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Demand and Supply of Long-term Care for Older Persons in Asia

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Abbreviations and Acronyms

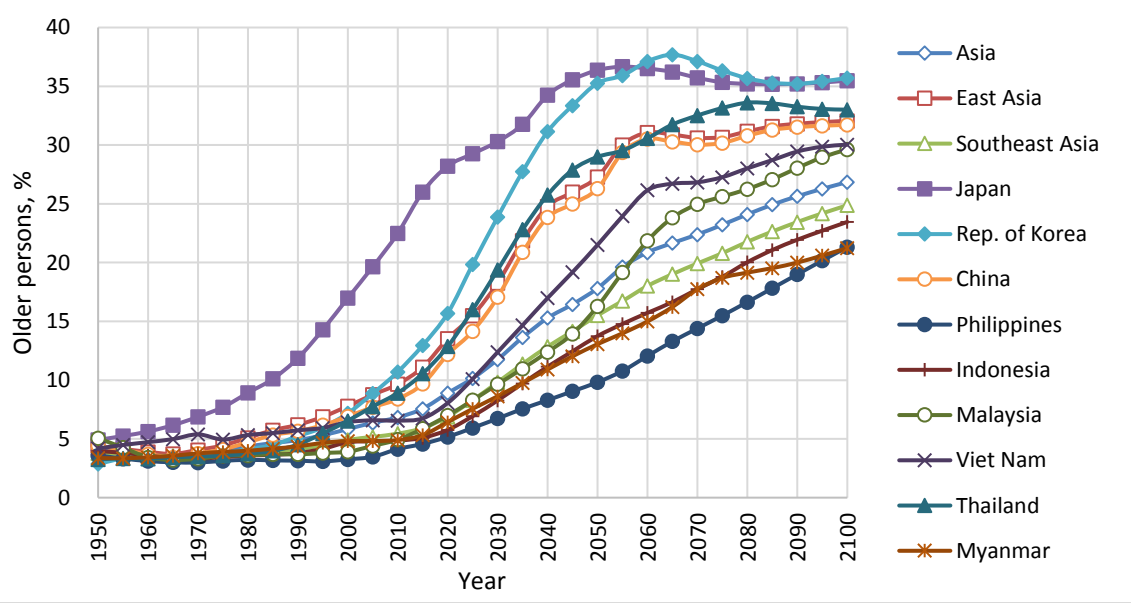
ADL	Activities of Daily Living
IPSS	National Institute of Population and Social Security Research
OECD	Organisation for Economic Co-operation and Development
MHLW	Ministry of Health, Labour and Welfare, Japan
WHO	World Health Organization
UN	United Nations
UNFPA	United Nations Population Fund

Chapter 1

Introduction

Asia is ageing. The proportion of older persons, defined throughout this report as those 65 years old and over, are increasing in all Asian countries (Figure 1.1). The number of older persons in Asia will double within 20 years from 2015, except for Japan (Figure 1.2). How to sustain active ageing[1] is a policy priority but inevitably the burden of long-term care for older persons will increase. The need is urgent, as the speed of ageing in Asia is much quicker than in Europe and Northern America (Figure 1.3). Japan used to be the outlier in the speed of ageing, which took only 24 years for the proportion of older persons to increase from 7% to 14%. However, now the speed of ageing in emerging countries is even quicker: in the Republic of Korea, it is 18 years; Thailand, 20 years; China, 23 years; and Viet Nam, 18 years. Since population ageing proceeds simultaneously with economic development, the former poses challenges to coping with the increasing cost of social security, such as pension or health insurance. The change in family values as well as strong internal and international migration leaves aged parents behind and alone. This will make family care more difficult and increase the demand for social care offered by the community and the government.

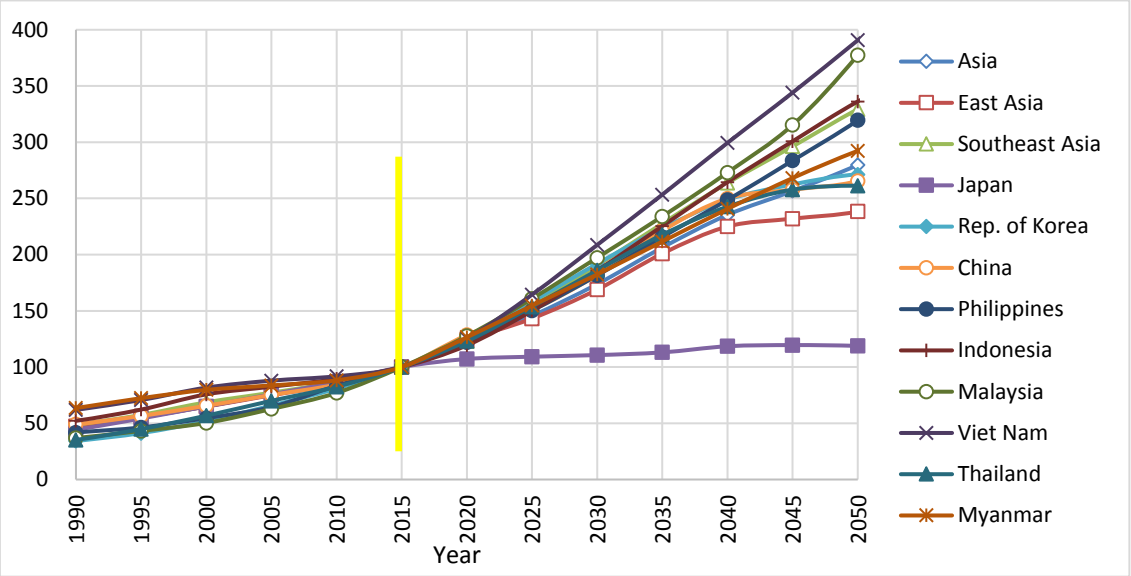
Figure 1.1: The Proportion of Older Persons in Asia



Source: United Nations (2017a), compiled by Authors.

