramids of the Tay, Thai and Muong ethnic groups have similar shapes. The bar representing the age group of 10-14 is quite narrow, proving that the fertility of these three ethnic groups decreased rapidly during 2000-2004. The population pyramids of these three ethnic groups in the 2009 census also had similar shapes.⁶

⁶ *General Statistics Office (2011).*

Figure 3.7. Population pyramid of ethnic groups with population of 1 million and higher, Viet Nam, 2014



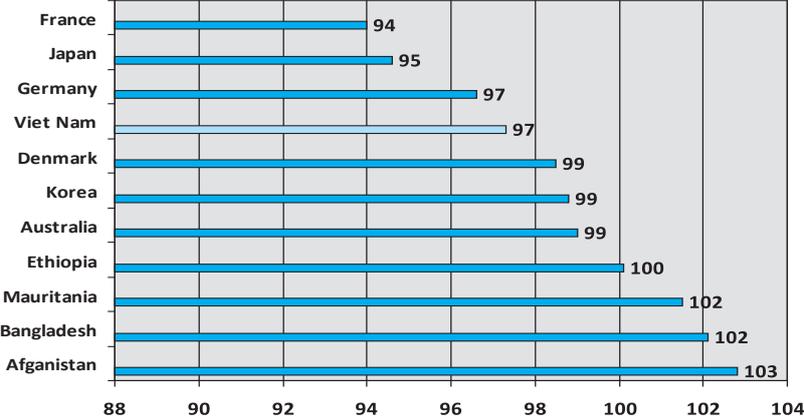
3.2. The sex structure of the population

3.2.1. Sex structure of the population

The sex ratio is used as a measure of the male and female composition of the population and is defined as the number of males per 100 females. This percentage is greater than 100 if the number of men is larger than the number of women and vice versa. For a closed population (without migration), the sex ratio of a population is affected by

differences in the birth rate and in the mortality rates of men and women. For an open population (including migration), in addition to the above factors, the sex ratio is also affected by the difference in the sex of migrants. In developing countries, especially countries with high life expectancy and a large difference in the life expectancies of men and women, the sex ratio of the total population is usually less than 100. In many developing countries with low life expectancy, however, the sex ratio of the population is generally greater than 100 (see Figure 3.8). Migration also plays a big role in affecting the sex composition of the population. Among migrants, the number of men tends to be larger than the number of women.

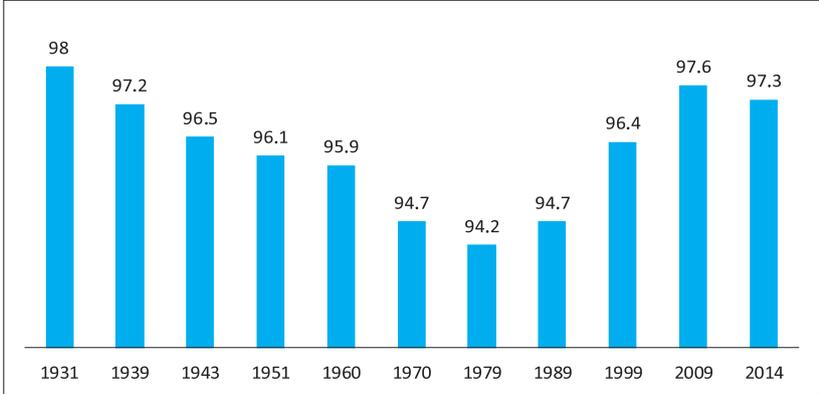
Figure 3.8. Sex ratio of selected countries, 2015



Source: United Nations, Population Division. World Population Prospects: The 2015 Revision. Population Database.

Figure 3.9 shows the change in the sex ratio of Viet Nam from 1931 to 2014. The Second World War, and the wars in the periods 1946-54, 1955-1964, 1965-1975 and early 1979 caused the sex ratio of Viet Nam to continue to fall from 98 in 1931 to 94.2 in 1978, the lowest in the world at the time.⁷ The peaceful period since then has gradually balanced the sex ratio of Viet Nam, with the ratio increasing to 97.3 in 2014. An increase in sex ratio at birth (SRB) in recent years also has contributed to the increase in the overall sex ratio of the population of Viet Nam.

Figure 3.9. Sex ratio of population of Viet Nam, 1931-2014



⁷ GSO (1991).

3.2.2 Sex ratio by age

Due to biological laws, in all countries of the world the SRB is greater than 100; in other words, the number of boys born is greater than the number of girls born. However, because the mortality of boys tends to be higher than for girls, the sex ratio is reduced over time.

Table 3.5. Sex ratio by age, Vietnam, 1979-2014

Age group	1979	1989	1999	2009	2014
0-4	104.8	106.5	108.6	108.7	111.2
5-9	104.3	105.4	107.4	106.3	108.5
10-14	106.6	106.2	107.2	105.7	105.9
15-19	96.5	98.1	100.7	104.4	104.7
20-24	87.7	92.3	94.3	101.8	103.3
25-29	88.2	90.7	99.3	100.5	100.7
30-34	89.5	91.7	99	101.7	99.1
35-39	87.6	87.4	94.7	102	99.8
40-44	84.7	86.9	90.7	99	99.6
45-49	89.3	81.4	89.7	94.1	96.2
50-54	91.5	80.3	82.4	89.4	89.8
55-59	78	88.2	78.5	84.2	83.6
60-64	81.6	82.9	78.3	80.1	79.6
65-69	74.8	76.6	80.6	72.5	79.1
70-74	65.4	67.8	71.5	67.3	69.6
75-79	58.5	59.6	60.3	66.8	63.0
80+	45.8	46.9	48.3	49.9	52.1
Total	94.2	94.7	96.7	97.7	97.3

Figure 3.10. Sex ratio by age, Viet Nam, 2009-2014

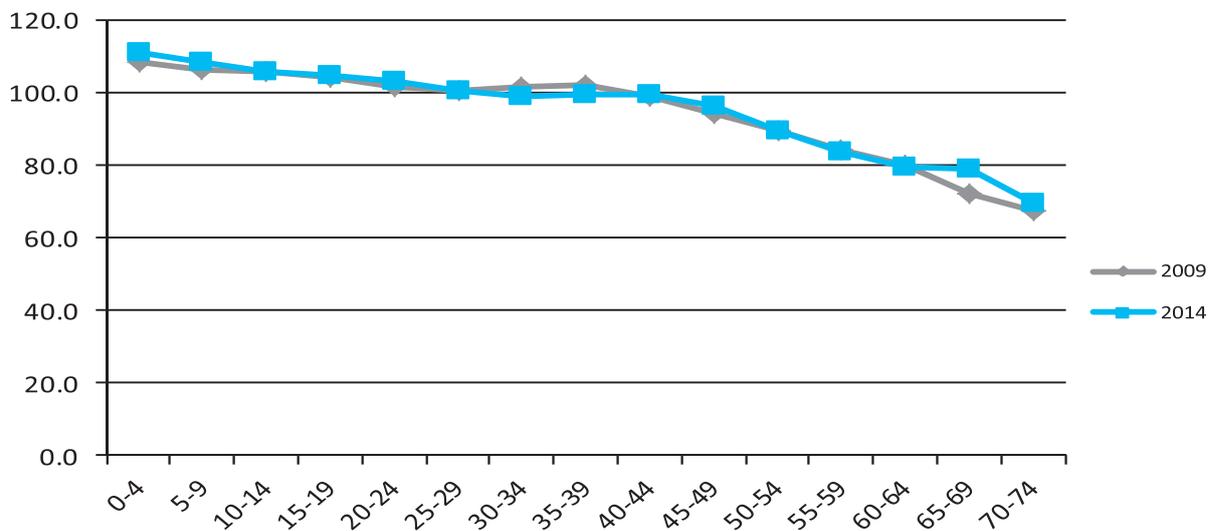
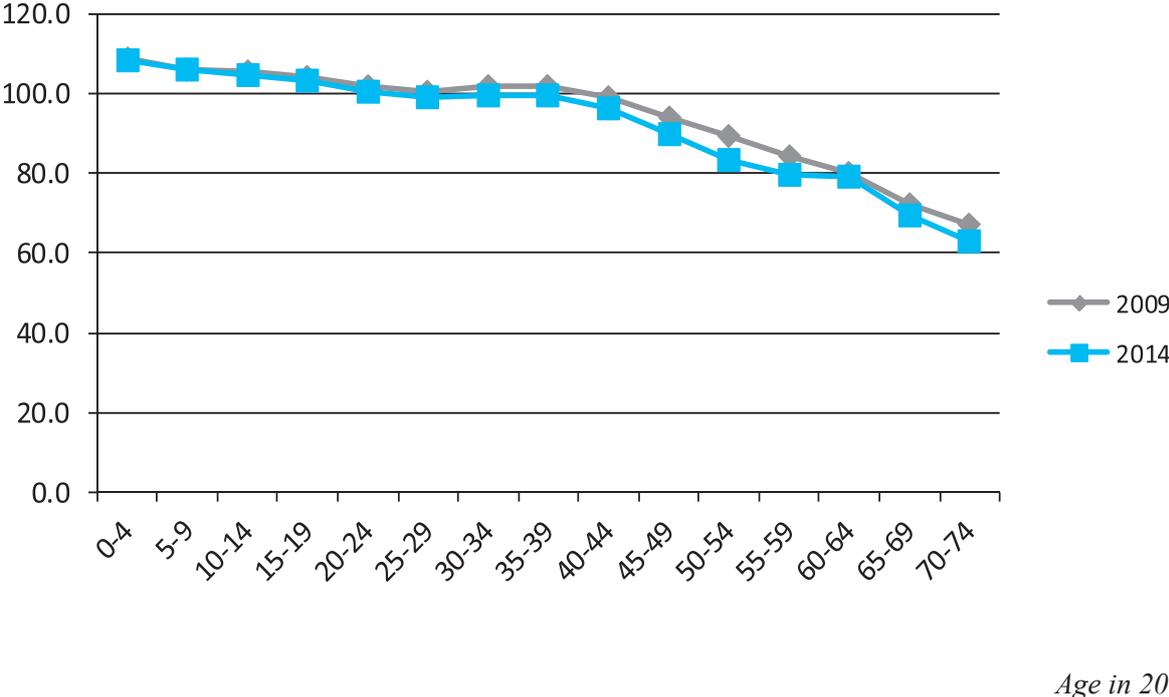


Figure 3.10 presents the sex ratio by age group from the 2009 census and the 2014 IPS. To evaluate data quality by age reported in these two surveys, it is possible to graph the sex ratio of the 2014 IPS according to the age cohort of the 2009 census (Figure 3.11). If the sex ratios from the two surveys are accurate, the curve plotted for 2014 will be slightly lower than the curve for 2009 due to differences in mortality by age between men and women in the period between the two surveys. The difference between the two curves allows assessment of the quality of each survey. Figure 3.11 shows that, in general, the curve of the sex ratio by age for 2014 is slightly below the curve for 2009.

Figure 3.11. Sex ratio by cohort, Viet Nam, 2009-2014

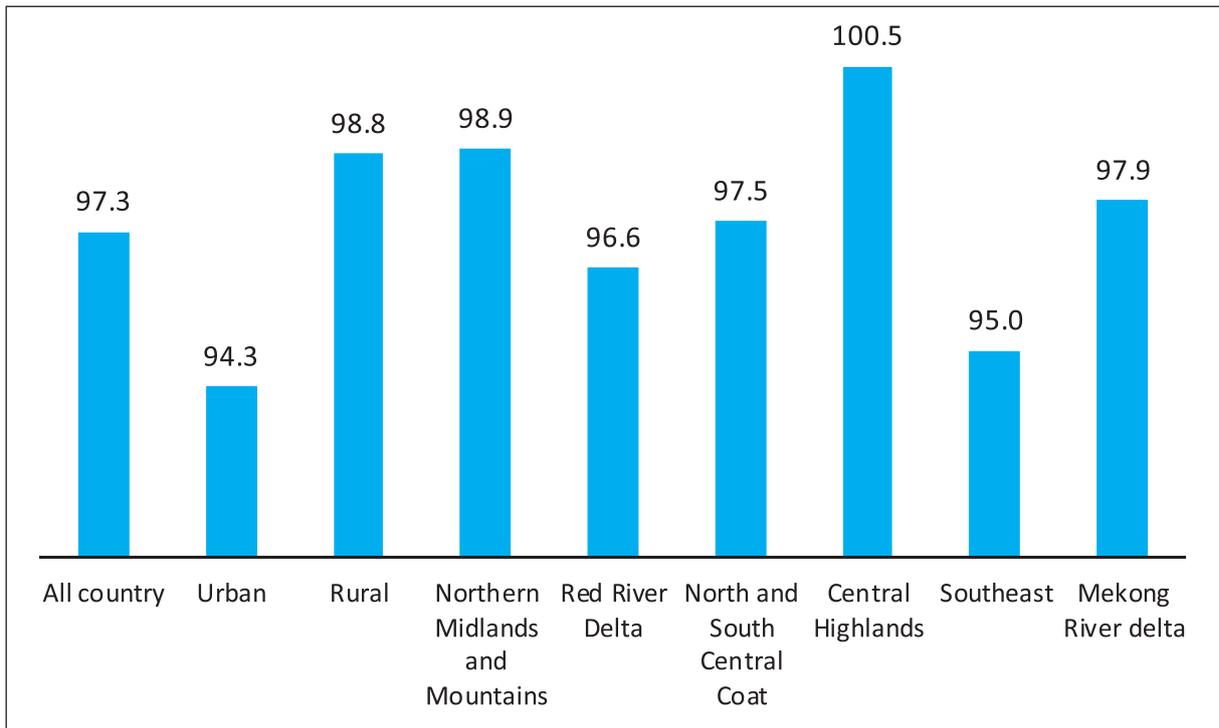


3.2.3. Differences in the sex ratio between urban/rural areas and socio-economic regions

There are considerable differences in the sex ratio between urban and rural areas of Viet Nam. According to the results of the 2014 IPS, while the sex ratio in rural areas is 98.8%, this figure is 94.3% in urban areas. Migration and differences in life expectancy are the primary reasons for this difference in the sex ratio between the urban and rural populations. The more economically developed regions in Viet Nam, especially the large urban areas, are attractive to migrants. According to the 2004 Viet Nam Migration Survey, “Find a job to improve their lives is considered to be one of the main reasons of migration” (GSO, 2005).

Migration has a large impact on the difference in sex ratios among regions. The Southeast region had the lowest sex ratio in the country, at only 95 men per 100 women. Ho Chi Minh City, which accounts for 51% of the population of the Southeast region, had the lowest sex ratio of country. The Red River Delta had the second lowest sex ratio at 96.6 males per 100 females.

Figure 3.12. Sex ratio by urban/rural areas and socio-economic regions, Viet Nam, 2014



The region with the highest sex ratio in the country was the Central Highlands with 100.5 males per 100 females. This region has always had a sex ratio greater than 100. The region with the second highest sex ratio is the Northern Midlands and Mountains with a sex ratio in 2014 of approximately 99 men per 100 women.

Thus, the two most economically developed regions in country have the lowest sex ratios, and vice versa. The North and South Central Coast and the Mekong River Delta regions had sex ratios equal to 97.5 and 97.9, respectively.

3.2.4. Differences in the sex ratio between provinces

Figure 3.13 illustrates the differences in the sex ratio among 63 provinces and cities in 2014. Provinces in the Central Highlands and most provinces in the Northern Mountainous region had a high sex ratio, while most provinces in the Southeast and Red River Delta had a low sex ratio. Differences in migration, life expectancy and sex selection at birth are the primary causes of these sex ratio differences among socio-economic regions. The Red River Delta had a very high sex ratio among children, implying sex selection is more common.

Quang Ninh province had a high sex ratio as well, perhaps due to the large mining industry. Miners are mainly male migrants from the neighboring provinces of Hai Duong, Hung Yen, Thai Binh, Nam Dinh, while most of their wives and children live in their home provinces.

Figure 3.13. Sex ratio by province, Viet Nam, 2014

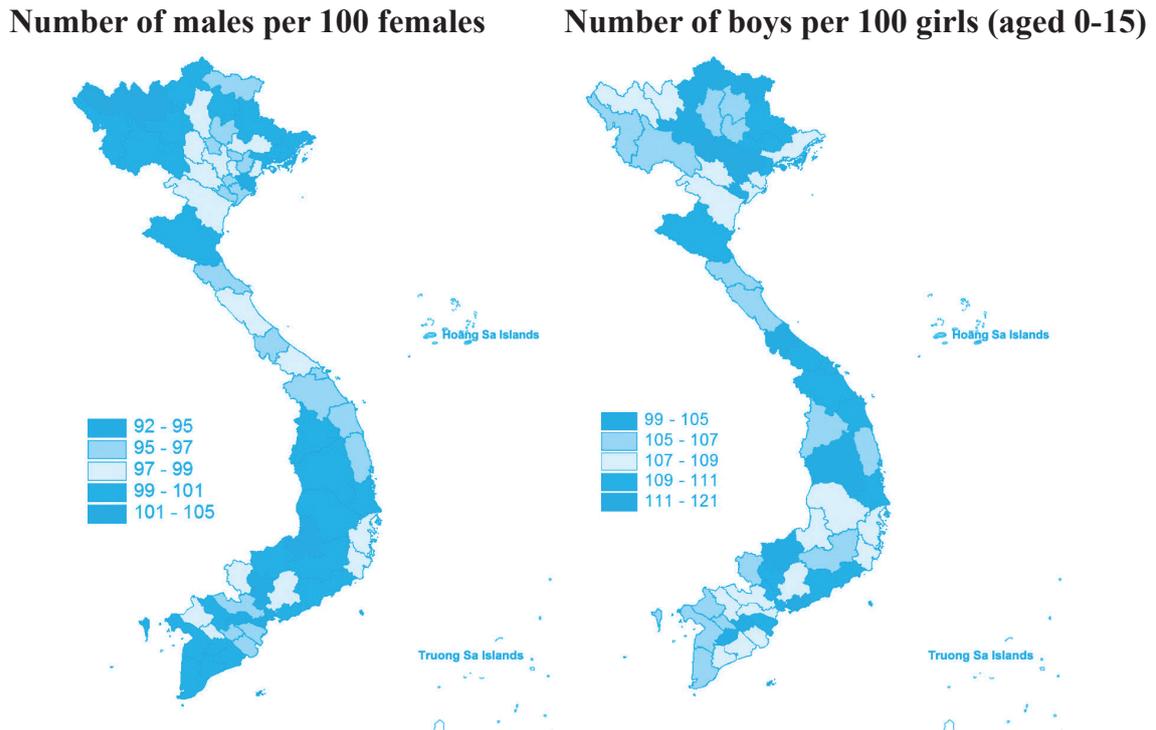
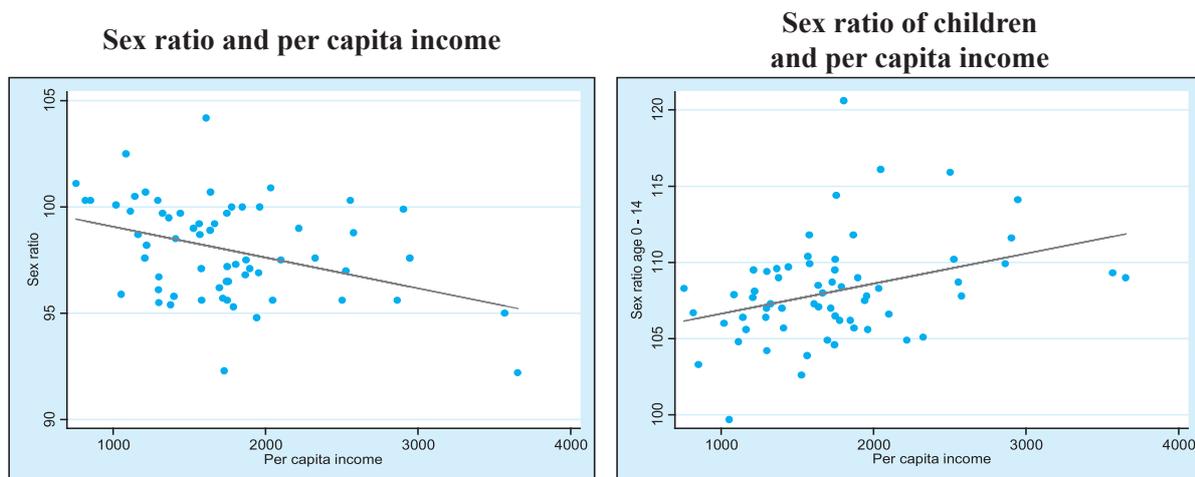


Figure 3.14 shows that provinces with a low sex ratio are the provinces with a higher per capita income and vice versa. However, the sex ratio among children is higher in high-income provinces. This indicates that son preference and prenatal sex selection is more likely to occur in provinces with higher incomes. People in these provinces have better economic conditions and access to health facilities that are able to perform the selection of the sex of the fetus. Adults in these higher-income provinces also tend to have fewer children and prefer to have a son for any birth.