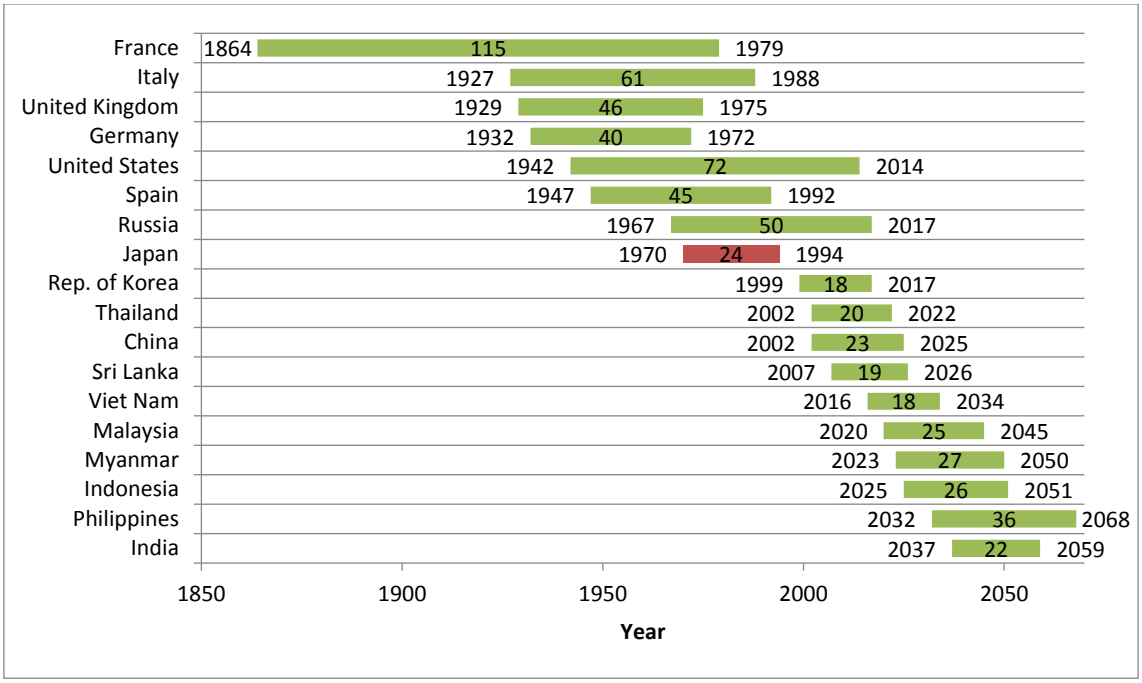
[1] Active ageing is a concept that delaying retirement and engaging in activities as in the younger age would fulfil the life of older persons based on the activity theory first framed by Havighurst (1961).

Figure 1.2: Relative Increase in the Number of Older Persons in Asia (2015 = 100)



Source: UN (2017a), compiled by Authors.

Figure 1.3: Speed of Ageing (Number of Years for the Proportion of Older Persons to Increase from 7% to 14%)



Source: UN (2017a), compiled by Authors.

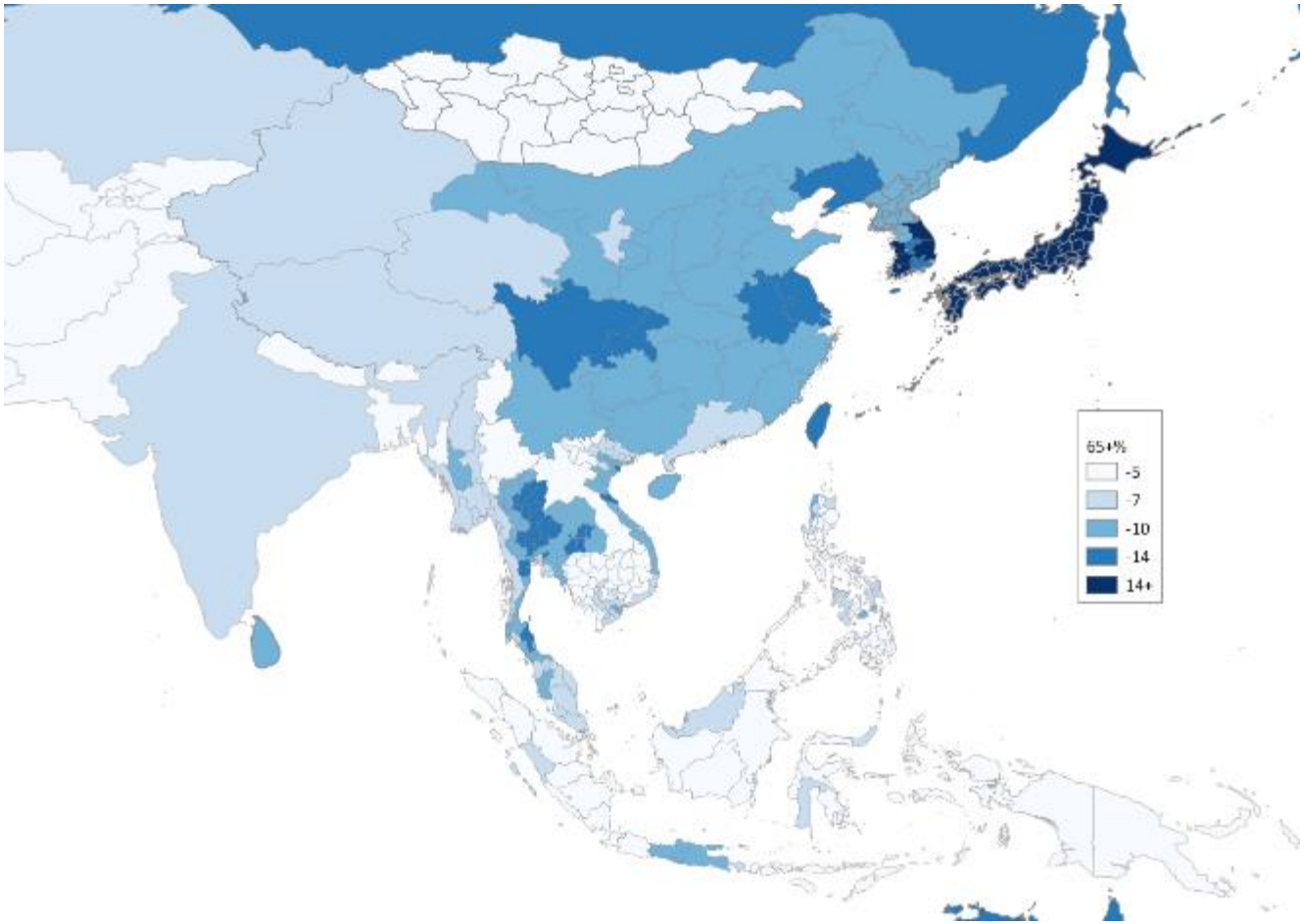
Considering these contexts, this research project focuses on the present status and future trend of demand and supply of long-term care for older persons in Asia, notably in East and Southeast Asia, particularly the Republic of Korea, China, Philippines, Indonesia, Malaysia, Viet Nam,

Thailand, and Myanmar. Demand is measured by the number of older persons who need care and their living arrangement, notably those living alone. Supply is measured by the people who provide long-term care and long-term care facilities. The macro-level data, mainly based on the population census, is compared among countries.

Along with national level measurement and international comparison, this research also addresses the importance of subnational difference. This is important as the size of countries vary. Comparing China of 1.4 billion people with Japan of 128 million or Thailand of 69 million might give a wrong conclusion. Also, it is important to observe the subnational level due to internal migration where some rural areas experience severe depopulation of the youth, thus resulting in a high proportion of older persons, much higher than the national average (Figure 1.4). For example, in countries with a lower proportion of older persons, there are some provincial 'pockets' with a much higher ageing rate, such as Chongqing in China (11.7% in 2010), Chai Nat in Thailand (13.7% in 2010), or Thai Binh in Viet Nam (10.5% in 2009). Also, because of cultural diversity in Asia, ageing issues might vary according to the ethnic or religious groups within a country (Box 1).

As stated in paragraph 27 of the Chairman's Statement of the 20th ASEAN Plus Three Commemorative Summit (ASEAN, 2017), the ASEAN region has various ageing-related challenges which should be solved through bilateral and regional cooperation. This research tries to push forward this recommendation and aims to provide the information base for the Asia Health and Wellbeing Initiative.

Figure 1.4: Proportion of Older Persons, National and Subnational Levels, around 2010

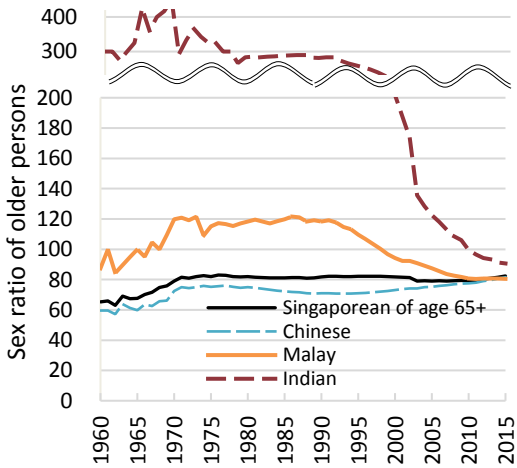


Note: The map was created using QGIS (https://www.qgis.org). Subnational boundary data is by gadm.org.
Sources: Population census data of Cambodia (2008), Indonesia (2010), Philippines (2010), Viet Nam (2009) through IPUMS International; China (2010), Japan (2010), North Korea (2014), Mongolia (2010), Malaysia (2010), Myanmar (2014), South Korea (2010), Thailand (2010) through each Statistics Bureau. Country-level data by the UN (2017). Compiled by Authors.

Box 1: Sex Ratios of Population of Older Persons in Singapore, by Ethnic Group

Total fertility rates (TFRs) of three major ethnic groups, namely, Chinese, Malays and Indians in Singapore became less than 2.0 by 1977. While Malay TFR maintained the replacement level from 1980 to the early 2000s, the TFRs of Chinese and Indians did not recover to achieve the replacement level and further declined since 1990s to the historical low level of 1.0 in 2017 (Statistics Singapore, 2019). Forty years of below-replacement fertility has been decaying the age structure of Singapore's population. The proportion of older persons were 2.3% nationally in 1960 and increased to 13.7% in 2018. By ethnic groups, they were 2.6% for Chinese, 1.3% for Malays, and 0.9% for Indians then increased to 15.5%, 9.1%, and 8.9%, respectively, in 2018. Singapore is facing a fundamental change in her intergenerational care system for older persons

Throughout the years, the older population structure went through a drastic change in terms of gender balance. The sex ratio (males per 100 females) of the older population of Chinese increased from 60 in 1960 to around 75 in the 1970s, then stayed at around 70–80 until 2015. As for Malays, the sex ratio recorded 120 from the 1970s to the 1980s, then decreased in the 1990s and reached around 80 in the 2010s. Indian sex ratio was 200–400 before the year 2000 then began to decline and settled at around 90 by 2015. Malay and Indian sex ratios drastically declined because of imbalances in sex ratios of cohort born before 1925–1930 (age 85–89 years and over in 2015) who immigrated before the establishment of the Republic of Singapore. Since sex ratios of cohort born after 1930 fit in the range of regular sex ratios at birth (100–110), the sex ratios of elderly population of all ethnicities are expected to stay around the same level.