Figure 3.14. Sex ratio of provinces and per capita income, 2012



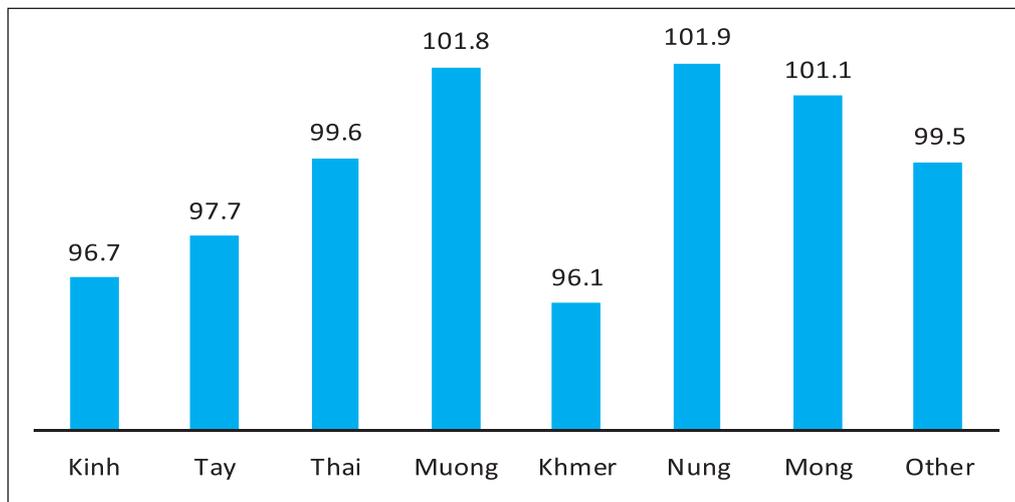
Source: Per capita income is estimated from the Viet Nam Household Living Standards Survey 2012 (GSO, 2014b)⁸

⁸ Data per capita income in 2014 (calculated from the Viet Nam Household Living Standards Survey 2014) has not been released.

3.2.5. Differences in the sex ratio between ethnic groups

Like the sex ratio of the whole country, the sex ratio of each ethnic group depends on the sex ratio at birth and differences in mortality by sex. Figure 3.15 presents the sex ratios of ethnic groups with over 1 million people. It shows that the Khmer group had the lowest sex ratio at 96.1 males per 100 females. The second lowest is the Kinh with 96.7 males per 100 females. The Nung, Muong and Mong ethnic groups had sex ratios over 100 (101.9%, 101.8% and 101.1%, respectively). Thus, the difference in the sex ratio between the Nung, with the highest sex ratio (101.92), and the ethnic Khmer, with the lowest sex ratio (96.1), was 5.8 percentage points.

Figure 3.15. Sex ratio of ethnic groups with a population of one million and over, Viet Nam, 2014



3.3. The dependency ratio

3.3.1. The dependency ratio in Viet Nam

Due to rapid fertility decline, especially in the period 1979-1999, the proportion of children aged 0-14 years in Viet Nam has decreased significantly over time – from 42.6% in 1979 to 39.2% in 1989, 33.1% in 1999, 24.5% in 2009 and to only 23.5% in 2014. Within only 10 years, from 1999 to 2009, the number of children aged 0-14 decreased by nearly 4 million, from 25.3 million in 1999 to 21.0 million in 2009. Meanwhile, the proportion of the population of labor force age increased dramatically, from 52.7% in 1979 to 69.1% in 2009. Over the past 15 years (1999-2014), the number of people aged 15-64 rose by 16.1 million, from 46.7 million in 1999 to 62.8 million in 2014. The proportion of the population aged 65 years and older increased, but not significantly; after 35 years, the proportion of people aged 65 years and older increased by 2.3 percentage points, from 4.8% in 1979 to 7.1% in 2009. Because the proportion of children dropped sharply, the young dependency ratio also decreased rapidly, from 80.8% in 1979 to 69.8% in 1989, 54.2% in 1999, 35.4% in 2009 and to only 33.8% in 2014. Thus, over three and a half decades, the proportion of dependent children fell by 2.4 times.

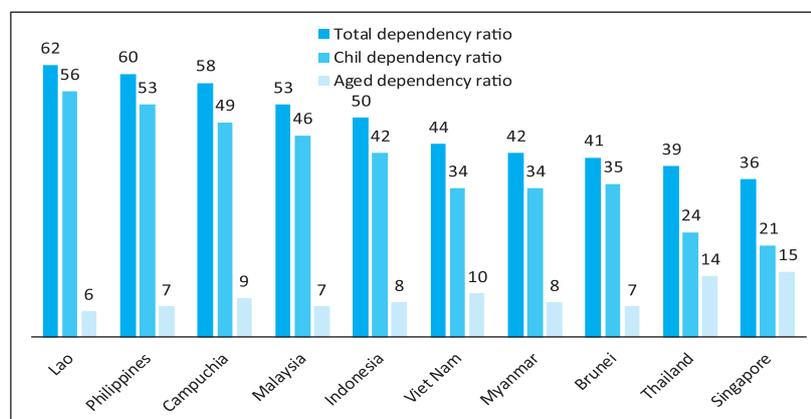
Table 3.6. Proportion of population by age group and dependency ratio, Viet Nam, 1979-2014

	1979	1989	1999	2009	2014
<i>Proportion of population</i>					
0-14	42.6	39.2	33.1	24.5	23.5
15-64	52.7	56.1	61.1	69.1	69.4
65 and over	4.8	4.7	5.8	6.4	7.1
<i>Dependency ratio</i>					
Child dependency ratio	80.8	69.8	54.2	35.4	33.8
Elderly dependency ratio	9.1	8.4	9.4	9.3	10.2
Total dependency ratio	89.9	78.2	63.6	44.7	44.0

The proportion of the population aged 65 and older and the proportion of the population aged 15-64 have increased at an equal rate. As a result, the elderly dependency ratio has remained almost unchanged at around 9%. Because the child dependency ratio has dropped, the total dependency ratio has declined rapidly, but at a slower rate. Table 3.6 shows that in 1979 there was one working-age person for each dependent person. However, in 2014 there were 2.3 working-age people per dependent person. Thus, the total dependency ratio of the population in Viet Nam has decreased more than twice in the past 30 years. As a country's total dependency ratio reaches 50 (i.e., two people aged 15-64 per dependent person), the population is said to enter a period of the "demographic window of opportunity". Viet Nam is now in the period of the "demographic window of opportunity".

Figure 3.15 shows the child dependency ratio, elderly dependency ratio and total dependency ratios in 2015 for ASEAN countries calculated on the basis of the population aged 15-64. Viet Nam's total dependency ratio in is the fourth lowest in Southeast Asia. It is higher than only Singapore, Thailand, Brunei and Myanmar. Among 10 countries in the ASEAN region, six had a demographic window of opportunity. Only the populations of Malaysia, Cambodia, Philippines and Laos have not reached the demographic window of opportunity period.

Figure 3.16. Dependency ratio of ASEAN countries, 2015



Source: United Nations, Population Division. *World Population Prospects: The 2015 Revision. Population Database.*

3.3.2. Dependency ratio by socio-economic region and province

Since the dependency ratio is calculated on the basis of the age structure of the population, the dependency ratio of a socio-economic region depends not only on fertility and mortality but also on migration between regions. Since the migration rate is higher for a population aged 15-64, areas with a large flow of out-migration will have a higher child dependency ratio and vice versa.

Table 3.7. Dependency ratio by socio-economic regions, Viet Nam, 2014

Region	Total dependency ratio	Child dependency ratio	Elderly dependency ratio
All country	44.0	33.8	10.2
Northern Midlands and Mountains	48.5	39.3	9.2
Red River Delta	46.1	33.1	13
North and South Central Coast	46.4	34.4	12
Central Highlands	50.6	43.7	6.9
Southeast	36.1	29.0	7.1
Mekong River Delta	41.7	32.0	9.7

Among the six socio-economic regions, four – the Southeast, Red River Delta, Mekong River Delta and the North and South Central Coast – had a child dependency ratio between 29% and 34% (see Table 3.7). In addition to low birth rates, ranging from 1.6 to 2.0 children for the last 15 years, the Southeast region also had a low child dependency ratio due to in-migration: in-migration of young people increased the proportion of people aged 15-64 and decreased the proportion of children.

The Central Highlands and Southeast regions had the lowest elderly dependency ratios, with respective figures of 6.9% and 7.1%, while the Red River Delta and North and South Central Coast had the highest age dependency ratios at 13% and 12%, respectively. The Central Highlands's elderly dependency ratio was low due to the highest mortality rate among the regions and low life expectancy. In contrast, the elderly dependency ratio in the Southeast was low due to the in-migration of young people. The Red River Delta and the North and South Central Coast had high elderly dependency ratios because of high out-migration rates.

In the 2009 census, the Northern Midlands and Mountains, Red River Delta, Southeast and Mekong River Delta regions all had total dependency ratios under 50%; that is, they had the "demographic window of opportunity" period. In the 2014 IPS, only the Central Highland had a total dependency ratio slightly higher than 50, at 50.4%.

3.3.3. Dependency ratio by province

Due to large differences in fertility, mortality and net migration rates among provinces and cities, the dependency ratio of the Viet Nam's provinces and cities are also very different. Figure 3.16 compares 10 provinces with the lowest child dependency ratios and 10 provinces with the highest child dependency ratios. As explained above, the child dependency ratio depends on the birth rate and migration (out-migration or in-migration). Provinces with the lowest child dependency ratios are Binh Duong, Ho Chi Minh City, Hai Phong, Vinh Long and Can Tho. These provinces had low fertility and/or high immigration. However, provinces with a high child dependency ratio such as Lai Chau, Dien Bien, Kon Tum, Gia Lai and Dak Nong also had the highest birth rates in the country.

Figure 3.18 shows the elderly dependency ratios for the 10 provinces with the lowest values and the 10 provinces with the highest values. The five provinces with the lowest elderly dependency ratios were Binh Duong, Dak Nong and Binh Phuoc, Lai Chau and Kon Tum provinces. These provinces had either high mortality (Lai Chau and Kon Tum), high immigration (Binh Duong) or both (Binh Phuoc and Dak Nong). However, five provinces with a high elderly dependency ratio are Ha Tinh, Thai Binh, Ha Nam, Quang Nam, and Quang Tri. These provinces had the lowest mortality rate, and negative net migration rates.

Figure 3.17. 10 provinces/cities with the highest child dependency ratios and 10 provinces/cities with the lowest child dependency ratios, Viet Nam, 2014

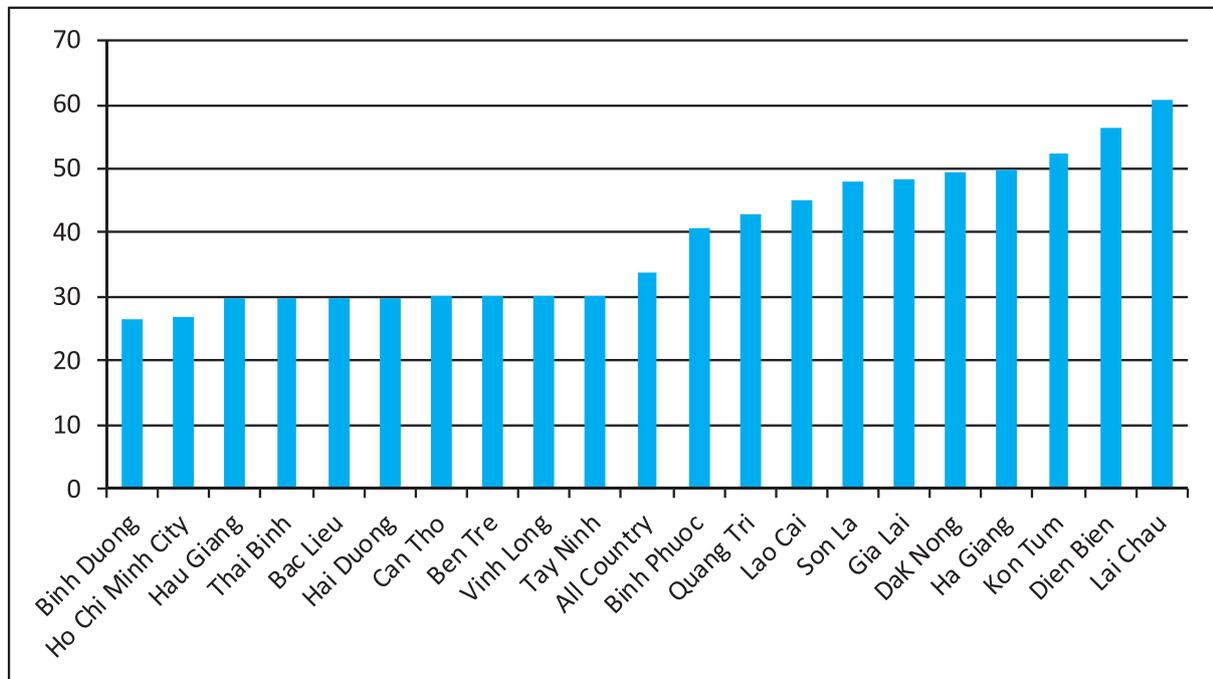


Figure 3.18. 10 provinces/cities with the highest elderly dependency ratios and 10 provinces/cities with the lowest elderly dependency ratios, Viet Nam, 2014

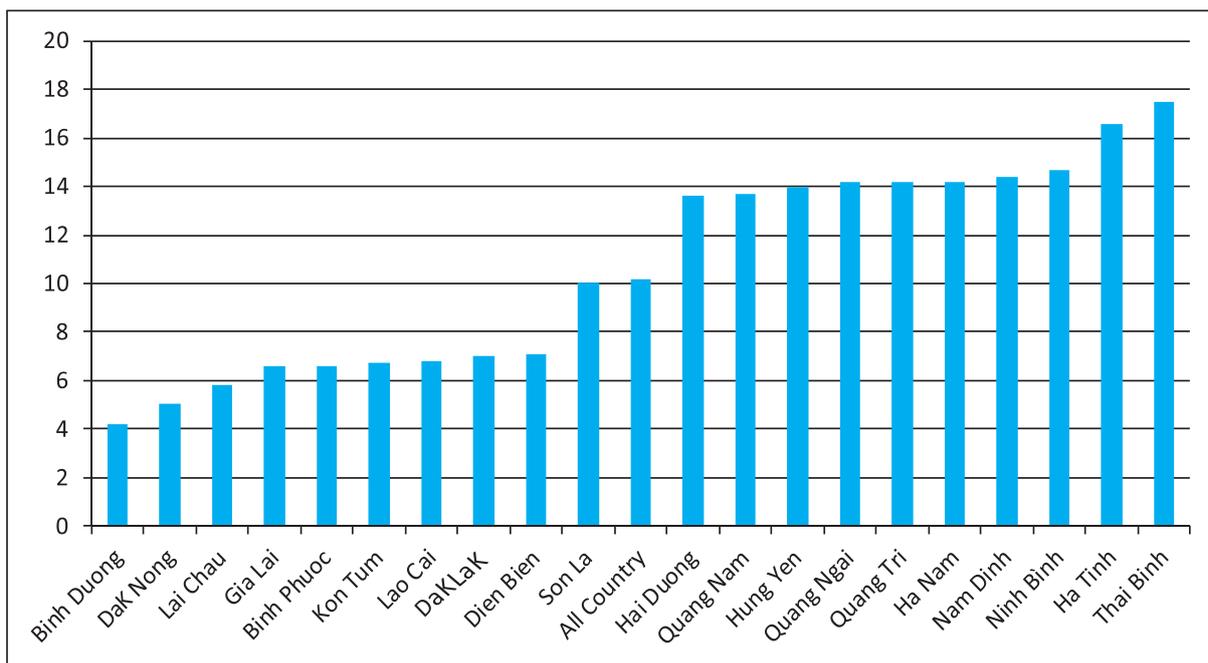
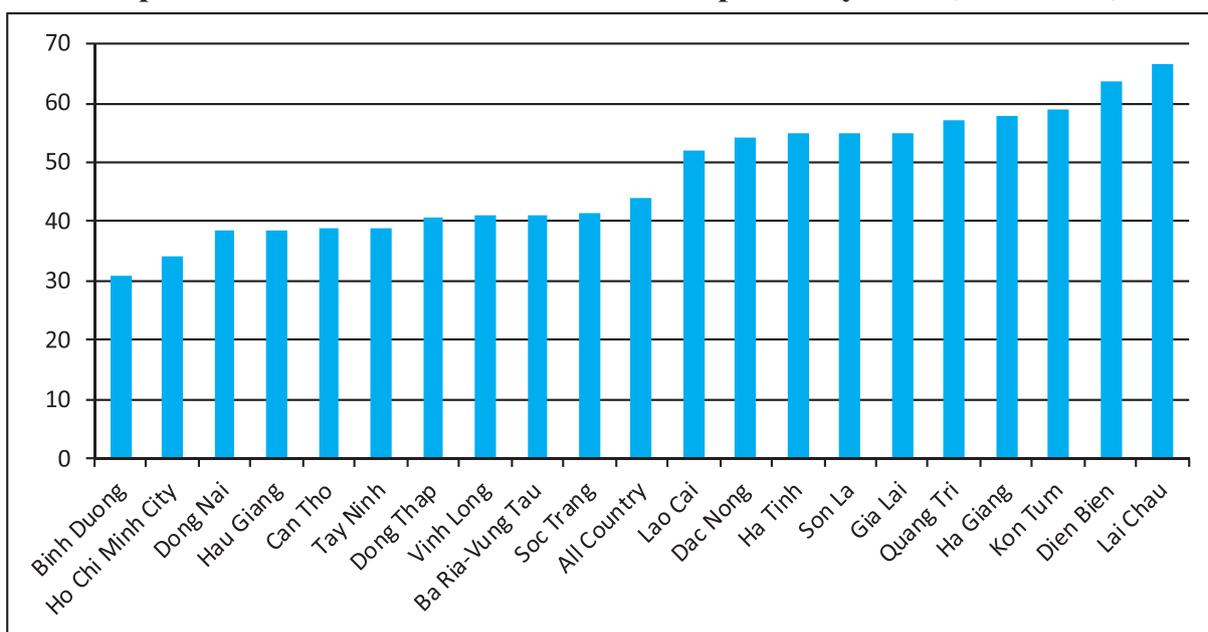


Figure 3.19 compares the 10 provinces/cities with the lowest total dependency ratios with 10 provinces with the highest total dependency ratios. Obviously, dependency ratios are impacted by all the components of population change (birth, death, in-migration and out-migration). Provinces with lower a total dependency ratio tend to have at least one of the following elements: low fertility (small number of children), low life expectancy (low number of old people) or high level of positive net migration (the number of people of working age is higher), or a combination of two or more of these factors.

Figure 3.19. 10 provinces/cities with the highest total dependency ratios and 10 provinces/cities with the lowest total dependency ratios, Viet Nam, 2014



Among the 10 provinces and cities with lower total dependency ratios, Binh Duong, Ho Chi Minh City, Can Tho, Vinh Long and Hai Phong had both a low birth ratio and the highest positive net migration rates in the country. Lai Chau, Dien Bien, Kon Tum and Gia Lai, which had the highest total dependency ratios in the country, also had the highest fertility rates. The TFR in 2014 of these provinces was 3.20, 3.11, 3.04 and 2.27 children per woman, respectively. Quang Tri Province had the fifth highest dependency ratio in the country. It had the highest fertility rate in the North and South Central Coast region, at 2.75 children per woman, as well as a low mortality rate of 7.74 per thousand and a negative net migration rate of -19.4 percent.

As of April 1 2014, 52 out of 63 provinces and cities nationwide with a total dependency ratio below 50%, i.e. they had reached the demographic window of opportunity. This was an increase of nine provinces compared with 2009. Among the 11 provinces that had not reached the demographic window of opportunity, six were located in the Northern Midlands and Mountains region, two in the North and South Central Coast (Ha Tinh and Quang Tri), and three in the Central Highlands (Kon Tum, Gia Lai and Dak Nong). Lai Chau had the highest total dependency ratio at 66.5%, meaning there were 1.5 people of working age to support each dependent person.

3.3.4. Dependency ratio by ethnic group

Differences in the age structure of ethnic groups affect their dependency ratios. Table 3.8 shows that there are significant differences in the child dependency ratio among Viet Nam's ethnic groups.

Table 3.8. Dependency ratio of ethnic groups, Viet Nam, 2014

	Total dependency ratio	Child dependency ratio	Elderly dependency ratio
Kinh	43.9	33.2	10.7
Tay	43.2	34.8	8.4
Thai	49.5	42.4	7.2
Muong	45.3	37.3	8.0
Khmer	46.0	36.9	9.2
Nung	46.8	38.1	8.6
Mong	85.6	79.7	5.9
Others	55.8	47.8	7.9

The Mong had the highest child dependency ratio at 79.7%. The set of “other ethnic groups” had the second highest child dependency ratio at 47.8%, while the Thai ranked third at 42.4%. Clearly high fertility, especially among the Mong, was the main reason leading to this phenomenon.

The Kinh had the lowest child dependency ratio at 33.3%, while the Tay ranked second at 34.8%. The three remaining ethnic groups with low child dependency ratios were the Khmer, Muong and Nung with ratios ranging from 37-38%. These groups had relatively low birth rates.

Table 3.8 also shows that there are differences in the elderly dependency ratio among ethnic groups with over one million people and the other ethnic groups with populations of less than one million. The Kinh had the highest elderly dependency ratio at 10.7%, and the Khmer had a slightly lower ratio of 9.2%. The Hmong had the lowest elderly dependency ratio, only 5.9% or half that of the Kinh. The Thai had the second lowest elderly dependency ratio, at 7.2%.

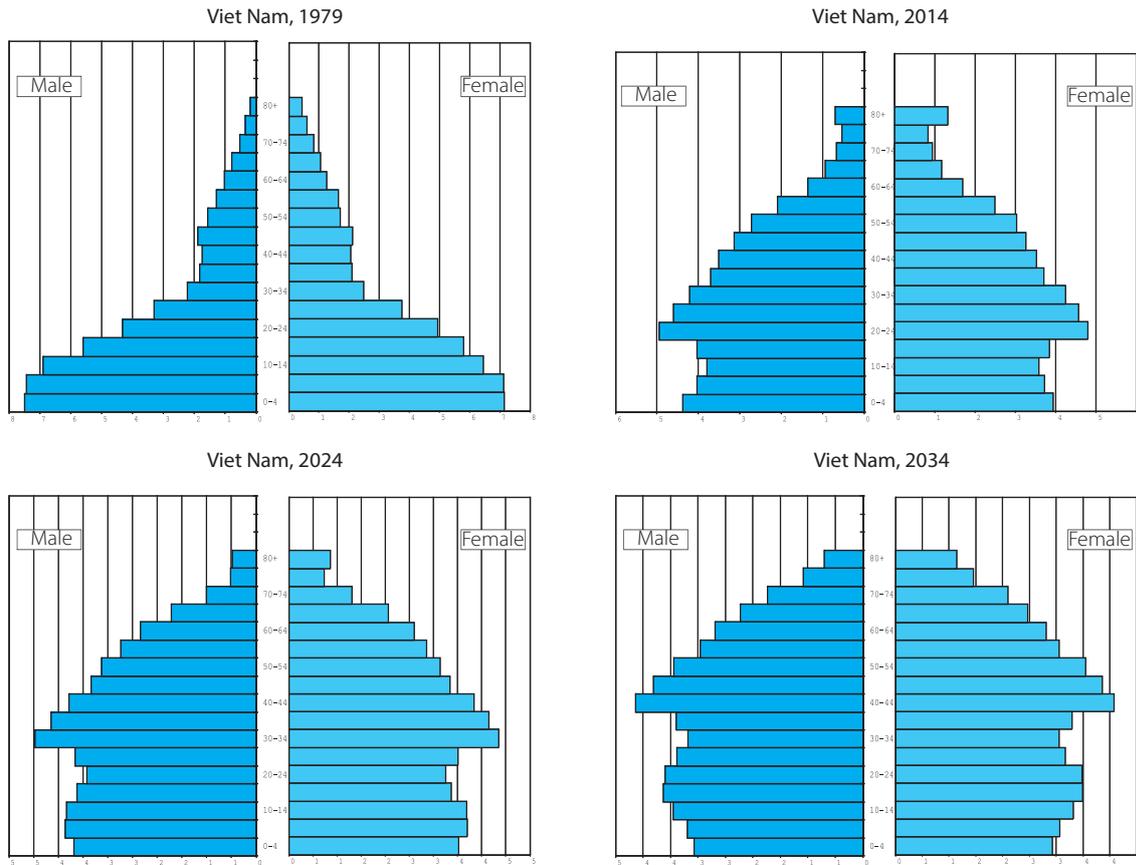
It is evident that the dependency ratio depends mainly on the child dependency ratio, because the value of the child dependency ratio is around three times higher than the elderly dependency ratio. Therefore, the Mong and the other ethnic groups had the highest total dependency ratios at 85.6% and 55.8%, respectively. Meanwhile, the Tay and Kinh had the lowest total dependency ratios at 43.2% and 43.9%, respectively. The remaining ethnic groups had total dependency ratios ranging from 45.3% (the Nung) to 49.5% (the Thai). Thus, among the eight ethnic groups with populations above one million, only the Mong and other ethnic groups have not entered the “demographic window of opportunity” period.

3.4. The prospects for the age-sex structure of the population of Vietnam

It can be said that the population of Viet Nam has begun to enter the era of an aging population.⁹ “Demographic change” or “demographic transition” are the terms used by demographers to describe mortality and birth rates falling from high mortality and fertility to low mortality and fertility. This can be clearly seen in the population pyramids from 1979 to 2009. In order to study the future prospects of the age-sex structure of Viet Nam’s population, the UN’s forecasts from the “World Population Prospects” publication are useful. However, because the UN used data from the 1999 census for the population projections of Viet Nam, the projections do not match the actual population of the country. Even in the latest version (2008), the difference between the figures forecast by the UN and the population estimate from the 2009 census is 2.2 million people.

⁹ UNFPA (2009). *Population and Development in Viet Nam. Direction towards a New Strategy 2011-2020*. Hà Nội, December – 2009, page 16.

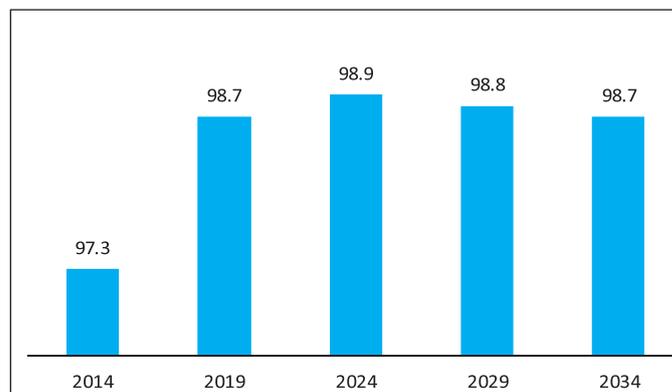
Figure 3.20. Population pyramid of Vietnam in 1979, 2014, 2024 and 2034



To project the age-sex structure of the population of Viet Nam, this monograph uses the results of population projections conducted by the GSO and published in *Viet Nam Population Projections 2009-2049*, Ministry of Planning and Investment, General Statistic Office, Hanoi, February 2011. Figure 3.21 shows the population pyramid of Viet Nam’s population in 1979 and 2014, as well as projections for 2024 and 2034.

According to forecasts, the sex ratio of Vietnam will continue to grow and reach its highest level in about a decade (2024) at 98.9 males per 100 females. Then the sex ratio will decrease, but not significantly (see Figure 3.21).

Figure 3.21. Projected sex ratio of Viet Nam’s population

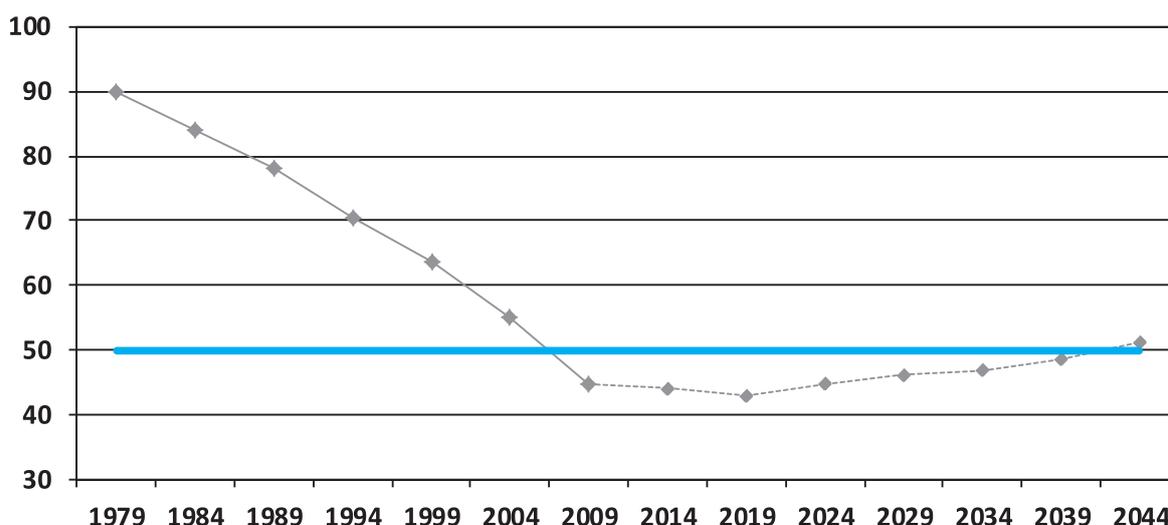


It is estimated that the total dependency ratio of the population of Viet Nam will reach its lowest level, at 42.9%, in 2019. After that, the total dependency ratio will start to rise and reach 51.2% in 2044. Thus, Viet Nam’s population will end the period of the “demographic window of opportunity” in late 2040 (see Figure 3.23).

Table 3.9. Dependency ratio, Viet Nam, 2019-2044

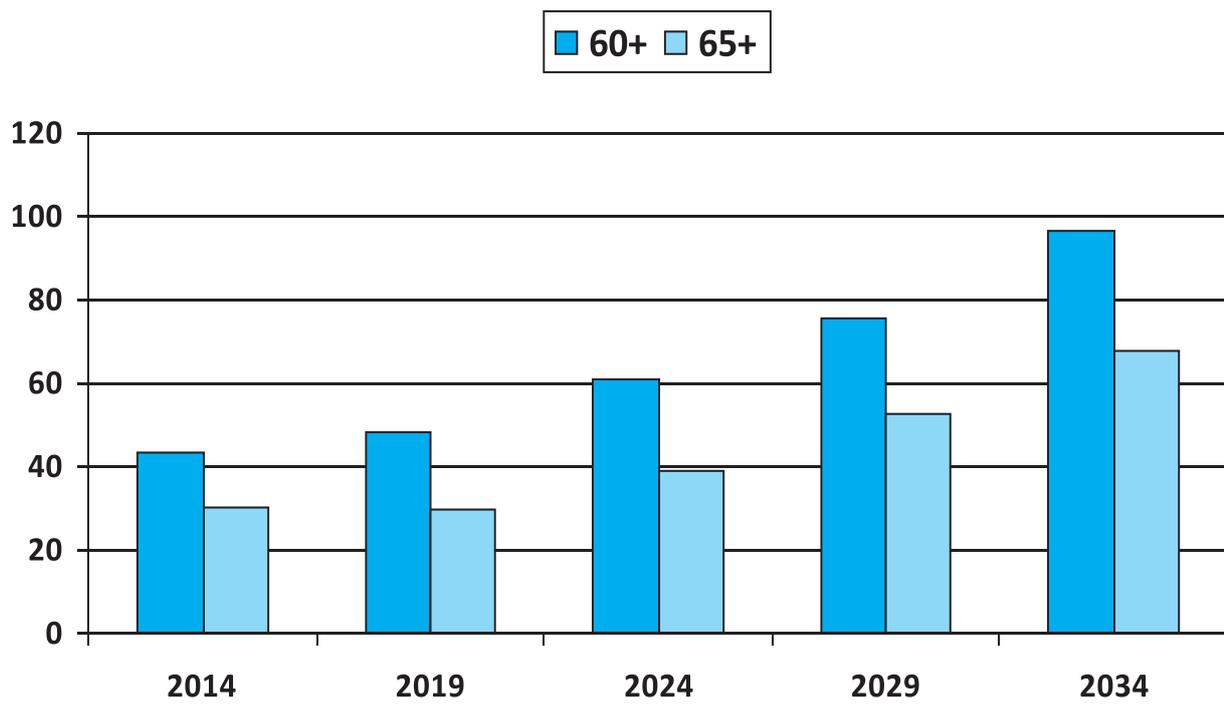
	2019	2024	2029	2034	2039	2044
Child dependency ratio	33.0	32.3	30.2	28.0	26.7	26.7
Elderly dependency ratio	9.9	12.6	15.9	19.0	21.9	24.6
Total dependency ratio	42.9	44.8	46.1	46.9	48.6	51.2

Figure 3.22. Total dependency ratio, Viet Nam, 1979-2044



In the coming years, the life expectancy of Viet Nam’s population will continue to increase while the total fertility rate will continue to decline or remain low. These trends will make Viet Nam’s population older in the future. Currently, the population aging ratio, calculated based on the group of elder people aged 60 years and above, is 43.3%, meaning that for every 100 children under age 15 there are 43.3 people aged 60 and older. It is estimated that in 2024, this ratio will be 61.1%, and in another decade (2034), this ratio will be 96.7%, meaning that for every one child there is nearly one elderly person. In the late 40s of the twenty-first century (around 2047), in the population of Viet Nam, there will be more elderly people (aged 60 and older) than children.

Figure 3.23. Projected aging index of population in Viet Nam, 2014-2034



CHAPTER 4: CHILDREN, YOUTH AND THE ELDERLY, AND RELATED SOCIO-ECONOMIC ISSUES

4.1. Education of children and youth

Education is one of the most important development goals of countries around the world, partly because of the role of education in increasing economic productivity (Psacharopoulos and Partinos, 2004; Schultz, 1997, 2002). Viet Nam has achieved the Millennium Development Goal of providing universal primary education and increasing the enrolment rate for lower-secondary and upper-secondary education (MPI, 2013). There are no differences in educational attainment between boys and girls. However, there is still a gender gap in literacy among the elderly: the illiteracy rate was around 19.7% for elderly females and 6% for elderly males in 2014.

In terms of literacy and welfare, there is a large gap between children from different welfare quintiles. The illiteracy rate of children and the youth in the lowest quintile for living standards was 4.5% and 9.8%, respectively, which are remarkably higher than that rate for children and youth in the highest quintiles.¹⁰

Table 4.1. Illiteracy rate of children and youth, Viet Nam, 2014

Group	The illiteracy rate of children 7-15 (%)	The illiteracy rate of youth 16-30 (%)
<i>Gender</i>		
Female	1.5	2.7
Male	1.6	2.1
<i>Urban/rural</i>		
Rural	1.9	3.1
Urban	0.9	1.0
<i>Living standard level</i>		
Lowest	4.5	9.8
Below middle	1.5	2.1
Middle	1.0	1.1
Above middle	0.7	0.7
Highest	0.5	0.3
All	1.6	2.4

¹⁰ In the 2014 IPS, the living conditions index can be used to reflect the level of welfare of households instead of income or consumption. For large-scale surveys such as the 2014 IPS, the authors could not collect expenditure or income data because of the high cost. According to Filmer and Scott (2008), and Kolenikov et al. (2009), the living conditions index is closely correlated with other variables of the household family such as income, spending, education and health care. Living condition is measured by an aggregate index which is constructed using housing conditions and durables owned by households. According to this index, people and households are divided into five quintiles based on their values in this index.

Table 4.2 presents the enrolment rate and education completion rate of children and youth. Nearly 50% of children aged 3-6 in Viet Nam were enrolled in kindergartens in 2014. It should be noted that the 2014 IPS was conducted in April 2014, and so children who had reached the age of six were not enrolled in primary school yet (the school year starts from September in Viet Nam). The school enrollment rate for children and youth aged 7 to 15 was approximately 94%. The difference in enrollment rates between boys and girls, as well as between urban and rural areas, was negligible. However, children in the group of low living conditions had lower enrollment rates than children in the high living conditions groups.

Enrollment rates for youth ages 16 to 23 (in upper-secondary schools, colleges and universities) was around 32.8% in 2014. Table 4.2 also shows the percentage of young people with high education levels. In general, women had higher enrollment rates and completion rates than men. This implies that there is no gender discrimination in education at schools or colleges. However, inequality in education between groups with different living conditions is very high. For example, in the group with low living conditions only about 2% of young people aged 24-30 had graduated from college or university, while this percentage in the group with high living conditions was 46%. Even the upper-secondary completion rate is also very different between groups with different living conditions. The proportion of young people who have completed upper-secondary school in the group with low living conditions was only about 16%, while this rate in the group with high living conditions was 83%.

Table 4.2. Enrolment and completion rates by education level, Viet Nam, 2014

Group	Enrolment rate, age 3-6 (%)	Enrolment rate, age 7-15 (%)	Enrolment rate, age 16-23 (%)	Completion of upper secondary school, age 24-30 (%)	Completion of college, university, age 24-30 (%)
<i>Gender</i>					
Female	48.6	93.9	34.4	48.3	20.0
Male	48.8	93.0	31.3	47.5	17.1
<i>Urban/rural</i>					
Rural	48.0	92.5	27.1	39.2	11.7
Urban	50.3	95.6	44.9	64.2	31.4
<i>Living standard level</i>					
Lowest	45.1	85.5	14.9	16.3	2.2
Below middle	48.1	91.4	23.6	29.7	5.7
Middle	48.0	94.3	27.7	38.0	9.0
Above middle	49.5	96.6	39.1	55.7	19.0
Highest	51.7	98.3	54.3	82.9	46.3
All	48.7	93.5	32.8	47.9	18.5

To understand the factors that affect student attendance, regression analysis was conducted for education variables on the explanatory variables. Regression methods are provided in detail in the Appendix. Table 4.3 presents the results of the regression analysis of school enrolment on characteristics of student and their families. The authors also conducted regression analysis of literacy, but those results are presented in the Appendix. In this section the focus is on presenting the results of the regression analysis of schooling variables.