In 1960s–1990s, the sex ratios of elderly population in Singapore were high, especially for Indians and Malays, which would imply a higher prevalence of lone elderly males without the spouse, thus, causing serious caregiving issues for them. After the 2010s, this gender balance irregularities would cease. Older population structure reflects their life history, and long-term care system should consider these facts.

Note: Data prior to 1980 refer total population which include foreigners, while data from 1980 onwards refer to Singapore residents which are composed of citizens and permanent residents.
Source: Singapore Census of Population (1970) and SingStat Table Builder, https://www.tablebuilder.singstat.gov.sg/. Department of Statistics Singapore. Compiled by Authors.

Chapter 2

Demand of Long-term Care: Care Need

1. Measurement of Care Need

How many older persons in the region need long-term care? To answer this question, one has to define 'long-term care', as it ranges from emotional care for those living alone to daily assistance of the bedridden. To assess the level of care need, functioning, independence or disability, various methods and indicators have been proposed. In addition to 'Activities of Daily Living' (ADL), which is a standardised measure of biological and psychosocial functions developed since the end of 1950s (Katz et al., 1963), one can cite, among others, 'instrumental Activities of Daily Living' (iADL) (Lawton and Brody, 1969), 'International Classification of Functioning' (ICF) (WHO, 2001) and WHO-Disability Assessment Schedule (WHO-DAS) (WHO, 2010), Washington Group on Disability Statistics (UN, 2014), or Global Activity Limitation Indicator (GALI) (Berger et al., 2015). These measurements are used to assess the condition of each individual and the results can be used to plan for care or rehabilitation. Or they can be incorporated into survey questionnaires to produce statistics. For example, the United Nations (UN) recommend disability questions to be incorporated in the population census as a core question (UN, 1997) and population level disability – hence, the level of care and assistance – can be measured if a country follows this UN recommendation.

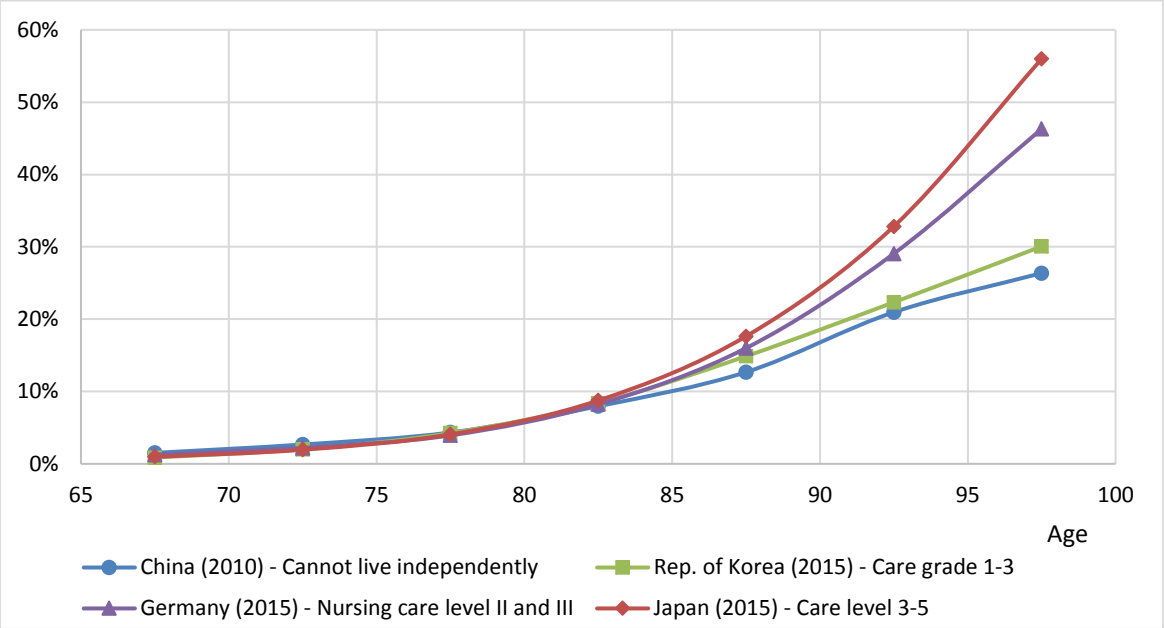
On the other hand, the statistics on care need can be obtained from administrative data. Public, hence universal, long-term care insurance started in Germany (in 1995), Japan (in 2000), and the Republic of Korea (in 2008), and the number of recipients is a direct measurement of the care needs in each country, assuming the insurance system covers all. The long-term care covered by the insurance system ranges from preventive services such as help in housework (cleaning, preparing food); in daily activities (helping change clothes, walking); intensive assistance (help in toileting, suctioning sputum for the bedridden); or watching over persons with dementia.

Using these measurement and data, care needs can be assessed.

2. Estimation of Care Needs

In this chapter, long-term care need is defined as the need for intensive assistance, due to the relative clarity of the definition and the high degree of necessity which should be assisted by social welfare services. The corresponding criteria can be roughly determined as care level 3–5 in Japan's long-term care insurance, care grade 1–3 in the Republic of Korea's long-term care insurance, nursing care level (*Pflegestufe*) II and III in Germany's long-term care insurance, and persons who answered 'cannot live independently' to the question of 'autonomy of daily living' in China's 2010 census.