Parents play a key role in children's school attendance. In order to analyze in detail the influence of parents, the analysis focused on children who live with at least one parent in the household. Households in which grandparents are heads were excluded. Although grandparents may live with their children and grandchildren, due to the limitations of the questionnaire it was not possible to identify the relationship between parents and children in the family in which grandparents are household heads.

Results of regression analysis show that boys and young men have lower enrollment rates than girls and young women. For children in kindergarten, older children have higher enrollment rates than younger children. However, at higher education levels, the greater the age the lower the enrollment rate. Also, the percentage of children attending preschool is higher in migrant families than in non-migrant ones. However, the enrollment rates at higher education levels of children in migrant families were lower than in non-migrant families.¹¹

Enrollment rates in different age groups vary widely among ethnic minority groups. The ethnic groups with a population of over 1 million, such as the Tay, Thai, Muong, Khmer, and Hmong, are considered separately, while smaller minorities are grouped into the category of 'other ethnic minorities'. The analysis shows that children of Tay, Thai and Muong have higher enrollment rates than other ethnic groups, even more than Kinh. This reflects an increasing priority placed on children's education among ethnic minorities. It should be noted that the descriptive statistics indicate that the proportion of Kinh children going to school is higher than children in ethnic minorities. However, descriptive statistics do not control for other factors such as the education level of parents and geographic locations that affect children's education. In the regression model, after controlling for the differences in these factors between Kinh and ethnic minorities, Kinh children do not have higher school enrolment rates than ethnic minority children.

Mong children have the lowest enrollment rates, while the enrollment rates for Kinh, Tay and Nung youth aged 16 and over are higher than for other ethnic groups. The enrolment rate of Muong and Khmer children is lower than children of other ethnic groups.

¹¹ *In this monograph, migration is defined as a change of residence within the past 5 years.*

The enrollment rate for youth aged 16-24 who have a mother as the family head is higher than those who with a father as the family head, by 2.8 percentage points. This may indicate that mothers place a higher priority on their children's education than fathers. Since some children do not live with both parents (because parents work outside the home, or parental divorce or death), the analysis was only able to control for age and educational level of the parent with higher education qualifications. The age of parents affect their children's school attendance. Age and age-squared variables are statistically significant in models of children's schooling. It implies an inverted U-shaped relationship between parental age and children's schooling. The probability of children attending school increases with the age of the parents, but this peaks at a certain age of the parents (at 47 years in the regression of school attendance of children 3-6 years old, and at 45 years in the regression of school attendance of children aged 7- 15), and then the probability of attending school decreases with parental age.¹²

The reason for this is that the age of parents reflects income and the experiences of parents. Higher age generally correlates with higher income and more experiences, which have a positive impact on children's school attendance. Age and income have an inverted U-shaped relationship, i.e. income increases with age, but only to a certain age, and then falls due to decreasing health and labor productivity of adults at older ages (Deaton, 1986; 2005).

Children of parents with higher education levels tend to have a higher rate of school enrolment. The impact of parental education on school enrolment of young people is highest for youth aged 16-23. The school enrollment rate of youth in Viet Nam is remarkably lower than that than the rate for children. In this context, parental education is especially important for the education of youth. For example, children aged 7-15 whose parents attended college or university have about a 3% higher enrollment rate than children of parents with no education. For youth aged 16-23, the effect of having parents with college or university education is even greater, resulting in a difference in up to 55% in school enrollment. Having parents with college or university education increases the probability of their children obtaining a college and university degree by 67%.

For this study, the authors analyzed the role of both parents in caring for children. Most researchers agree that having a single parent, whether due to divorce, death or widowhood, tends to have a negative impact on the development of children (e.g., Amato and Keith, 1991; Haveman and Wolfe, 1995; Gruber, 2004; Kim, 2011). Absence of parents due to migration also has an impact on children. Theoretically, parental absence due to migration can have a positive or a negative effect on school attendance of children.

¹² This is the age at which the marginal impact of age on the probability of attending school is equal to 0. This is calculated by the coefficient of age divided by 2 times the absolute value of the variable age-squared coefficient. Specifically $47=0,01923/(2*0.00021)$ and $45=0,0018 / (2*0.00002)$.

On the one hand, parental migration contributes to household income, but on the other hand it can have a negative impact on children because children receive less care from parents (Antman, 2010 and 2012). Table 4.3 indicates that children in households without either parent, due to divorce or death of parents, have lower enrollment rates than other children. The effect is higher on youth. For youth aged 16-23, having a single parent because of divorce reduces the enrollment rate by 8.2%, and having a single parent due to death reduces the enrollment rate by 7.6%. Notably, the effect on children of divorce of parents is even higher than the effect of parental death.

Children with parents who migrate also have lower enrollment rates compared to children living in households where parents do not migrate. Marriage between ethnic groups may also affect children through exchange of cultural norms between parents and biological factors (e.g. Furtado, 2009; 2012). Analysis shows that children in families in which one Kinh parent and one from an ethnic minority group, as well as children of parents from two different ethnic minorities, have higher school attendance rates than children with parents from the same ethnic minority group. This implies that different ethnic groups have different knowledge about children's education, and inter-ethnic marriage can contribute to increasing knowledge and interest in children's education.

There is an influential view that children in large families receive less investment from parents than those from small families (Becker 1960; Becker and Lewis 1973; Becker and Tomes 1976). Our analysis shows that children in large families have a lower enrollment rate than children in smaller sized families. An additional household member reduces the enrolment rate of children aged 3-6 by around 3.1%, for children aged 7-15 the impact is 0.4%, and for youth aged 16-23 enrollment is reduced by 2.6%. The proportion of children in households does not affect enrollment rates of children. However, a higher proportion of elderly family members improves the schooling rate of children, possibly because the elderly can also support children's education.

The percentage of children in school varies across regions and rural/urban areas. Children and youth in the Red River Delta and Northern Midlands and Mountains have higher enrollment rates than those in the central and southern regions. Children and youth in urban areas have higher enrollment rates than those in rural areas.

Table 4.3. Logistic regression of school enrolment

Explanatory variables	School enrollment (Age 3-6) (Yes=1, No=0)		School enrollment (Age 7-15) (Yes=1, No=0)		School enrollment (Age 16-23) (Yes=1, No=0)	
	Marginal effect	Standard error	Marginal effect	Standard error	Marginal effect	Standard error
Male (male=1, female=0)	0.00049	0.01027	-0.00609***	0.00062	-0.10434***	0.00356
Age	1.41702***	0.02474	-0.01111***	0.00023	-0.11631***	0.00101
Religion (yes=1, no=0)	0.05302***	0.01583	-0.00048	0.00106	-0.01989***	0.00583
Migration during past 5 years (yes=1, no=0)	0.07642**	0.03780	-0.03252***	0.00645	-0.08427***	0.01182
Other ethnic minorities	Reference					
Kinh	0.02222	0.04549	0.02085***	0.00341	0.02832*	0.01614
Tay	0.09152***	0.03319	0.01055***	0.00183	0.03552**	0.01603
Thai	0.14600***	0.03808	0.01007***	0.00189	0.00680	0.01821
Muong	0.14731***	0.03089	0.00920***	0.00204	-0.04959***	0.01594
Khmer	-0.04736	0.04892	0.00368	0.00245	-0.04421**	0.02159
Nung	0.06395	0.05102	0.01050***	0.00176	0.04171**	0.01711
Mong	-0.11905***	0.04503	-0.01041***	0.00353	0.02644	0.02663
Household head (father=1, mother=0)	0.01046	0.01758	-0.00167	0.00109	-0.02982***	0.00678
Parental age	0.01923***	0.00610	0.00180***	0.00047	0.00154	0.00311
Parental age squared	-0.00021***	0.00008	-0.00002***	0.00001	-0.00003	0.00003
Parents with education degree	Reference					
Parents with primary degree	0.13959***	0.01624	0.01678***	0.00078	0.14652***	0.00631
Parents with lower- secondary degree	0.20193***	0.01628	0.02561***	0.00098	0.26174***	0.00674
Parents with upper- secondary degree	0.22032***	0.01773	0.02750***	0.00090	0.42372***	0.00770
Parents with college, university	0.20519***	0.02161	0.02701***	0.00092	0.55442***	0.00756
Live with both parents	Reference					
One of parents migrate	-0.02129	0.05705	-0.01526***	0.00521	-0.02937	0.01846
One of parents dead	-0.01622	0.05566	-0.02301***	0.00358	-0.07574***	0.01232
Divorced or separated parents	-0.01118	0.05484	-0.02967***	0.00502	-0.08187***	0.01369
Parents of the same ethnic group	Reference					
One of parents is ethnic minorities and another is Kinh	-0.02486	0.03216	0.00506***	0.00190	0.06290***	0.01635

Explanatory variables	School enrollment (Age 3-6) (Yes=1, No=0)		School enrollment (Age 7-15) (Yes=1, No=0)		School enrollment (Age 16-23) (Yes=1, No=0)	
	Marginal effect	Standard error	Marginal effect	Standard error	Marginal effect	Standard error
Parents are both Kinh	0.04954	0.04387	0.00181	0.00215	0.04856***	0.01319
Parents are of different ethnic minorities	0.04176	0.04192	0.00645**	0.00280	-0.00089	0.02162
Urban (urban=1, rural=0)	-0.02107	0.01539	0.00295**	0.00117	0.12205***	0.00606
Northern Midlands and Mountains	Reference					
Red River Delta	-0.01877	0.01921	0.00574***	0.00160	0.08999***	0.00973
North and South Central Coast	-0.08371***	0.01866	-0.00362**	0.00167	0.04200***	0.00817
Central Highlands	-0.12794***	0.02399	-0.00725***	0.00226	-0.01881*	0.00963
Southeast	-0.16098***	0.02199	-0.01376***	0.00275	0.08200***	0.01084
Mekong River Delta	-0.27806***	0.01713	-0.03460***	0.00340	-0.01080	0.00835
Household size	-0.03105***	0.00619	-0.00387***	0.00028	-0.02610***	0.00173
Proportion of children	0.07374	0.05715	0.00333	0.00269	0.02104	0.01489
Proportion of elderly	0.28683***	0.10762	0.02336***	0.00534	0.08873***	0.02370
Observations	59,032		158,256		131,677	
R-squared	0.809		0.244		0.286	

Note: Age and education level of parents are age and education levels of the parent (father or mother) with the highest education level. If there is a single parent, the education and age of parents is the education and age of this single parent.

*Note: *** statistically significant at 1%; ** at 5%; and * at 1%.*

Table 4.4 presents the regression analysis of upper-secondary (high school) graduation and college/university degrees among youth in the age group of 24-30 years. Tay and Kinh have higher rates of upper-secondary and college/university graduation than other ethnic groups. The relationship between parental age and educational levels of children has an inverted U shape. However, the age at the peak of the inverted U-shaped is very high (parental age of 89 for the regression of upper-secondary education and 77 years for the regression of college and university graduation). This implies that parental age has a positive but decreasing effect on the educational level of children.

The variables of education, marriage and migration of parents have similar effects as the regression models of school enrolment. Single parents or low education parents have a negative impact on the education of children. In Table 4.4 migration has a positive sign, suggesting that migrants tend to have higher education. The reason may be that people move to cities to obtain high education levels or migrants tends to migrate to cities if they have high educational attainment.

Table 4.4. Logistic regression of completion of upper-secondary school and college/university

Explanatory variables	Complete upper-secondary (Yes=1, No=0)		Complete college/ university (Yes=1, No=0)	
	Marginal effect	Standard error	Marginal effect	Standard error
Male (male=1, female=0)	-0.11449***	0.00575	-0.10214***	0.00449
Age	-0.00646***	0.00127	-0.00384***	0.00090
Religion (yes=1, no=0)	-0.05337***	0.00822	-0.01485***	0.00509
Migrated in the past 5 years (yes=1, no=0)	0.12313***	0.01217	0.15378***	0.01145
Other ethnic minorities	Reference			
Kinh	0.09951***	0.02068	0.03989***	0.01389
Tay	0.10189***	0.02147	0.02439	0.01814
Thai	0.05233*	0.02718	-0.01027	0.02233
Muong	-0.02573	0.02844	-0.03025*	0.01768
Khmer	-0.03313	0.03195	0.02730	0.02670
Nung	0.03895	0.02644	0.01100	0.02242
Mong	-0.08314	0.05459	-0.04246	0.03490
Household head (father=1, mother=0)	-0.08098***	0.00866	-0.05013***	0.00621
Parental age	0.00897**	0.00444	0.00771**	0.00309
Parental age squared	-0.00005	0.00004	-0.00005*	0.00003
Parents with education degree	Reference			
Parents with primary degree	0.15943***	0.00729	0.09441***	0.00791
Parents with lower-secondary degree	0.33289***	0.00682	0.19846***	0.00886
Parents with upper-secondary degree	0.44887***	0.00491	0.41057***	0.01158
Parents with college, university	0.45853***	0.00395	0.67095***	0.01016
Live with both parents	Reference			
One of parents migrate	-0.03728	0.02662	-0.01292	0.01898
One of parents dead	-0.09943***	0.01996	-0.03053**	0.01290
Divoced or separate parents	-0.13743***	0.02466	-0.04970***	0.01357
Parents of the same ethnic group	Reference			
One of parents is ethnic minorities and another is Kinh	0.06641***	0.02203	0.03699**	0.01811
Parents are both Kinh	0.03226*	0.01930	0.04505***	0.01327
Parents are of different ethnic minorities	0.01108	0.03487	0.01361	0.02739
Urban (urban=1, rural=0)	0.12236***	0.00735	0.08588***	0.00497

Explanatory variables	Complete upper-secondary (Yes=1, No=0)		Complete college/ university (Yes=1, No=0)	
	Marginal effect	Standard error	Marginal effect	Standard error
Northern Midlands and Mountains	Reference			
Red River Delta	0.04764***	0.01252	0.03717***	0.00829
North and South Central Coast	-0.03957***	0.01237	0.00845	0.00766
Central Highlands	-0.09695***	0.01680	0.01192	0.01050
Southeast	-0.08630***	0.01381	-0.00090	0.00844
Mekong River Delta	-0.19091***	0.01218	-0.03831***	0.00718
Household size	-0.00636***	0.00221	-0.00532***	0.00141
Proportion of children	-0.40361***	0.02461	-0.27241***	0.01737
Proportion of elderly	-0.02518	0.02259	-0.01847	0.01503
Observations	69690		69690	
R-squared	0.224		0.213	

Note: Age and education level of parents are age and education level of the parent (father or mother) with the highest education level. If there is a single parent, the education and age of parents is the education and age of this single parent.

*Note: *** statistically significant at 1%; ** at 5%; and * at 10%.*

4.2. Early marriage and divorce among youth

Early marriage (married before the marriage age regulated by law) can lead to difficulties for young couples in ensuring a stable life for themselves and their children. It can also affect the health of mothers and children at birth, as mothers that get married early tend to give birth when very young. Some studies also have found that early marriage may increase the risk of divorce (e.g. Martin and Bumpass, 1989; White, 1990). For this study, early marriage is defined as married before 20 years of age for men and before 18 years of age for women (the marriage age according to the law in Viet Nam).

Table 4.5 shows that around 2.7% of young people in Viet Nam married below the age of marriage prescribed by law. The rate of early marriage is higher for women than for men and is higher among people living in rural areas than those living in urban areas. The rate of early marriage is particularly high among people with low living conditions.

The divorce and separation rate is 1.8% for all adults and 2.4% for young people. The divorce rate is higher for women because women are less likely to get remarried than men. People with higher living conditions have a lower rate of divorce than those with lower living conditions.

Table 4.5. Rate of early marriage and divorce, Viet Nam, 2014

Group	Percentage of people married before the legal minimum age (%)	Percentage of divorced and separated people (%)	Percentage of divorced and separated people aged 16-30 (%)
<i>Gender</i>			
Female	3.7	2.2	2.6
Male	2.2	1.3	2.1
<i>Urban/rural</i>			
Rural	3.3	1.5	2.4
Urban	1.3	2.3	2.4
<i>Living standard level</i>			
Lowest	8.1	1.9	2.5
Below middle	2.6	1.9	3.0
Middle	1.7	1.8	2.6
Above middle	1.2	1.6	2.3
Highest	0.6	1.6	1.8
All	2.7	1.8	2.4

Table 4.6 presents the logistic regression for the probability of early marriage and divorce. Women have a higher probability of early marriage and divorce than men. Information was not available about previous divorces, and thus the results here refer to current divorces. The divorce rate for women is higher than for men, possibly because women find it more difficult to get re-married than men. Age has a positive correlation with divorce. There is an inverted U-shaped relationship between age and probability of divorce; the probability of divorce increases with age until 30, and then decreases with age.

Religion and ethnicity also affect marriage. The rate of early marriage in religious people is lower than among non-religious people. However, the divorce rate is higher among religious people than among non-religious ones. The rate of early marriage and divorce is higher in ethnic minorities with small populations (less than 1 million). Compared with other ethnic groups, Kinh people have a lower rate of early marriage, but a higher divorce rate, particularly among youth. Mong people have a higher rate of early marriage but a lower divorce rate than other ethnic groups.

Education plays an important role in reducing the incidence of early marriage and divorce. Geographic factors also affect the rate of marital problems, due to regional differences in culture and economies. The rate of early marriage in urban areas is lower than in rural areas. However, the divorce rate in urban areas is higher than in rural areas. Southern regions of Viet Nam, like the Southeast and the Mekong River Delta, have a lower rate of early marriage but a higher divorce rate than the northern regions.

Household demographic variables are correlated with marriage of household members. People living in households with a large number of people are more likely to marry early but less likely to divorce. The proportion of children in households is negatively correlated with the divorce of adults. However, a higher proportion of elderly members in households is positively correlated with the risk of divorce of other household members.

Table 4.6. Logistic regression of early marriage and divorce, Viet Nam

Explanatory variables	Early marriage (Yes=1, no=0)		Divorce and separate (Yes=1, No=0)		Divorce and separate of youth 16-30 years old (Yes=1, No=0)	
	Marginal effect	Standard error	Marginal effect	Standard error	Marginal effect	Standard error
Male (male=1, female=0)	-0.01738***	0.00104	-0.01108***	0.00043	-0.00818***	0.00068
Age	0.01481***	0.00414	0.00178***	0.00012	0.00346**	0.00165
Age squared	-0.00024**	0.00012	-0.00003***	0.00000	-0.00005	0.00003
Religion (yes=1, no=0)	-0.00154***	0.00055	0.00233***	0.00054	0.00306***	0.00102
Migration during past 5 year (yes=1, no=0)	0.06838***	0.00582	-0.00416***	0.00079	-0.01305***	0.00085
Other ethnic minorities	Reference					
Kinh	-0.02125***	0.00221	-0.00080	0.00106	0.00086	0.00168
Tay	-0.00514***	0.00050	-0.00566***	0.00111	-0.00267	0.00223
Thai	0.00075	0.00114	-0.00659***	0.00132	-0.00401*	0.00223
Muong	-0.00392***	0.00070	-0.00401***	0.00153	-0.00233	0.00253
Khmer	-0.00529***	0.00055	-0.00502***	0.00122	-0.00299	0.00209
Nung	-0.00436***	0.00061	-0.00783***	0.00123	-0.00678***	0.00219
Mong	0.00865***	0.00202	-0.00963***	0.00141	-0.01301***	0.00129
Have no education degree	Reference					
Have primary degree	-0.00040	0.00061	-0.00308***	0.00043	-0.00444***	0.00091
Have lower-secondary degree	-0.00882***	0.00104	-0.00642***	0.00049	-0.00921***	0.00100
Have upper-secondary degree	-0.00784***	0.00050	-0.00765***	0.00052	-0.01443***	0.00100
Have college, university	0.00125	0.00427	-0.01059***	0.00048	-0.01618***	0.00081
Urban (urban=1, rural=0)	-0.00397***	0.00059	0.00835***	0.00060	-0.00074	0.00099
Northern Midlands and Mountains	Reference					
Red River Delta	-0.00329***	0.00074	-0.00408***	0.00066	-0.00391***	0.00144
North and South Central Coast	-0.00459***	0.00061	-0.00324***	0.00065	-0.00098	0.00145
Central Highlands	-0.00349***	0.00056	-0.00006	0.00090	0.00280	0.00186
Southeast	-0.00604***	0.00059	0.00945***	0.00118	0.00779***	0.00228
Mekong River Delta	0.00024	0.00081	0.00730***	0.00089	0.00892***	0.00198
Household size	0.00131***	0.00012	-0.00748***	0.00025	-0.00134***	0.00027
Proportion of children	-0.00061	0.00142	-0.00625***	0.00142	-0.04354***	0.00264
Proportion of elderly	-0.00375*	0.00209	0.02245***	0.00114	0.01771***	0.00292
Observations	84447		708435		144564	
R-squared	0.302		0.0750		0.0637	

Note: Age and education level of parents are age and education of the parent (father or mother) with the highest education level. If there is a single parent, the education and age of parents is the education and age of this single parent.