Figure 2.1: Care Need Rate, by Age

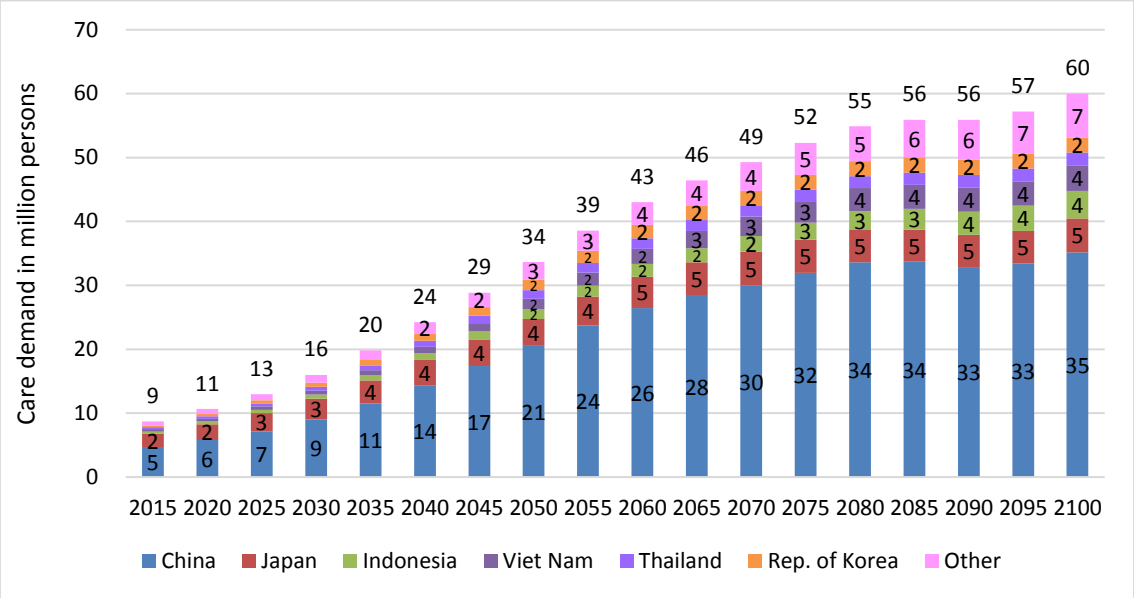


Sources:
China – Population Census 2010. Compiled by Authors.
Republic of Korea – National Health Insurance Service, Long-term Care Insurance Statistics 2015. Special Tabulation by Authors.
Germany – Nursing Care Statistics, Federal Statistical Office.
Japan –Survey of Long-term Care Benefit Expenditures, October 2015, Ministry of Health, Labour and Welfare.
Data is shown in Annex 1, Table 1.

Figure 2.1 shows the proportion of older persons who need long-term care (referred to as 'care need rate'). This is almost identical to age groups 65–69, 70–74, 75–79, 80–84 years in four countries and the rates are 1%, 2%, 4%, and 8% in the respective age groups. For the older age groups 85–89, 90–94, and 95+, the proportions in the four countries differ and are roughly related to the level of life expectancy (Annex 1). Applying this common trend in the four countries to the other countries in the region, we estimated care need in terms of the number of older persons who need long-term care.

Altogether in East and Southeast Asia, 8.7 million was placed under care need in 2015, more than half of them are in China (4.7 million) and a quarter in Japan (2.0 million). Care need in the remaining countries is still limited. However, within 20 years, from 2015 to 2035, care need will more than double to 19.8 million in the region. The increase is notably quick in Brunei (2.71 times more in 2030 than in 2015), Singapore (2.64 times), China Macao (2.53 times), the Republic of Korea (2.36 times), Malaysia (2.24 times), Cambodia (2.03 times), and Thailand (2.03 times). By 2050, regional care need will increase to 33.6 million, and will reach 60.0 million 2100.

Figure 2.2: Estimates of Care Need in East and Southeast Asia (in million older persons)



Source: Estimated by Authors.

Table 2.1: Estimates of Care Need in East and Southeast Asia (in 1,000 older persons)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
China*	4,715	5,811	7,155	9,013	11,498	14,380	17,383	20,511	23,738	26,462	28,338	29,939	31,969	33,615	33,713	32,870	33,385	35,182
Japan	2,031	2,443	2,845	3,238	3,636	3,965	4,130	4,232	4,493	4,909	5,254	5,328	5,170	5,040	4,986	5,036	5,155	5,297
Indonesia	384	446	537	665	834	1,038	1,264	1,504	1,743	1,979	2,213	2,450	2,695	2,967	3,270	3,599	3,942	4,288
Viet Nam	363	425	504	614	770	1,002	1,310	1,665	2,020	2,364	2,699	3,037	3,361	3,632	3,773	3,789	3,815	4,021
Thailand	296	378	479	601	753	936	1,142	1,346	1,521	1,653	1,734	1,770	1,791	1,835	1,910	1,977	1,995	1,984
Rep. of Korea	281	381	509	664	850	1,078	1,353	1,644	1,897	2,078	2,195	2,261	2,303	2,356	2,405	2,432	2,369	2,319
China, Taiwan	144	181	225	282	357	454	568	674	753	814	869	922	954	952	941	927	889	853
Philippines	136	165	201	249	308	376	450	531	621	728	852	996	1,159	1,335	1,519	1,713	1,922	2,152
Myanmar	84	96	115	141	172	203	233	263	293	322	351	383	416	448	475	495	511	529
DPRK	73	87	104	121	145	178	214	256	294	324	349	375	410	455	496	532	562	592
China, Hong Kong	66	83	102	125	156	200	255	308	350	378	399	425	450	463	461	446	430	438
Malaysia	56	73	96	125	161	204	253	312	383	470	575	697	827	945	1,031	1,087	1,135	1,201
Singapore	28	39	55	75	101	135	173	210	242	269	291	310	323	337	353	369	379	385
Cambodia	18	23	28	37	48	61	74	95	117	146	182	225	269	309	342	380	421	470
Lao PDR	8	9	10	13	16	20	24	31	38	48	59	71	83	95	106	118	130	142
Mongolia	4	4	5	7	9	12	16	19	24	28	33	37	41	45	48	53	61	72
China, Macao	3	3	5	6	9	13	18	23	28	31	34	38	44	49	51	49	47	50
Timor-Leste	1	1	2	2	3	3	4	4	5	6	7	9	12	16	21	26	32	39
Brunei	1	1	1	2	2	3	4	6	7	9	10	12	13	14	15	15	16	17
Total	**8,691**	**10,650**	**12,979**	**15,978**	**19,827**	**24,260**	**28,870**	**33,635**	**38,568**	**43,016**	**46,445**	**49,284**	**52,290**	**54,908**	**55,917**	**55,913**	**57,196**	**60,031**