*Note: *** statistically significant at 1%; ** at 5%; and * at 10%.*

To analyze the influence of parents on marriage of youth, the characteristics of parents were included in the regression model (Table 4.7). The number of observations in this table is lower than in Table 4.6 because observations included only young people who are living with at least one parent. The analysis shows that the gender of the household head, either father or mother, does not affect the marriage of their children. However, parental age affects children's marriage. There is a U-shaped relationship between parental age and early marriage of children. Early marriage decreases with parental age, but after the parental age of 49 the early marriage of children increases as parental age increases.

The relationship between parental age and children's divorce follows an inverted U-shape. In other words, couples have a higher probability of divorce as their parents' age increases, but after the peak age of 45, the probability of divorce decreases as parental age increases. This may indicate that after divorces people return to live with their parents, especially when parents are older.

People whose parents have a higher level of education tend to have lower rates of early marriage and divorce. Another interesting fact is that young people with a single parent tend to marry early, but they are less likely to divorce compared to people who grew up with both parents.

Table 4.7. Logistic regression of early marriage and divorce of young people, Viet Nam

Explanatory variables	Early married (Yes=1. No=0)		Divorced and separated (Yes=1. No=0)	
	Marginal effect	Standard error	Marginal effect	Standard error
Male (male=1, female=0)	-0.00192***	0.00057	-0.11906***	0.00530
Age	0.00715**	0.00330	0.01642***	0.00372
Age squared	-0.00010	0.00010	-0.00025***	0.00007
Religion (yes=1, no=0)	-0.00100	0.00011	0.00132	0.00231
Migration during past 5 year (yes=1, no=0)	0.00404*	0.00206	0.02381***	0.00590
Other ethnic minorities	Reference			
Kinh	-0.00784***	0.00201	0.01186**	0.00506
Tay	-0.00225***	0.00050	-0.00199	0.00630
Thai	-0.00005	0.00077	0.00908	0.00920
Muong	-0.00177**	0.00071	-0.00136	0.00758
Khmer	-0.00309***	0.00039	-0.00233	0.00586
Nung	-0.00205***	0.00052	-0.00211	0.00766
Mong	0.00341***	0.00111	-0.01659***	0.00635
Have no education degree	Reference			
Have primary degree	0.00077	0.00056	-0.01204***	0.00223
Have lower-secondary degree	-0.00226***	0.00066	-0.02241***	0.00238
Have upper-secondary degree	-0.00357***	0.00038	-0.03986***	0.00240

Explanatory variables	Early married (Yes=1. No=0)		Divorced and separated (Yes=1. No=0)	
	Marginal effect	Standard error	Marginal effect	Standard error
Have college, university	0.00729	0.00637	-0.04242***	0.00178
Household head (father=1, mother=0)	0.00088	0.00062	0.00061	0.00285
Parental age	-0.00099***	0.00018	0.00352***	0.00122
Parental age squared	0.00001***	0.00000	-0.00004***	0.00001
Parents with education degree	Reference			
Parents with primary degree	-0.00128***	0.00037	-0.00120	0.00232
Parents with lower-secondary degree	-0.00223***	0.00050	-0.00575**	0.00266
Parents with upper-secondary degree	-0.00239***	0.00058	0.00336	0.00396
Parents with college, university	-0.00365***	0.00066	-0.01636***	0.00405
<i>Live with both parents</i>	<i>Reference</i>			
One of parents migrate	0.00101	0.00175	-0.02254***	0.00437
One of parents dead	0.00157	0.00114	-0.01145***	0.00436
Divorced or separated parents	0.00409*	0.00221	-0.01129**	0.00460
Parents of the same ethnic group	<i>Reference</i>			
One of parents is ethnic minorities and another is Kinh	-0.00207***	0.00068	0.00419	0.00900
Parents are both Kinh	-0.00097	0.00099	-0.00006	0.00535
Parents are of different ethnic minorities	-0.00100	0.00023	0.04976***	0.01793
Urban (urban=1, rural=0)	-0.00030	0.00051	-0.00464**	0.00217
Northern Midlands and Mountains	Reference			
Red River Delta	-0.00182***	0.00066	-0.00185	0.00371
North and South Central Coast	-0.00282***	0.00047	-0.00806***	0.00312
Central Highlands	-0.00272***	0.00038	0.00187	0.00442
Southeast	-0.00241***	0.00055	0.00575	0.00459
Mekong River Delta	0.00076	0.00073	0.00107	0.00367
Household size	0.00126***	0.00011	-0.01358***	0.00096
Proportion of children	0.00085	0.00112	0.02617***	0.00765
Proportion of elderly	-0.00895***	0.00216	0.05045***	0.00857
Observations	73992		40108	
R-squared	0.266		0.189	

Note: Age and education level of parents are age and education levels of the parent (father or mother) with the highest education level. If there is a single parent, the education and age of parents is the education and age of this single parent.

*Note: *** statistically significant at 1%; ** at 5%; and * at 10%.*

4.3. Aging population and related issues

4.3.1. The aging index of Viet Nam's population over time

The aging index is calculated by measuring the number of people aged 60 (or 65) years or older in a population per 100 people under 15 years of age. It shows, in other words, how many people aged 60 (or 65) years and older there are for every 100 children aged 0-14.

Figure 4.1. Aging index, Vietnam, 1979-2014

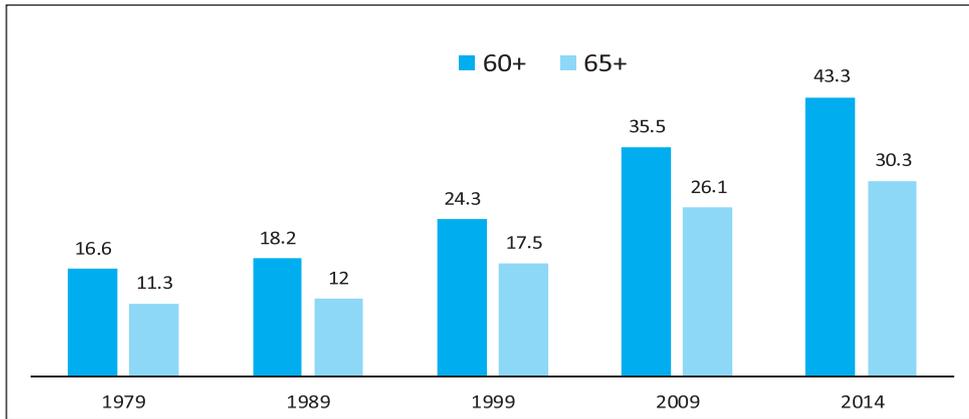
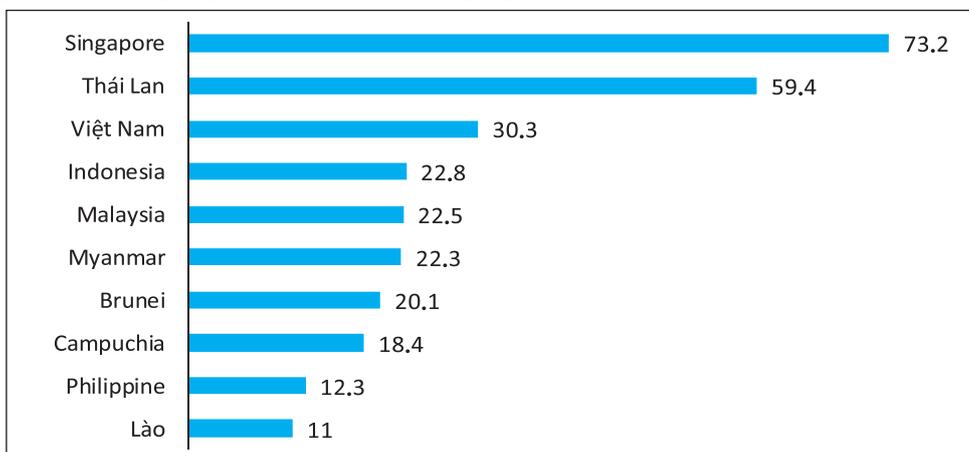


Figure 4.1 shows that the aging index of Viet Nam's population has increased during the past 35 years. In 1979, for every 100 children under 15 years there were only 16.6 people aged 60 years and older. Yet after 20 years (1999) the index increased by 1.5 times, and continued increasing to reach 43.3 people aged 60 years and older for every 100 children under 15 years in 2014, nearly 3 times higher than in 1979. The increase in the aging index reflects an increase in the health and life expectancy of the Vietnamese people. However, it also poses challenges for ensuring pensions and health care for the elderly.

Among the 10 ASEAN countries, the aging index of Viet Nam (calculated for the population aged 65 years and above) is just below Singapore and Thailand (see Figure 4.2). The aging index of Viet Nam is much higher than other ASEAN countries such as Laos, Cambodia and the Philippines.

Figure 4.2. Aging indices (65+) of population in ASEAN countries, 2015



4.3.2. Aging index by urban/rural areas, and socio-economic regions and provinces

Figure 4.3 shows the differences in the aging index of the population between urban and rural areas and among socio-economic regions. The difference in the ageing index between urban and rural areas in Viet Nam is not large. For the index calculated based on the population aged 60 and older, the aging index for urban areas is higher than for rural areas by 2.7 percentage points (46.4% versus 43.7%).

Among the six socio-economic regions, the Red River Delta had the highest aging index, followed by the North and South Central Coast and Mekong River Delta, while the Central Highlands and the Northern Midlands and Mountains had the lowest aging index values. In the Red River Delta, for every 100 children under 15 years old, there were 56.8 people aged 60 and older, while in the Central Highlands, for every 100 children under 15 there were only 23.6 people aged 60 and older.

Figure 4.3. Aging indices by urban and rural areas and socio-economic regions, Viet Nam, 2014

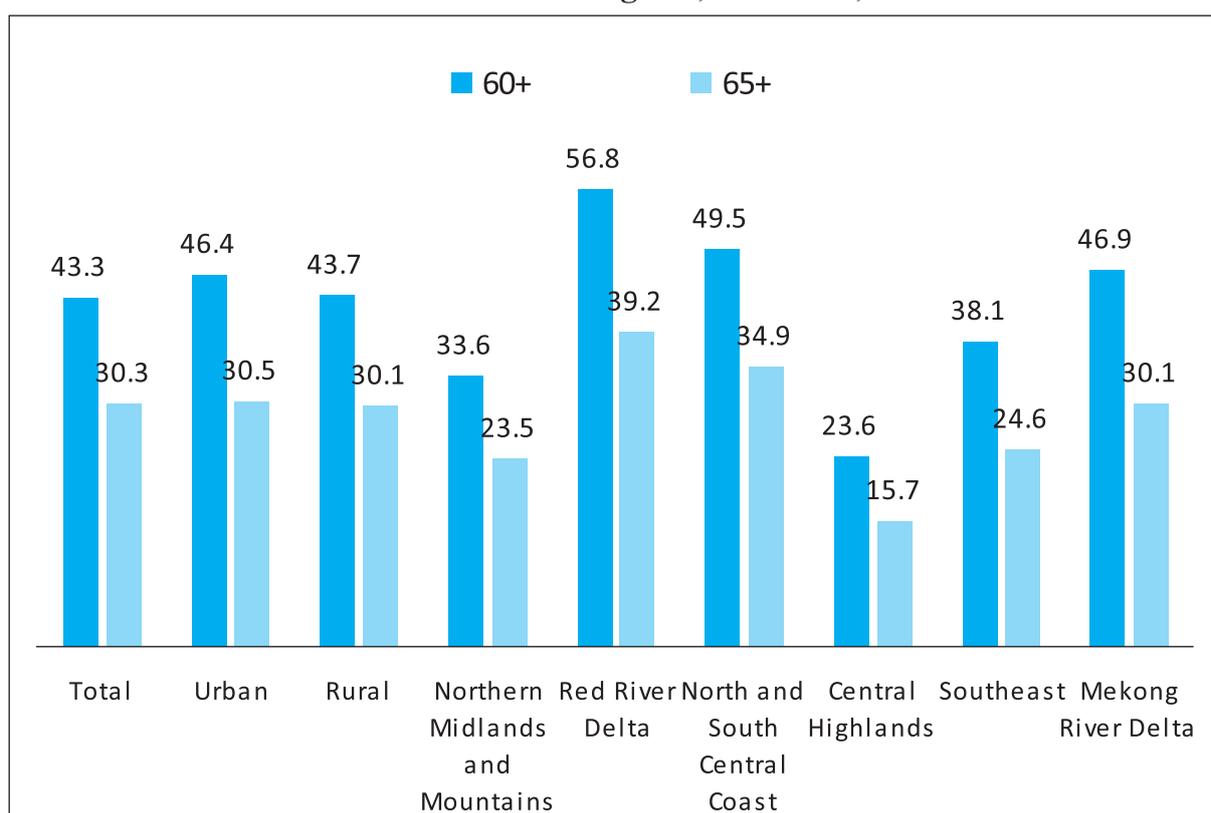


Figure 4.4 shows the aging index of the provinces/cities, by population aged 60 and older, in 2014. The provinces in the Red River Delta and the North and South Central Coast had the highest aging indices. Seven provinces with an aging index above 50 were Ha Tinh, Hung Yen, Ninh Binh, Nam Dinh, Hai Duong, Ha Nam and Thai Binh. Most of these are provinces in the Red River Delta, which has had relatively low fertility. The number of elderly migrants to these provinces is much higher than the number of child migrants.

Figure 4.4. Map of the aging index by province, Viet Nam, 2014

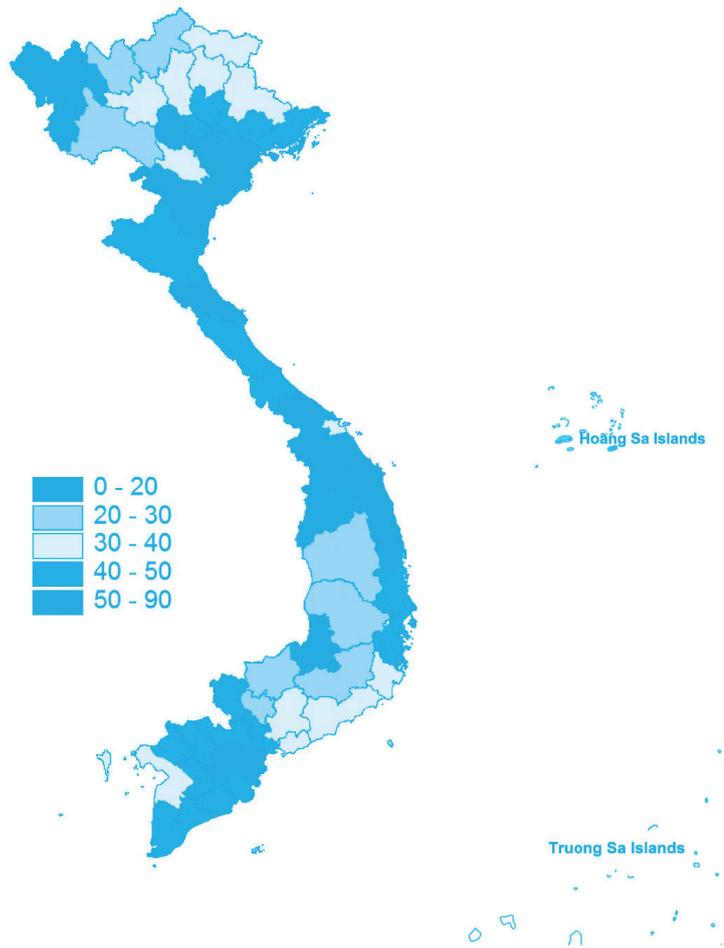


Figure 4.5. Comparison of the 10 provinces with the lowest aging index (60+) and the 10 provinces with the highest aging index, Viet Nam, 2014

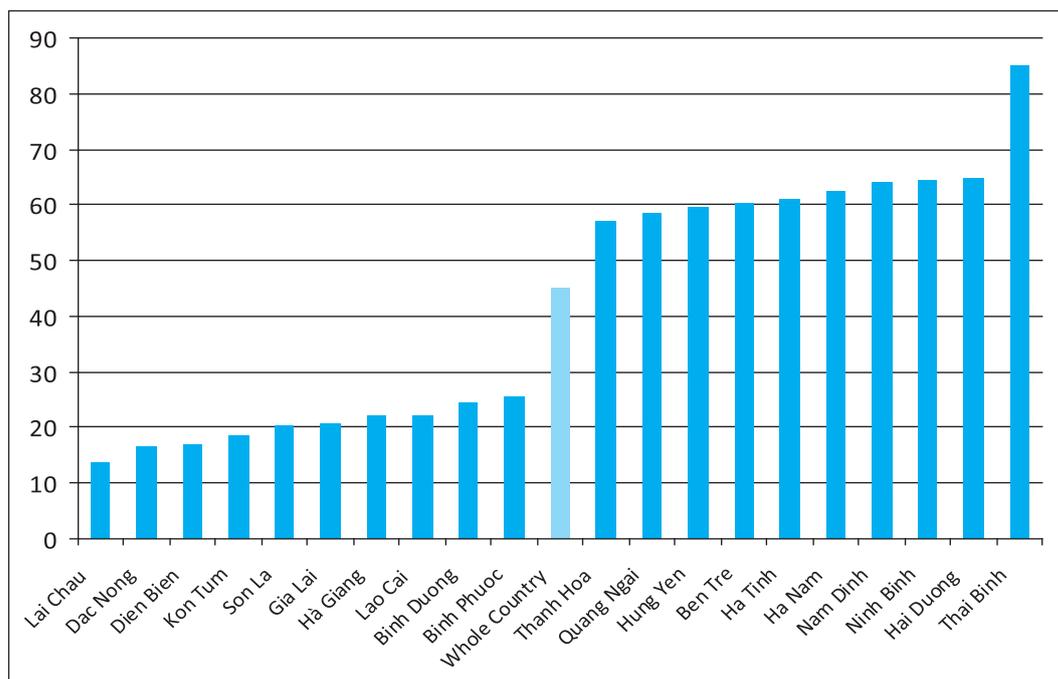
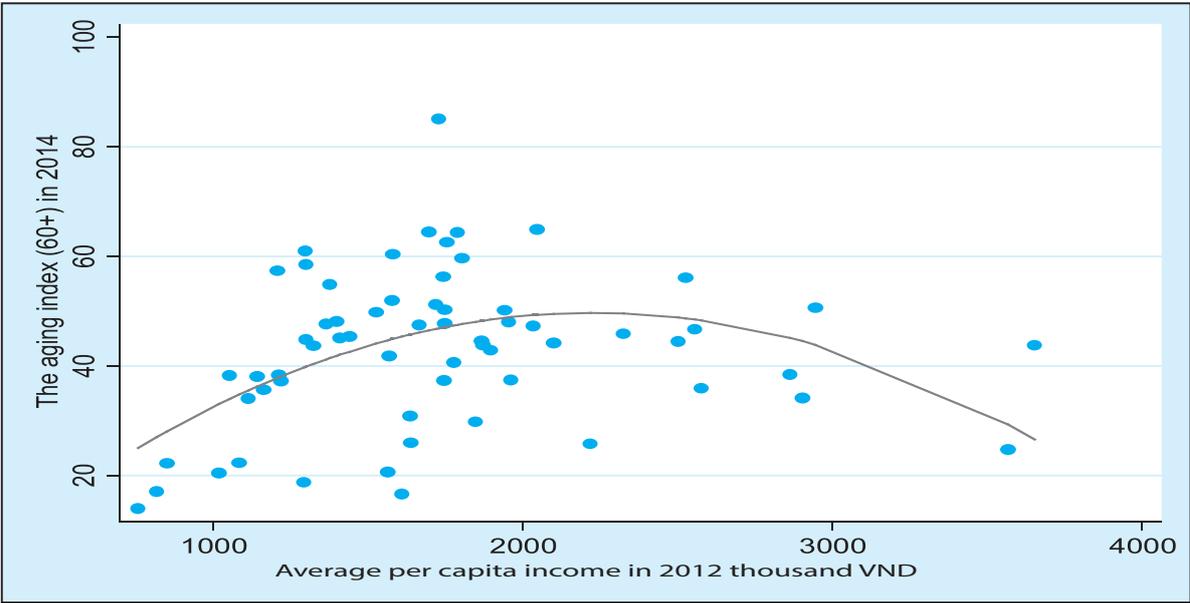


Figure 4.5 shows that among the 10 provinces with the lowest aging index, five are in the Northern Midlands and Mountains region (Lai Chau, Dien Bien, Son La and Lao Cai Ha Giang), three are in the Central Highlands (Dak Nong and Kon Tum and Gia Lai), and two are in the Southeast (Binh Duong and Binh Phuoc).

Figure 4.6 shows the U-shaped relationship between the aging index and the average income of the provinces. The poor provinces had a very low aging index, primarily because these provinces have a higher fertility rate and thus large numbers of children. Provinces with high living standards also had a low aging index, but this was not due to the high birth rate, but rather due to higher migration of young people to these provinces.

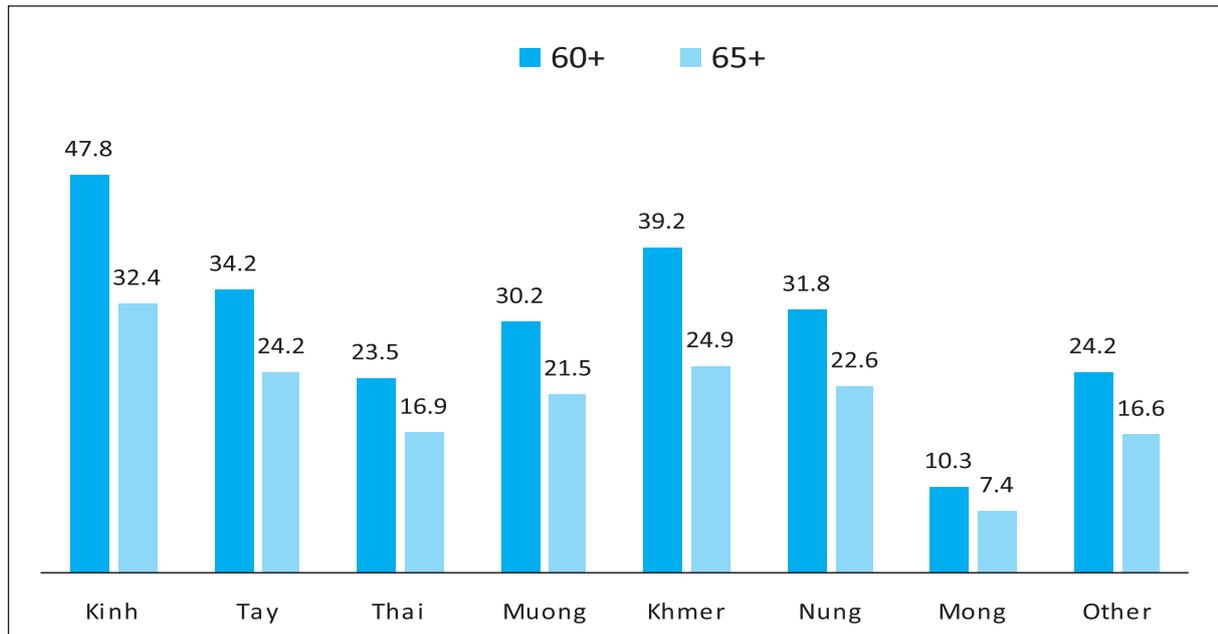
Figure 4.6. The aging index (60+) and average income of provinces, Viet Nam, 2014



4.3.4. Aging index by ethnic groups

Among the eight ethnic groups with a population of more than one million, the Kinh had the highest aging index, followed by ethnic Khmer. The Mong had the lowest aging index, followed by the Thai. While the aging index calculated for the population aged 60 years and older of the Kinh was 47.8%, it was only 10.3% for the Mong. The difference between ethnic Kinh and Mong is 4.6 times, equivalent to 37.5 percentage points. The main reasons for low aging indexes in ethnic minority groups are low life expectancy and high fertility rates.

Figure 4.7. Aging index by ethnic groups with populations of more than 1 million, Viet Nam, 2014



4.3.5. Elderly people living alone and determinants of living alone

As described in the previous chapter, the aging problem poses many challenges to ensuring the health and welfare of the elderly. A related problem is the increasing number of single elderly people in Viet Nam. This problem may be due to migration of young people as well as a change in the culture whereby married children no longer live with their parents. Using data from the 2014 IPS, the proportion of elderly people who live alone can be estimated. Figure 4.8 shows that in 2014 the proportion of elderly people living alone was 3.2% among people aged 60 years and older, but was 16.4% among seniors aged 80 years and older. Elderly women are more likely to live alone than elderly men. This may be due more to women's higher life expectancy compared to men, and a higher rate of widowed women. The rate of re-marriage among women is also lower than among men. Rural areas had a higher percentage of elderly people living alone than urban areas, primarily due to the rural-urban migration of young people.

Figure 4.8 provides estimates of the proportion of elderly people who live alone by living conditions. There is a strong positive correlation between living alone and living conditions. Approximately 32.4% of the elderly aged 80 years or older in the group with the lowest living condition were living alone. The proportion in the highest living condition group was just 3.1%. There is a large difference in the proportion of lonely elderly people between rural and urban areas; a large proportion of elderly people in rural areas with low living conditions live alone. This suggests that policies supporting single elderly people should be focused on poor areas and poor groups of elderly.

Figure 4.8. Proportion of elderly people living alone by living conditions, Viet Nam, 2014

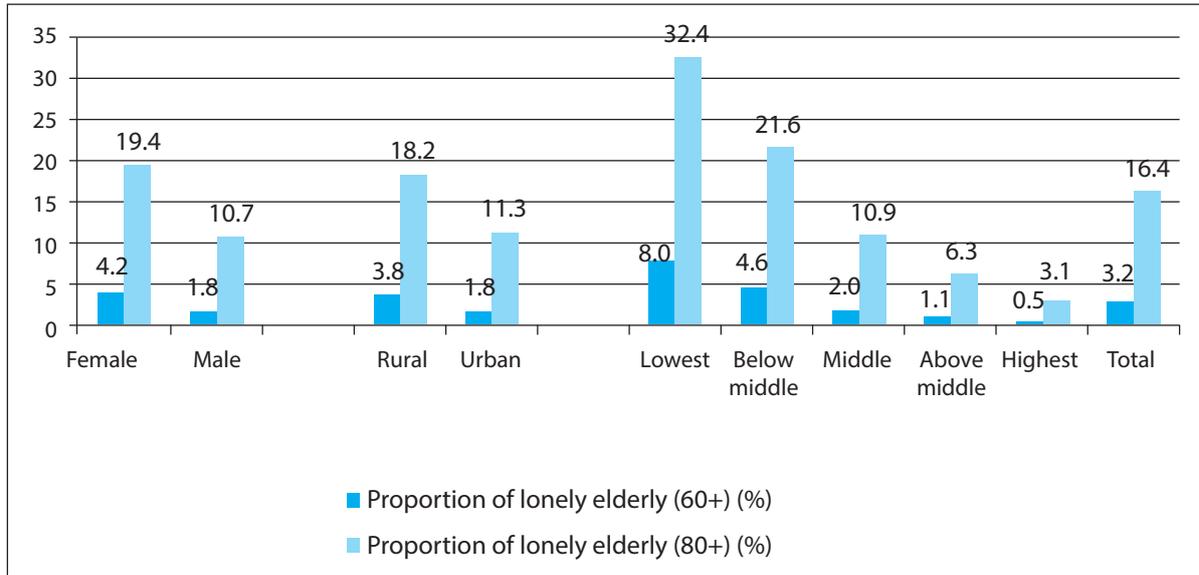


Table 4.8 shows the influence of some factors on the probability of elderly people living alone. These include demographic variables, ethnicity, education and geography. The regression coefficients in this section are marginal effects instead of regression coefficients from logitics (see annex 2)¹³. The results show that women have a higher probability of living alone than men. Age has a positive correlation with the probability of living alone.

Single status also is influenced by culture, represented by religion. Religious people have a higher rate of living alone than non-religious people, especially among the elderly aged 80 years and older. In particular, after controlling for variables in the model, the proportion of single elderly religious people is higher than the proportion of non-religious elderly people by about 3.4%.

Kinh people has a higher proportion of elderly people living alone than ethnic minority people. This is primarily because the migration rate of Kinh is higher than among ethnic minorities. Also, because of migration rural areas tend to have a higher rate of single elderly people than urban areas; young people migrate to urban areas and leave old people behind in rural areas. The Red River Delta and central regions have the highest proportion of single elderly people, while the Southeast and Mekong River Delta have the lowest proportion of single elderly people.

Education is also correlated with the probability of living alone. Those who graduated from college or university have a lower rate of living alone. This trend also reflects the correlation between standard of living (measured by the index of living conditions) and elderly people living alone. Old people who have few assets and poor

¹³ Logistic model includes intercept. However, maginal effect of the intercept is non-significant so that it is not mentioned. Readers who wish to know more information on this logistic regression model can contact the author.

housing conditions are more likely to live alone compared to those with greater assets and better housing conditions.

Table 4.8. Logistic regression of elderly people living alone, Viet Nam, 2014

Explanatory variables	The elderly living alone (from 60 and above)		The elderly living alone (from 80 and above)	
	Marginal effect	Standard error	Marginal effect	Standard error
Male (male=1, female=0)	-0.00003***	0.00001	-0.07246***	0.00446
Age	0.00018***	0.00003	0.05046***	0.01528
Age squared	-0.00000***	0.00000	-0.00029***	0.00009
Religion (yes=1, no=0)	0.00001***	0.00000	0.03444***	0.00668
Migrated in the past 5 years (yes=1, no=0)	-0.00002***	0.00001	-0.06735***	0.01850
Other ethnic minorities	Reference			
Kinh	0.00003***	0.00001	0.09490***	0.01036
Tày	-0.00001	0.00001	-0.02882	0.02833
Thái	-0.00003***	0.00001	-0.07559***	0.02192
Mường	-0.00002**	0.00001	-0.05655*	0.02936
Khmer	0.00004	0.00002	0.09163*	0.04882
Nùng	0.00001	0.00002	0.02482	0.04567
Mông	-0.00003***	0.00001	-0.09980***	0.01973
Have no education degree	Reference			
Have primary degree	-0.00000	0.00000	-0.00534	0.00552
Have lower-secondary degree	-0.00001	0.00000	-0.01229	0.00987
Have upper-secondary degree	-0.00001	0.00001	-0.01116	0.01692
Have college, university	-0.00002**	0.00001	-0.04685**	0.01997
Urban (urban=1, rural=0)	-0.00002***	0.00000	-0.05262***	0.00550
Northern Midlands and Mountains	Reference			
Red River Delta	0.00004***	0.00001	0.10613***	0.01214
North and South Central Coast	0.00002***	0.00001	0.06250***	0.01058
Central Highlands	-0.00000	0.00001	-0.00940	0.01458
Southeast	-0.00001***	0.00000	-0.03473***	0.01110
Mekong River Delta	-0.00001***	0.00000	-0.03303***	0.00896
Observations	140887		27438	
R-squared	0.383		0.0648	

Note: *** statistically significant at 1%; ** at 5%; and * at 10%.

CHAPTER 5: CONCLUSION AND POLICY RECOMMENDATIONS

5.1. Main findings

Overall, the quality of data on age in the 2014 IPS is quite good. The Whipple Index, Myer Index, as well as gender-age and the UN's age indicators support the view that the data quality of the 2014 IPS is good. However, due to the fact that the people interviewed for the 2014 IPS differ slightly from those interviewed for the censuses in 1970, 1989, 1999 and 2009, it is important to adjust the data when comparing the age-sex structure of the national population over time.

The 2014 IPS data show that the structure of Viet Nam's population has been generally stable in recent years. Because the fertility rate was almost unchanged in 2014 compared to prior censuses, the proportion of the population aged 0-4 was similar to the proportion of the population aged 5-9. The proportion of children has declined dramatically over time. The proportion of children 0-4 years old accounted for 14.6% of the population in 1979, dropping to only 9.4% in 1999 and 8.3% in 2014. Low fertility and high life expectancy have caused the population pyramid to appear drum-shaped, meaning Viet Nam's population pyramid in 2014 characterized an aging population.

The age-sex structure of the population in 2014 also differed between rural and urban areas. The proportion of children and young people aged 15-19 years, both male and female, living in rural areas was higher than youth of these ages living in urban areas. However, the proportion of people in the age groups between 25 and 69 years was lower in rural areas than in urban areas. The proportion of single elderly people in rural areas was remarkably higher compared to urban areas due to the rural-urban migration of young people.

The regions with the highest fertility, including the Central Highlands and Northern Midlands and Mountains, had the largest proportion of children aged 0-14. The Red River Delta and Mekong River Delta had the largest proportion of people aged 65 and older, whereas the Central Highlands had the lowest proportion of people aged 65 years and above. The age pyramid of the Southeast represents the shape of a population with a low birth rate and a high in-migration level. And the age pyramids of the Northern Midlands and Mountains, Red River Delta and Central Highlands are typical of young populations.

The Mong people had the highest fertility rate as well as the highest proportion of children aged 0-14. Other ethnic minority groups and the Thai had the second highest and the third highest proportion of children aged 0-14, while the proportion was lowest among the Kinh at only 23.1%, around half of that of the Mong.

Populations with relatively low mortality rates will have a high proportion of elderly people. The Kinh had the lowest death rate, and as a result the proportion of the

population aged 65 and older reached 7.5% in 2014. This proportion for the Mong, who had the highest death rate, was only 3.2%.

Looking at the population pyramids for the larger ethnic groups (those with more than one million people) reveals that the pyramids for the Tay, Muong, and Nung have bars at the bottom that are much wider than the bars at the top. This indicates that the birth rate for these ethnic groups in the 5-year period before the 2014 IPS increased significantly compared to the previous 5-year period.

Also, the sex ratio of Viet Nam has continued to increase, from 94.2 in the 1989 census to 97.3 in 2014. The sex ratio in urban areas was lower than in rural areas. Migration has had a large impact on differences in the sex ratio among regions. The Southeast region had the lowest sex ratio, followed by the Red River Delta. The region with the highest sex ratio was the Central Highlands.

There is a clear difference in sex ratio of 63 provinces and cities in 2014. Sex ratio in the provinces of the Central Highlands and Northern Midlands and Mountains is high while that in the Southeast and Red River Delta is low.

It is also clear that rapid decline fertility has reduced the proportion of children aged 0-14. At the same time, the proportion of the population of working age has increased dramatically. The proportion of the population aged 65 years and older also increased, but at a slower pace. As a result, the overall dependency ratio has declined from 89.9% in 1979 to 63.6% in 1999, 46% in 2009 and only 44% in 2014.

In all, 52 out of the 63 provinces in the country have achieved the demographic window of opportunity, an increase of nine provinces compared to the 2009 census. Among the 11 provinces which have not reached the demographic window of opportunity period, six are located in the Northern Midlands and Mountains, and two in the North and South Central Coast. It is estimated that Viet Nam will complete the period of the demographic window of opportunity in 25 years, around 2040.

The data also show that there is a negative relationship between the dependency ratio and the per capita income of provinces and cities in Viet Nam. Provinces and cities with high average income levels tended to have a lower dependency ratio and vice versa.

The aging index of Viet Nam's population increased during the past 35 years. In 2014, the aging index was 43.8% for the population from 60 years and older and 30.3% for the population aged 65 and older. Among the 10 ASEAN countries, the aging index of Viet Nam was just lower than Singapore and Thailand. Viet Nam's population is in an aging period. The relationship between the aging index and average income levels of provinces and cities follows the inverted U shape. Poor provinces and provinces with relatively high incomes had a lower aging index than the middle income provinces.

In addition, there is a growing trend of elderly people living alone in Viet Nam. In 2014 rural areas had a higher ratio of single elderly people than in urban areas. The Red River Delta and the central regions had a higher ratio of single elderly people than

other regions, while the Southeast and Mekong River Delta had the lowest ratio of single elderly people.

Women were more likely to live alone than men, and the rate of single elderly people living alone was lower among people who graduated from college or university. Up to 32.4% of the elderly aged 80 years or older in the group of low living conditions were living alone in 2014. This proportion in the group of elderly aged 80 years or older with high living conditions was only 3.1%. Thus there was a large difference in the proportion of elderly people living alone in urban and rural areas and in households with different economic conditions.

5.2. Policy recommendations

The age-sex structure of Vietnam has changed remarkably during the past three decades, particularly over the last 10 years. Therefore, national and local economic development policies should take into account these demographic changes in socio-economic order to cope with them and take advantage of the opportunities they present. Socio-economic policies should be more focused on assisting people in areas with a high young population structure and/or a high dependency ratio, in particular provinces and groups in the Central Highlands and Northern Midland and Mountains regions to address these demographic changes, contributing to improve people's lives and conditions for local economic development.

In 2014 among 63 cities there were 24 provinces and cities with a very high sex ratio of children aged 0-4, above 110%. It is necessary to strengthen monitoring sex ratio at localities. In addition to communication campaigns about the negative effects of sex selection, such as the resulting surplus of men and social security problems, there should be stronger sanctions that aim to eliminate the disclosure of fetus gender and sex selection methods.

The fertility rate in the last 15 years in most provinces was low and stable. The proportion of children at kindergarten and primary schools age did not increase significantly. However when conducting planning related to preschool and elementary schooling, local authorities should pay attention to the number of migrants, especially young women who are often accompanied by children or who will have children, in order to avoid a shortage of schools and teachers.

Viet Nam is in the stage of demographic opportunity dubbed the 'demographic window of opportunity'. From a demographic perspective, this opportunity will last approximately 25 years. Therefore, in the current context of low labor productivity especially for the young and middle-aged people, improving the quality of the young workforce is of utmost urgency. The government should have policies and vocational training programs to meet the needs of the labor market, enhance the skills of workers, and contribute to improved labor productivity. Especially for the young and middle aged people. At the same time, when young labor force is increasing, enhancing investment in improving the quality of reproductive health services for young people is also essential.