* Excluding Taiwan, Hong Kong, and Macao.
Source: Estimated by Authors.

Chapter 3

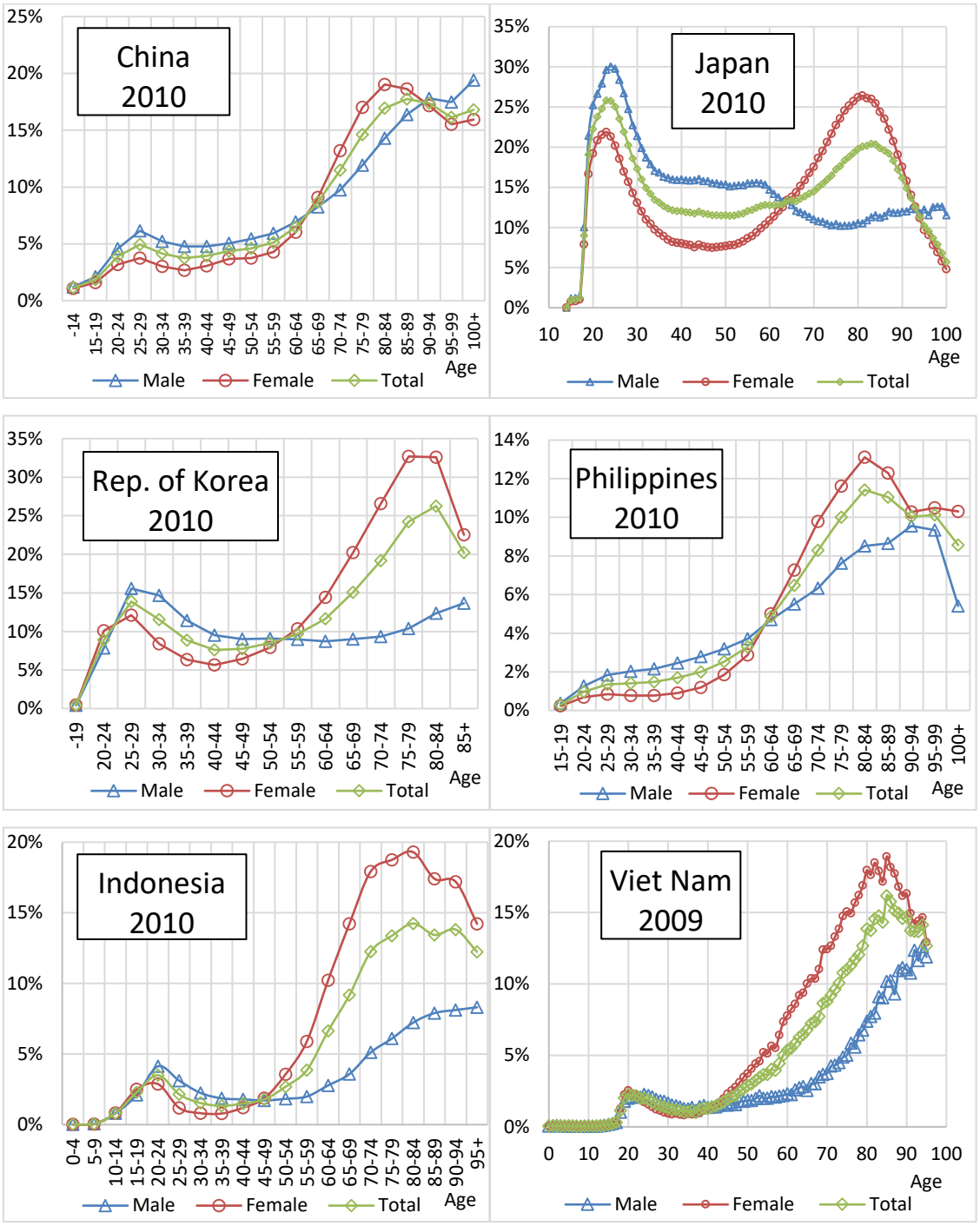
Demand for Long-term Care: Older Persons Living Alone

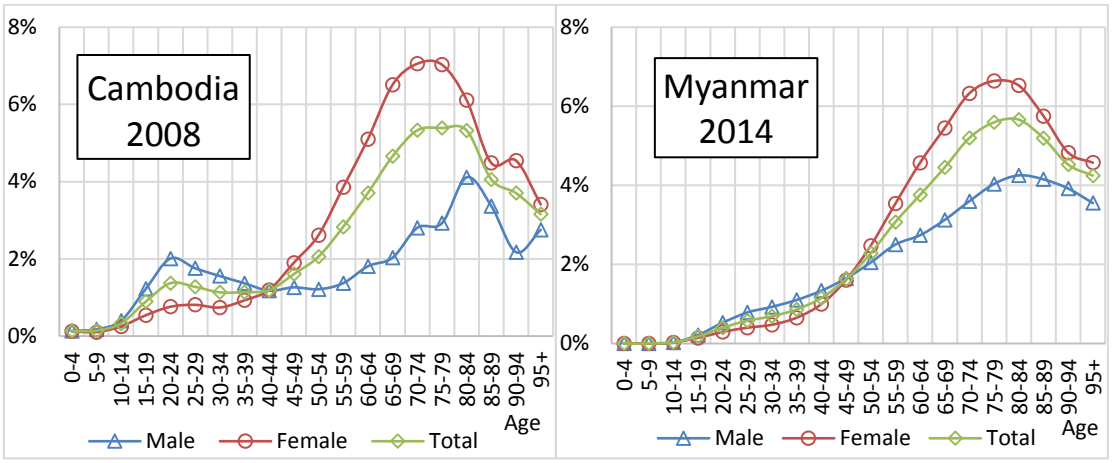
1. Living Arrangements of Older Persons

The role of the family for long-term care is important especially in Asia. Some Asian countries already have a family-first policy for the care of aged parents, explicitly promulgating a law that clearly defines the role of children to take care of their parents (Box 2). Nevertheless, the proportion of older persons living alone are increasing globally, particularly in Asia (UN, 2017b). Although lowering mortality contributes to the smaller number of widows/widowers, the increasing outmigration of children, within or beyond the national borders, leaves older parents in an empty nest after the death of the spouse. Also, nuclearization and changing family values contribute to smaller families, which lead more older persons living alone.

Generally, the proportion of living alone changes with age (Figure 3.1). The proportion increases with age as children depart from the parental home to study or to work to be independent; the proportion decreases after these children marry and form their own families. This change is outstanding in Japan and the Republic of Korea, somewhat observed in China, Viet Nam, Cambodia, and Indonesia, and not at all observed in the Philippines and Myanmar. During this transition, the proportion of men living alone are higher compared to women. From around the age of 40s and 50s, the proportion starts to increase due to the children's departure and the death of the spouse. For older age, the proportion forms an inverted U-shape (Reher and Requena, 2018). When people get very old, they start to need care and live again with family members (most probably with children) or move to a facility. During this phase, the proportion of women living alone are higher than men. For men, the trend differs among countries. The downward trend in very old age is not found in China, Japan, the Republic of Korea, Viet Nam, nor Indonesia, whereas the trend exists in the Philippines, Cambodia, and Myanmar. This might be caused by the different old-age care arrangements by country.

Figure 3.1: Proportion of People Living Alone, by Age

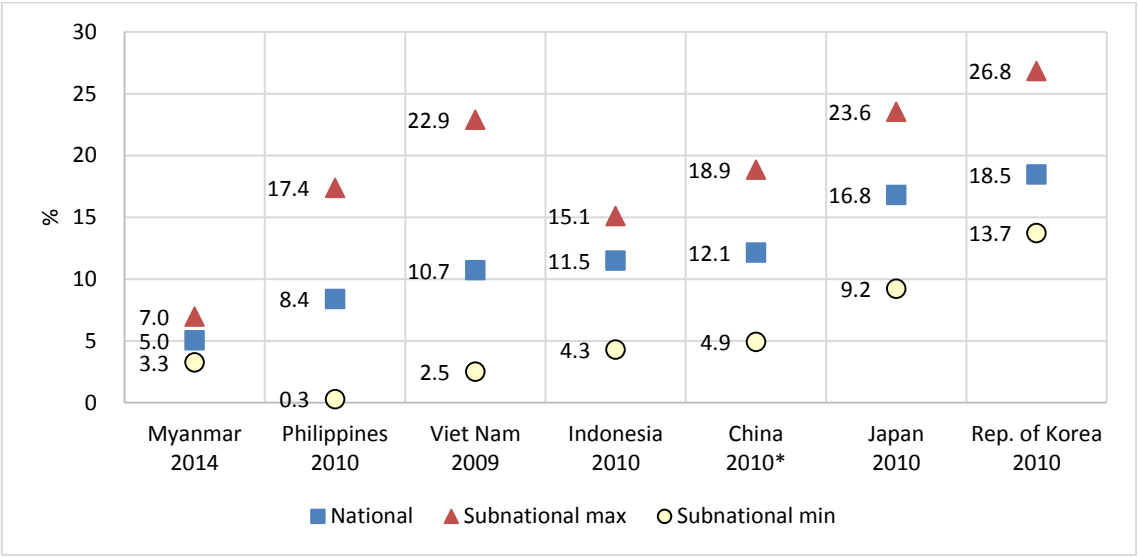




Note: Range of vertical axes varies due to the different levels of proportion.
Sources: Data of the Philippines, Indonesia, Viet Nam, and Cambodia are from the census through IPUMS International; those of China, Japan, Republic of Korea, Myanmar, from each country's Statistics Bureau, compiled by Authors.

Among target countries, the proportion of older persons living alone (Figure 3.2) are the lowest in Myanmar (5.0%) and the highest in the Republic of Korea (18.5%). A general trend is that the higher the proportion of older persons, the higher the proportion of older persons living alone. However, the Republic of Korea's living alone rate of 18.5% is higher than Japan's 16.8% in spite of the relatively lower ageing rate. This might be related to the stronger internal migration in the Republic of Korea (Hayashi, 2015).