Although the average age of first marriage in Viet Nam continues to rise, early marriage still exists among the youth. Approximately 2.2% of young men below the age 20 and 3.7% of young women under age 18 were married as of April 2014. Early marriage can cause young people to drop out of school and miss employment opportunities. In addition, early childbearing can negatively affect maternal and child health and may make it difficult for young couples to ensure a stable life for themselves and their children. The attention parents give to their children plays an important role in the education of children and their age at marriage. The government should have policies and programs for improving the education of youth and the dissemination of knowledge about the adverse impacts of early marriage, especially for people in rural and remote areas with a high density of ethnic minorities.

Ageing index of Viet Nam's population has increased sharply for the last 35 years. Population projections indicate that the proportion of elderly people in Viet Nam will grow rapidly in the coming years. The country will face the challenge of population aging because many elderly people are economically dependent on others and have chronic diseases. Social insurance policies and health insurance programs should be developed and modified to adapt to an aging population. The government should have strategies and policies to ensure health care for a larger elderly population in the future. Raising the retirement age and better managing pension funds can be effective measures to ensure the affordability of insurance funds and ensuring social security for the elderly.

The issue of single elderly people also needs attention. Rural-urban migration of young people had led to an increasing number of elderly people living alone in rural areas. Households consisting of all dependent members and single elderly people tend to have low education levels and low living conditions. For these households, social pensions supporting the elderly as well as other types of supports for poor children and ethnic minorities are very important.

In addition, because there are differences in the age-sex structure of populations living in rural and urban areas and in different economic/geographic areas, and differences in the age-sex structure of ethnic groups, population policies must be designed according to the features of each population group.

ANNEXES

Annex 1. Adjustment of the age-sex structure data of the 2014 IPS population

A.1.1. The need to adjust the age-sex structure data of the population when making comparisons over time

Census subjects: the 2009 Population and Housing Census covered all Vietnamese regularly residing in the Socialist Republic of Viet Nam at the reference point of 0:00 on 1 April 2009, and Vietnamese citizens given permission by the authorities to travel overseas within the authorized period (GSO, 2010).

Subjects of the Population Change and Family Planning Surveys (PCFPS): the subjects of these surveys are all households and usual residents in the sample enumeration areas. The survey excludes those who live in areas governed exclusively by the military and police, but covers households who have military and police members (GSO, 2013).

Thus, the subject of the censuses are the entire population, while the subject of the PCFPS does not include people in areas under the management of the Defense Ministry and Ministry of Police. So it is clear that the age structure of the population in the PCFPS is not the same as the age structure of the entire population of Viet Nam. In the age structure of the PCFPS, the proportion of children aged 0-14 is higher than in the age structure of the entire population of the country, and the proportion of the population in the 15-64 year old is lower in the PCFPS, especially those in the age group 15-34 (as the majority of the population living in areas managed by the Ministry of Defense and Ministry of Police are in this age group).

The specific groups of people covered by the PCFPSs include:

1. People who live in nursing homes, orphanages, SOS villages, leprosariums, centers/schools/camps and other social facilities close to the boundaries of communes, wards, and townships managed directly under the Ministry Labour, Invalids and Social Affairs; patients living in leprosariums and mental hospitals, and people who are in drug addiction rehabilitation centers, etc.;
2. Students in special schools such as boarding schools, school learning, disability centers, as well as priests in convents, and monks or monks living in apartments associated with temples;
3. Students of vocational schools, secondary vocational schools, colleges, universities, and academies currently living as usual residents in hostels; and
4. Homeless people and those living on the surface of bodies of water such as rivers, as well as helpless patients in hospitals.

The 2014 IPS also does not include people under the management of the Ministry

of Defense and Ministry of Public Security, and the specific groups outlined above. To determine the differences in the age-sex structure between the entire population of Viet Nam and the population covered by the PCFPS, we can compare the census data and the PCFPS data.

Table A.1. Differences between the proportion of the population of selected age groups and the dependency ratio based on the entire population and extrapolated sample data, Viet Nam 1989-2009

	1989		1999		2009	
	Entire population	Extrapolated sample	Entire population	Extrapolated sample	Entire population	Extrapolated sample
Proportion						
0-14	39.0	40.0	33.2	33.5	24.5	25.0
15-64	56.3	55.5	61.1	60.7	69.1	68.4
65+	4.7	4.5	5.8	5.8	6.4	6.6
Total	100	100	100	100	100	100
Child dependency ratio	69.3	72.0	54.3	55.2	35.4	36.6
Elderly dependency ratio	8.4	8.2	9.4	9.6	9.3	9.7
Total dependency ratio	77.8	80.2	63.7	64.7	44.7	46.3

The data in Table A.1 shows that in all three population censuses (1989, 1999 and 2009) the proportion of the population aged 0-14 in the extrapolated sample population data are greater than the comprehensive data, while the proportion in the age group 15-64 is the opposite. When comparing comprehensive data and extrapolated sample population data by 5-year age groups, we can see a greater difference. When comparing the population of the smallest age group (0-4 years) in the Population and Housing Census of 2009 and in the extrapolated sample population data, the population from the extrapolated sample data is larger than the actual (overall score) by 425,000 people. The populations from the extrapolated sample data are smaller than the actual figures most for the groups aged 20-24, 15-19, 25-29 and 30-34. For the 20-24 age group, the figures in Table A.1 show that the extrapolated sample population is smaller than the actual population for this age group by more than a half million people (534,000). It is clear that the people registered by the Ministry of Defense and Ministry of Police in the population census are mainly in these age groups, particularly the 20-24 age group.

Table A.2. The difference in absolute numbers between comprehensive population data and the extrapolated sample population data by age group, Viet Nam, 1989-2009

Thousand people

	1989			1999			2009		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-4	-179	-81	-261	-63	-9	-72	-175	-70	-245
5-9	-139	-62	-202	-79	-11	-90	-113	-33	-147
10-14	-113	-46	-159	-78	-11	-90	-86	12	-74
15-19	11	-7	4	4	1	5	93	129	222
20-24	261	0	261	201	21	222	324	210	534
25-29	44	3	47	57	15	71	137	56	194
30-34	76	27	102	41	11	52	45	15	60
35-39	32	27	59	2	2	4	11	-11	0
40-44	14	17	31	-14	-1	-15	-21	-23	-44
45-49	-3	10	7	-13	-3	-16	-31	-8	-39
50-54	-8	12	4	-9	-2	-12	-60	-68	-129
55-59	-1	-8	-8	-9	-2	-11	-49	-17	-66
60-64	-17	-1	-18	-11	-3	-14	-36	-13	-49
65-69	-4	-11	-15	-12	-2	-14	-32	-11	-43
70-74	-10	2	-8	-8	-2	-10	-30	-15	-46
75-79	-9	2	-6	-5	-1	-7	-22	-8	-30
80+	45	116	160	-4	-1	-5	-25	-20	-45
Total	0	0	0	0	0	0	-71	125	54

To see the difference between the age-sex structure of the population obtained from the sample surveys such as the 2014 IPS and the actual population, a comparison was made between population age and sex data obtained in the 2009 Population and Housing Census and generalized data from the 2014 IPS (see Table A.3).

**Table A.3. Population by age and sex in the 2009 Population
and Housing Census and the 2014 IPS**

Thousand people

Age group	1/4/2009			1/4/2014		
	Male	Female	Total	Male	Female	Total
0-4	3663	3371	7034	3794	3417	7211
5-9	3458	3253	6711	3719	3425	7144
10-14	3725	3523	7248	3544	3338	6882
15-19	4578	4386	8964	3569	3406	6975
20-24	4254	4179	8433	4046	3951	7997
25-29	3905	3885	7790	3939	3881	7820
30-34	3463	3405	6868	3678	3762	7440
35-39	3298	3233	6531	3380	3433	6813
40-44	2968	2999	5967	3283	3288	6571
45-49	2642	2808	5450	2971	3062	6033
50-54	2082	2330	4412	2691	2965	5656
55-59	1364	1620	2984	2090	2400	4490
60-64	862	1076	1938	1373	1668	3041
65-69	653	901	1554	829	1082	1912
70-74	568	844	1412	599	860	1459
75-79	480	719	1199	476	756	1231
85+	449	900	1349	638	1181	1819
Total	42412	43432	85844	44619	45875	90493

According to the results of the 2009 Population and Housing Census, the number of males in the age group 0-4 on 1/4/2009 was 3,663,000. On 1/4/2014, five years later, these children were in the age group 5-9 and the total must have been less than 3,663,000 because some young people of this cohort would have died during the five years between the surveys. However, according to data from the 2014 IPS, on 1/4/2014 the number of males in the 5-9 age group had increased to 3,719,000, an increase of 5,000. On the other hand, according to the results of the 2009 census, the number of males in the 10-14 age group on 1/4/2009 was 3,725,000, yet by 1/4/2014, five years later, the number of these children – now in the 15-19 age group – was only 3,544,000. This implies that 281,000 of them had died during the previous five years. This is much higher than the actual number of deaths in this age cohort. Thus, to compare the age-sex structure between censuses and surveys (comparison over time), it is necessary to adjust the numbers for the subjects of censuses and surveys to make them more consistent.

A.1.2. Adjustment based on differences in the age-sex structure between comprehensive population data and extrapolated sample population data from censuses

Based on the average percentage difference between the population data obtained through sample surveys and comprehensive population data from the three population censuses in 1989, 2999 and 2009 for each age group, it is possible to adjust the population for these age groups obtained in the 2014 IPS with the following formula:

$${}_5P_x^{IPSdc} = {}_5P_x^{IPSS} \frac{{}_5P_x^{tbTD}}{{}_5P_x^{tbm}}$$

In which:

- ${}_5P_x^{IPSdc}$ = Population in age group x, x+5 from the 2014 IPS after adjusting;
- ${}_5P_x^{IPSS}$ = Extrapolated sample population in age group x, x+5 generalized in the 2014 IPS;
- ${}_5P_x^{tbm}$ = Average extrapolated sample population in age group x, x+5 in the 1989, 1999 and 2009 censuses;
- ${}_5P_x^{tbTD}$ = Comprehensive population in age group x, x+5 in the censuses of 1989, 1999 and 2009.

Tables A.4 and A.5 present the proportion of the population by 5-year age groups on 1/4/2014 before and after adjustment.

Table A.4. Proportion of population by 5-year age groups and sex on 1/04/2014 before and after adjustment

Age group	Proportion before adjustment			Proportion after adjustment		
	Male	Female	Total	Male	Female	Total
0-4	8,5	7,4	8,0	8,2	7,3	7,8
5-9	8,3	7,5	7,9	8,1	7,4	7,7
10-14	7,9	7,3	7,6	7,8	7,2	7,5
15-19	8,0	7,4	7,7	8,1	7,5	7,8
20-24	9,1	8,6	8,8	9,8	8,8	9,3
25-29	8,8	8,5	8,6	9,0	8,5	8,8
30-34	8,2	8,2	8,2	8,4	8,2	8,3
35-39	7,6	7,5	7,5	7,6	7,5	7,6
40-44	7,4	7,2	7,3	7,3	7,1	7,2
45-49	6,7	6,7	6,7	6,6	6,7	6,6
50-54	6,0	6,5	6,3	5,9	6,4	6,1
55-59	4,7	5,2	5,0	4,6	5,2	4,9
60-64	3,1	3,6	3,4	3,0	3,6	3,3
65-69	1,9	2,4	2,1	1,8	2,3	2,1
70-74	1,3	1,9	1,6	1,3	1,9	1,6
75-79	1,1	1,6	1,4	1,0	1,6	1,3
80+	1,4	2,6	2,0	1,5	2,7	2,1
Total	100	100	100	100	100	100

Table A.5. Proportion of population by 5-year age groups on 1/4/2014 before and after adjustment

Age group	Proportion before adjustment			Proportion after adjustment		
	Male	Female	Total	Male	Female	Total
0-4	4,2	3,8	8,0	4,0	3,7	7,8
5-9	4,1	3,8	7,9	4,0	3,7	7,7
10-14	3,9	3,7	7,6	3,8	3,7	7,5
15-19	3,9	3,8	7,7	4,0	3,8	7,8
20-24	4,5	4,4	8,8	4,8	4,5	9,3
25-29	4,4	4,3	8,6	4,5	4,3	8,8
30-34	4,1	4,2	8,2	4,1	4,2	8,3
35-39	3,7	3,8	7,5	3,8	3,8	7,6
40-44	3,6	3,6	7,3	3,6	3,6	7,2
45-49	3,3	3,4	6,7	3,2	3,4	6,6
50-54	3,0	3,3	6,3	2,9	3,2	6,1
55-59	2,3	2,7	5,0	2,3	2,6	4,9
60-64	1,5	1,8	3,4	1,5	1,8	3,3
65-69	0,9	1,2	2,1	0,9	1,2	2,1
70-74	0,7	1,0	1,6	0,6	0,9	1,6
75-79	0,5	0,8	1,4	0,5	0,8	1,3
80+	0,7	1,3	2,0	0,7	1,4	2,1
Total	49,3	50,7	100	49,3	50,7	100

A.1.3. Adjustment based on differences in the age-sex structure of the projected population and the age-sex structure obtained from the 2014 IPS

As is well known, the level of international migration has a negligible effect on a country's population. After five years, the population in the age groups from 5 years and over are only affected by mortality, while people in the 0-4 age group are affected by fertility (ASFR) and mortality of children under 5 years of age. Therefore, it is possible to use population projection data by component method to determine the change in population structure by age group.

After the end of the 2009 census, based on the results, the General Statistics Office conducted a population projection by component method. The results of this projection were announced in 2011 (GSO, 2011). The population Viet Nam on 1 April 2009 was 85,847,000 people, and on 1 April 2014 the population was projected to be 90,654,400. Thus, compared with the total population of 90,493,4000 obtained from the 2014 IPS, this projected total was higher by only 161,000. This difference is due to the difference between predicted fertility and mortality rates and actual fertility and mortality rates. However, the difference is very small, less than 0.2% of the population.

Table A.6. The difference between projected and extrapolated proportions of the population by age group, Viet Nam, 2014

Age group	Difference			Projected proportion		
	Male	Female	Total	Male	Female	Total
0-4	63	267	330	8.6	8.1	8.3
5-9	-83	-65	-148	8.1	7.4	7.7
10-14	-99	-91	-190	7.7	7.1	7.4
15-19	137	109	246	8.2	7.7	8.0
20-24	492	420	912	10.1	9.6	9.8
25-29	270	280	550	9.4	9.1	9.2
30-34	183	103	286	8.6	8.5	8.5
35-39	40	-48	-8	7.6	7.4	7.5
40-44	-33	-82	-115	7.2	7.0	7.1
45-49	-60	-99	-159	6.5	6.5	6.5
50-54	-124	-207	-331	5.7	6.0	5.9
55-59	-94	-132	-226	4.4	5.0	4.7
60-64	-92	-113	-205	2.9	3.4	3.1
65-69	-50	-79	-130	1.7	2.2	2.0
70-74	-43	-61	-104	1.2	1.7	1.5
75-79	-42	-76	-117	1.0	1.5	1.2
80+	-146	-287	-433	1.1	2.0	1.5
Total	319	-161	159	100	100	100

A.1.4. Adjustment based on the age-sex structure of the population collected by organizations in sectors managed under separate plans in the 1989 census

In the four population censuses that have been conducted in Viet Nam, only in the 1989 census was population data by sex and age published for the two categories of i)

the entire population and ii) the population without people in special groups. There are three special groups: people under the management of the Ministry of Defense, Ministry of Police and Ministry of Foreign Affairs. Using data on the total number and age-sex structure of the entire population minus the corresponding figures for the sectors of the population without the three special groups, it is possible to estimate the number and age-sex structure of the three special groups. It is then possible to project the size and structure of these special groups over time and add these groups to the people surveyed in the 2014 IPS. The drawback of this approach is that it is not possible to determine differences in the number and age-sex structure of the three special groups between 1989 and 2014.

A.1.5. Adjustment based on the age structure of the 2009 census and fertility and mortality in the five year period from 2009 to 2014

Under this method, the adjusted age-sex structure in 2014 is based on the age-sex structure of the 2009 census as well as fertility and mortality data collected in the five years from 2009 to 2014. This is a method commonly used by the United Nations and demographers to update population projections. It should be noted that this correction is only applied to the country's population and only used to analyze the changing age-sex structure over time. The results obtained in this way (performed by GSO) are presented in Table A.7.

Table A.7. Age-sex structure of the population adjusted by the combined method, Viet Nam, 2014

Age group	Proportion according to each sex			Proportion according to total population		
	Male	Female	Total	Male	Female	Total
0-4	8.89	7.77	8.33	4.38	3.94	8.33
5-9	8.18	7.33	7.75	4.03	3.72	7.75
10-14	7.71	7.08	7.39	3.80	3.59	7.39
15-19	8.17	7.59	7.87	4.03	3.85	7.87
20-24	10.03	9.45	9.73	4.94	4.79	9.73
25-29	9.33	9.01	9.17	4.60	4.57	9.17
30-34	8.53	8.37	8.45	4.21	4.25	8.45
35-39	7.52	7.33	7.42	3.71	3.71	7.42
40-44	7.11	6.94	7.02	3.51	3.52	7.02
45-49	6.35	6.42	6.39	3.13	3.26	6.39
50-54	5.51	5.97	5.74	2.72	3.03	5.74
55-59	4.23	4.92	4.58	2.09	2.49	4.58
60-64	2.74	3.35	3.05	1.35	1.70	3.05
65-69	1.89	2.33	2.11	0.93	1.18	2.11
70-74	1.34	1.88	1.61	0.66	0.95	1.61
75-79	1.07	1.65	1.36	0.53	0.84	1.36
80+	1.40	2.61	2.01	0.69	1.32	2.01
Total	100	100	100	49.31	50.69	100

The data in Table A.8 shows that age-sex indicators obtained by the combined method are more relevant than other methods. Therefore, analysis of the age-sex structure in Chapter 3 was based on data obtained using this method.

Table A.8. Population structure by age and dependency ratio, Viet Nam 1989-2014

	1989	1999	2009	2014
Proportion population under 15 years old	39.2	33.1	24.5	23.5
Proportion population 15-64 years old	56.1	61.1	69.1	69.4
Proportion population 65 years old and over	4.7	5.8	6.4	7.1
	100	100	100	100
Dependency ratio				
Child dependency ratio	69.8	54.2	35.4	33.8
Elderly dependency ratio (65+)	8.4	9.4	9.3	10.2
Total dependency ratio	78.2	63.6	44.7	44

Annex 2. Regression method

Association between two variables does not mean causality. For example, the school enrollment rate in urban areas is higher than in rural areas. This can be because the access to school and education is better in urban areas. Another reason might be that urban households have higher incomes than rural households. To understand the factors affecting the welfare of individuals, regression analysis was used. Regression analysis provides an understanding of the effect of one explanatory variable on a dependent variable after controlling for other explanatory variables.

In this study, the logistic regression model was used, which is applied to binary variables (Green, 2011). The model is as follows:

$$y_j = \alpha + HEAD_j y + HOUSEHOLD_j \delta + \varepsilon_j, (P.1)$$

where y_j is a dummy variable, for example, school enrolment of individual i in household j . $INDIVIDUAL_{i,j}$ is the vector of individual characteristics, $HEAD_j y$ represents characteristics of the household head such as age and sex, $HOUSEHOLD_j$ represents variables of households such as household size and proportion of children and elderly in households, and ε_j is unobserved variables.

The logistic function is as follows:

$$P(y_{i,j} = 1|X) = F(\beta_0 + INDIVIDUAL_{i,j}\beta_1 + HEAD_j\beta_2 + HOUSEHOLD_j\beta_3), (P.2)$$

where $X\beta$ denote $\beta_0 + INDIVIDUAL_{i,j}\beta_1 + HEAD_j\beta_2 + HOUSEHOLD_j\beta_3$

Since the logistic function is non-linear, the coefficient of explanatory variables in the logistic function does not have clear economic meaning. To interpret the meaning of the coefficient, the marginal effect of explanatory variables was computed as follows:

$$P(y_{i,j} = 1|X) = F(X\beta) = \frac{e^{X\beta}}{1 + e^{X\beta}} (P.3)$$

Marginal effects change across the values of X . Thus, the marginal effect at the mean of X was computed as:

$$MF\bar{X} = \frac{\partial P(y_{i,j}=1|X)}{\partial X} = \frac{\partial F(X\beta)}{\partial X} \beta = \frac{e^{X\beta}}{1 + e^{X\beta}} \left(1 - \frac{e^{X\beta}}{1 + e^{X\beta}}\right) \beta (P.4)$$

where \bar{X} is the mean of X , and $\hat{\beta}$ is the estimates of β in the model (P.1). The marginal effect is explained as follows: if X changes by ΔX , y will change by $\overline{MF\bar{X}} \Delta X$. In this report, the marginal effects are presented.

It should be noted that a key assumption of the regression model is that the explanatory variables are not correlated with unobserved variables. Measuring the causal impact of an explanatory variable such as parental education on children's school attendance is a major challenge. The ability and/or health of parents can influence their own education, and can also affect their children through channels other than education. In the regression model variables like intelligence or health are often not measured and included in the model. The estimation of education will be biased. To be able to explain the causal impact of explanatory variables on outcome variables, the explanatory variables must be exogenous. This is a strong assumption, and therefore the explanation of the regression used here is careful when talking about causal effects. The regression coefficient of an explanatory variable can be interpreted as a correlation between the explanatory variable and the outcome variable after controlling for other explanatory variables in the model.

Annex 3. Additional Tables

Table A.9. Projected population for different age groups by province, Viet Nam, 2014

Provinces, cities	All people	Age 0-14	Age 15-64	Age 60+	Age 65+	Aging index (60+)
TP Ha Noi	7067456	1642199	4856604	831619	568652	50.6
Ha Giang	786564	248105	498643	55195	39815	22.2
Cao Bang	519548	129345	353154	49561	37050	38.3
Bac Can	307027	70096	217972	26718	18959	38.1
Tuyen Quang	751580	190236	514316	67806	47028	35.6
Lao Cai	663037	196871	436344	43852	29821	22.3
Dien Bien	536069	185061	327822	31606	23186	17.1
Lai Chau	413420	150645	248283	21030	14492	14.0
Son La	1162376	358874	749810	73690	53692	20.5
Yen Bai	780611	210305	519663	71765	50643	34.1
Hoa Binh	815907	194276	572054	72448	49577	37.3
Thai Nguyen	1168707	268782	813474	128498	86451	47.8
Lang Son	752241	174641	531184	67049	46417	38.4
Quang Ninh	1196763	279952	826812	130808	89999	46.7
Bac Giang	1619327	385776	1122706	161657	110845	41.9
Phu Tho	1357134	315283	926719	163876	115133	52.0
Vinh Phuc	1038420	256479	699848	114349	82092	44.6
Bac Ninh	1124342	282371	753475	125709	88496	44.5
Hai Duong	1760148	366529	1226600	238420	167020	65.0
Hai Phong	1941084	432638	1344513	242618	163933	56.1
Hung Yen	1156200	255197	790381	152242	110622	59.7
Thai Binh	1788426	360490	1214945	306918	212991	85.1
Ha Nam	798572	174814	546064	109366	77694	62.6
Nam Dinh	1845388	418153	1247423	269153	179812	64.4
Ninh Binh	932806	210409	629619	135747	92778	64.5
Thanh Hoa	3491079	761341	2428829	436714	300909	57.4
Nghe An	3020407	703718	2089606	335455	227082	47.7
Ha Tinh	1254035	309754	810137	188841	134144	61.0
Quang Binh	866626	217023	579199	97832	70404	45.1
Quang Tri	615387	168320	391450	75533	55617	44.9

Provinces, cities	All people	Age 0-14	Age 15-64	Age 60+	Age 65+	Aging index (60+)
Thua Thien - Hue	1130101	271748	758618	136626	99735	50.3
Da Nang	1004313	237141	704275	91211	62897	38.5
Quang Nam	1469426	338149	994834	185537	136443	54.9
Quang Ngai	1239824	275781	844221	161692	119823	58.6
Binh Dinh	1513350	364371	1015110	186809	133869	51.3
Phu Yen	885630	213130	604262	96773	68238	45.4
Khanh Hoa	1196403	274348	838389	117620	83667	42.9
Ninh Thuan	589050	158121	398096	48798	32834	30.9
Binh Thuan	1206804	288491	846055	108033	72257	37.4
Kon Tum	481549	158551	302746	29727	20252	18.7
Gia lai	1373704	429323	885960	89001	58421	20.7
Dac Lac	1828823	495990	1245695	129075	87137	26.0
Dac Nong	564380	180373	365555	29890	18452	16.6
Lam Dong	1256104	334815	855166	99891	66123	29.8
Binh Phuoc	929641	256403	631397	66148	41841	25.8
Tay Ninh	1103207	240514	793913	106367	68780	44.2
Binh Duong	1855788	377391	1419208	93434	59189	24.8
Dong Nai	2822705	636084	2034494	228421	152127	35.9
Ba Ria-Vung Tau	1054730	251785	746737	86067	56208	34.2
T.P Ho Chi Minh	7955282	1582298	5927107	692282	445877	43.8
Long An	1475404	328624	1042949	157963	103831	48.1
Tien Giang	1712201	381506	1202161	191585	128534	50.2
Ben Tre	1262051	267473	885527	161491	109050	60.4
Tra Vinh	1028550	234280	724075	112883	70195	48.2
Vinh Long	1041175	223014	738088	125475	80073	56.3
Dong Thap	1681112	372438	1194818	176874	113857	47.5
An Giang	2155381	509432	1498671	223718	147279	43.9
Kien Giang	1742935	427855	1214970	160434	100110	37.5
Can Tho	1235450	267198	889301	122511	78951	45.9
Hau Giang	767913	163656	553549	81548	50708	49.8
Soc Trang	1307186	300971	924752	131422	81463	43.7
Bac Lieu	876418	188018	633290	89010	55109	47.3
Ca Mau	1216076	289890	853199	117851	72986	40.7
Whole country	90493352	21236846	62834837	9462236	6421670	44.6

Table A.10. Proportion of households with all dependent members, by sex of head of household, rural/urban areas, and province, Viet Nam, 2014

Provinces and cities	Male-headed households	Female-headed households	Urban	Rural	All Viet Nam
TP Ha Noi	3.84	9.14	4.87	5.98	5.42
Ha Giang	1.02	4.30	3.23	1.08	1.49
Cao Bang	1.80	7.14	4.76	2.39	2.99
Bac Can	1.25	3.49	2.44	1.51	1.68
Tuyen Quang	2.21	7.41	7.40	2.62	3.29
Lao Cai	1.36	5.85	4.23	1.51	2.25
Dien Bien	1.60	4.30	3.67	1.72	2.10
Lai Chau	0.89	4.60	2.65	1.10	1.44
Son La	1.20	5.22	4.68	1.33	1.90
Yen Bai	2.75	9.97	7.86	3.25	4.35
Hoa Binh	1.83	5.96	5.09	2.13	2.64
Thai Nguyen	2.95	7.39	5.15	4.04	4.39
Lang Son	1.52	5.43	3.08	1.98	2.21
Quang Ninh	5.02	11.07	6.23	7.31	6.63
Bac Giang	3.55	10.99	5.21	5.00	5.03
Phu Tho	4.64	13.66	6.15	7.18	7.00
Vinh Phuc	4.29	12.43	4.99	6.78	6.32
Bac Ninh	4.63	15.16	4.69	7.99	7.08
Hai Duong	7.82	22.51	7.85	12.54	11.44
Hai Phong	5.70	14.38	5.72	10.34	8.24
Hung Yen	7.98	25.85	9.44	12.62	12.22
Thai Binh	9.65	30.56	10.54	15.33	14.88
Ha Nam	8.32	27.59	10.33	13.87	13.33
Nam Dinh	7.83	28.16	9.28	12.83	12.20
Ninh Binh	7.97	24.66	8.76	12.42	11.70
Thanh Hoa	5.12	15.58	6.47	7.69	7.52
Nghe An	4.49	13.27	4.91	6.83	6.50
Ha Tinh	9.32	25.66	8.99	14.14	13.34
Quang Binh	5.98	14.73	4.21	9.36	8.28
Quang Tri	4.69	12.68	3.92	8.10	6.87
Thua Thien - Hue	5.38	15.62	5.48	10.81	8.19

Provinces and cities	Male-headed households	Female-headed households	Urban	Rural	All Viet Nam
Da Nang	2.80	4.71	2.55	9.66	3.48
Quang Nam	5.77	19.29	6.39	10.48	9.71
Quang Ngai	6.42	19.56	6.33	10.48	9.83
Binh Dinh	5.61	15.63	5.40	9.66	8.36
Phu Yen	5.05	17.08	6.90	8.34	7.93
Khanh Hoa	2.88	6.83	4.14	4.13	4.13
Ninh Thuan	2.72	8.92	4.22	4.79	4.58
Binh Thuan	2.75	8.20	4.19	4.43	4.33
Kon Tum	2.19	6.16	2.96	3.25	3.15
Gia lai	1.57	4.87	2.39	2.24	2.29
Dac Lac	2.01	6.33	2.87	2.89	2.88
Dac Nong	1.49	5.45	2.39	2.04	2.10
Lam Dong	2.62	5.78	4.10	2.98	3.45
Binh Phuoc	1.72	5.39	2.49	2.64	2.61
Tay Ninh	2.03	5.74	3.10	3.20	3.18
Binh Duong	1.00	2.14	1.04	2.92	1.42
Dong Nai	2.19	5.17	1.99	3.60	3.08
Ba Ria-Vung Tau	2.23	4.65	2.32	3.71	3.00
T.P Ho Chi Minh	1.28	2.46	1.75	1.88	1.77
Long An	2.31	6.58	2.77	3.87	3.67
Tien Giang	2.40	7.27	3.43	4.17	4.05
Ben Tre	3.15	10.05	4.43	5.43	5.33
Tra Vinh	2.37	7.86	3.86	4.04	4.01
Vinh Long	2.76	7.60	3.44	4.44	4.26
Dong Thap	1.94	5.91	2.33	3.25	3.07
An Giang	2.00	6.45	2.79	3.44	3.24
Kien Giang	2.07	4.97	1.93	3.23	2.89
Can Tho	1.89	4.52	2.57	2.98	2.71
Hau Giang	1.92	7.82	2.93	3.59	3.43
Soc Trang	2.16	6.87	2.53	3.81	3.41
Bac Lieu	1.96	5.53	2.51	3.02	2.88
Ca Mau	1.60	4.13	1.72	2.29	2.15
Whole country	3.73	9.94	3.75	6.34	5.46

Table A.11. Household size by province and urban/rural area, Viet Nam, 2014

Provinces and cities	Urban	Rural	All Viet Nam
TP Ha Noi	3.65	3.91	3.78
Ha Giang	3.52	4.70	4.48
Cao Bang	3.20	4.22	3.96
Bac Can	3.36	3.99	3.87
Tuyen Quang	3.30	3.88	3.80
Lao Cai	3.38	4.51	4.20
Dien Bien	3.27	4.79	4.49
Lai Chau	3.58	5.01	4.69
Son La	3.46	4.52	4.34
Yen Bai	3.29	4.04	3.86
Hoa Binh	3.36	4.08	3.96
Thai Nguyen	3.13	3.70	3.52
Lang Son	3.60	4.05	3.95
Quang Ninh	3.56	3.73	3.62
Bac Giang	3.60	3.87	3.84
Phu Tho	3.48	3.61	3.59
Vinh Phuc	3.41	3.90	3.78
Bac Ninh	3.70	3.67	3.68
Hai Duong	3.23	3.34	3.31
Hai Phong	3.49	3.38	3.43
Hung Yen	3.26	3.43	3.41
Thai Binh	3.25	3.11	3.12
Ha Nam	3.46	3.36	3.37
Nam Dinh	3.14	3.19	3.18
Ninh Binh	3.34	3.36	3.35
Thanh Hoa	3.45	3.79	3.74
Nghe An	3.53	4.03	3.94
Ha Tinh	3.40	3.36	3.37
Quang Binh	3.61	3.75	3.72
Quang Tri	3.77	3.85	3.83
Thua Thien - Hue	3.81	3.89	3.85
Da Nang	4.05	3.91	4.03

Provinces and cities	Urban	Rural	All Viet Nam
Quang Nam	3.76	3.72	3.73
Quang Ngai	3.63	3.63	3.63
Binh Dinh	3.58	3.58	3.58
Phu Yen	3.52	3.59	3.57
Khanh Hoa	3.84	3.95	3.90
Ninh Thuan	3.81	4.10	3.99
Binh Thuan	3.90	4.03	3.97
Kon Tum	3.75	4.27	4.09
Gia lai	3.87	4.41	4.23
Dac Lac	3.79	4.19	4.08
Dac Nong	3.68	4.13	4.06
Lam Dong	3.55	3.94	3.77
Binh Phuoc	3.62	3.90	3.84
Tay Ninh	3.66	3.68	3.68
Binh Duong	2.93	3.47	3.04
Dong Nai	3.79	3.81	3.80
Ba Ria-Vung Tau	3.68	3.74	3.71
T.P Ho Chi Minh	3.85	3.72	3.83
Long An	3.58	3.74	3.71
Tien Giang	3.47	3.63	3.60
Ben Tre	3.27	3.34	3.33
Tra Vinh	3.49	3.72	3.68
Vinh Long	3.27	3.59	3.53
Dong Thap	3.56	3.87	3.81
An Giang	3.83	3.88	3.87
Kien Giang	4.06	3.94	3.97
Can Tho	3.80	3.96	3.85
Hau Giang	3.88	3.93	3.91
Soc Trang	4.01	3.96	3.98
Bac Lieu	4.02	4.21	4.15
Ca Mau	3.91	4.06	4.02
Whole country	3.64	3.78	3.73

Table A.12. Explanatory variables used in regressions

Explanatory variables	Type	Mean	Standard deviation	Min	Max
<i>Individual-level variables</i>					
Male (male=1, female=0)	Binary	0.4927	0.4999	0	1
Age	Discrete	32.225	20.798	0	110
Religion (yes=1, no=0)	Binary	0.1741	0.3792	0	1
Migrated in the past 5 years (yes=1, no=0)	Binary	0.0661	0.2485	0	1
Kinh	Binary	0.8571	0.3499	0	1
Tay	Binary	0.0200	0.1399	0	1
Thai	Binary	0.0181	0.1335	0	1
Muong	Binary	0.0150	0.1214	0	1
Khmer	Binary	0.0134	0.1150	0	1
Nung	Binary	0.0113	0.1059	0	1
Mong	Binary	0.0137	0.1164	0	1
Other ethnic minorities	Binary	0.0513	0.2206	0	1
Have no education degree	Binary	0.3131	0.4638	0	1
Have primary degree	Binary	0.2302	0.4209	0	1
Have lower-secondary degree	Binary	0.2294	0.4205	0	1
Have upper-secondary degree	Binary	0.1544	0.3613	0	1
Have college, university	Binary	0.0729	0.2600	0	1
Urban (urban=1, rural=0)	Binary	0.3284	0.4696	0	1
Northern Midlands and Mountains	Binary	0.1286	0.3347	0	1
Red River Delta	Binary	0.2282	0.4197	0	1
North and South Central Coast	Binary	0.2153	0.4110	0	1
Central Highlands	Binary	0.0608	0.2390	0	1
Southeast	Binary	0.1737	0.3789	0	1
Mekong River Delta	Binary	0.1934	0.3950	0	1
Gender household head (male=1, female=0)	Binary	0.7629	0.4253	0	1

Explanatory variables	Type	Mean	Standard deviation	Min	Max
Age of household heads	Discrete	49.104	14.268	15	108
Household head have no education degree	Binary	0.2122	0.4089	0	1
Household head have primary degree	Binary	0.2634	0.4405	0	1
Household head have lower-secondary degree	Binary	0.2849	0.4514	0	1
Household head have upper-secondary degree	Binary	0.1622	0.3686	0	1
Household head have college, university	Binary	0.0774	0.2672	0	1
Household head married	Binary	0.8365	0.3698	0	1
Household head widowed	Binary	0.1147	0.3187	0	1
Household head divorced/separated	Binary	0.0209	0.1430	0	1
Household size	Discrete	4.4377	1.7578	1	33
Proportion of children	Continuous	0.2536	0.2039	0	1
Proportion of elderly	Continuous	0.1053	0.2132	0	1
Observations		1342072			
<i>Variables of Parents</i>	Binary				
One of parents migrated	Binary	0.0222	0.1473	0	1
One of parents dead	Binary	0.1010	0.3013	0	1
Divorced or separated parents	Binary	0.0254	0.1573	0	1
Parents of the same ethnic group	Binary	0.1270	0.3330	0	1
Parents are Kinh and ethnic minorities	Binary	0.0210	0.1434	0	1
Parents are both Kinh	Binary	0.7036	0.4567	0	1
Parents are of different ethnic minorities	Binary	0.0059	0.0764	0	1
Observations		504177			

Table A.13. Logistic regression of illiteracy of children and youth, Viet Nam, 2014

Explanatory variables	Illiterate (Age 7-15) (Illiterate =1, Literate=0)		Illiterate (Age 16-30) (Illiterate =1, Literate=0)	
	Marginal effect	Standard error	Marginal effect	Standard error
Male (male=1, female=0)	0.00115***	0.00043	-0.00305***	0.00042
Age	-0.01453***	0.00073	0.00161***	0.00039
Age squared	0.00063***	0.00003	-0.00002**	0.00001
Religion (yes=1, no=0)	-0.00156**	0.00074	0.00164**	0.00073
Migrated in the past 5 years (yes=1, no=0)	0.00411**	0.00185	-0.00484***	0.00055
Other ethnic minorities	Reference			
Kinh	-0.02546***	0.00281	-0.05162***	0.00349
Tay	-0.00588***	0.00069	-0.01065***	0.00039
Thai	-0.00452***	0.00088	-0.00282***	0.00103
Muong	-0.00805***	0.00063	-0.01041***	0.00042
Khmer	-0.00476***	0.00104	-0.00373***	0.00099
Nung	-0.00704***	0.00061	-0.00868***	0.00061
Mong	0.01826***	0.00372	0.03131***	0.00479
Urban (urban=1, rural=0)	-0.00217***	0.00064	-0.00407***	0.00059
Northern Midlands and Mountains	Reference			
Red River Delta	-0.00185*	0.00104	-0.00908***	0.00072
North and South Central Coast	0.00278**	0.00114	-0.00230**	0.00101
Central Highlands	0.00743***	0.00199	-0.00124	0.00121
Southeast	0.00187	0.00150	-0.00367***	0.00098
Mekong River Delta	0.01063***	0.00200	0.00593***	0.00143
Household size	0.00123***	0.00013	0.00042***	0.00009
Proportion of children	0.00935***	0.00180	0.01405***	0.00114
Proportion of elderly	0.00244	0.00225	0.00806***	0.00136
Observations	190,387		332,757	
R-squared	0.124		0.206	

Note: *** statistically significant at 1%; ** at 5%; and * at 1%

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