Figure 3.2: Proportion of Older Persons Living Alone (around 2010, selected countries)

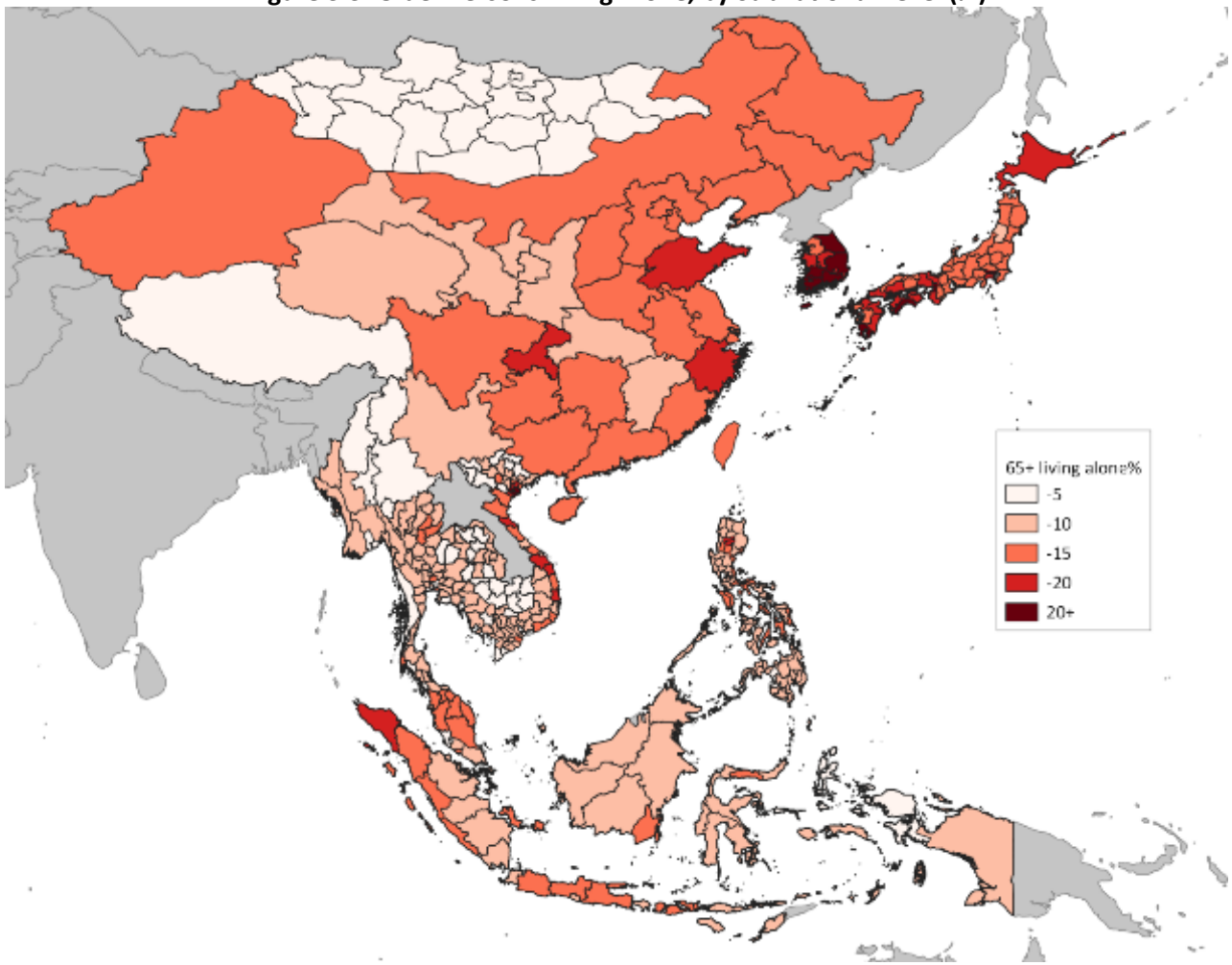


Note: The number of subnational divisions differs by country: Myanmar = 15 states/regions, Philippines = 98 provinces, Viet Nam = 63 provinces, Indonesia = 33 provinces, China = 31 provinces (Census 2010) as well as Hong Kong and Macao (Census 2011) and Taiwan (Census 2010), Japan = 47 prefectures, Republic of Korea = 16 provinces/cities. The first-level administrative division was compared.
Sources: Data of the Philippines, Viet Nam, and Indonesia are from the census through IPUMS International. Those of China, Japan, Republic of Korea, and Myanmar are from respective census data. Compiled by Authors.

Disparities among provinces are also large (Figure 3.2). Viet Nam has the largest disparity ranging from 2.5% to 22.9%, followed by the Philippines. This is partly due to the number of provincial divisions. However, this disparity shows how rural areas are affected by the outmigration of children to urban areas. For example, in the provinces of Ha Nam, Nam Dinh, and Thai Binh, just south of Ha Noi, Viet Nam's capital city, the proportion of older persons living alone exceed 20%, more than the national average of Japan or the Republic of Korea (Figure 3.3). In Ifugao and the Mountain Province of the Philippines, the proportion is as high as 17%. This is due to the strong outmigration of the young to Manila or Baguio City who do not return (Commission on Population, 2016). The same high rates are observed in Aceh province (15.1%) in Indonesia, Zhejiang (18.9%), Shandong (15.8%), and Chongqing (15.3%) in China.

In Asia where elderly care is considered to be the role of family and the public care system is not yet fully developed, it is important to know how many older persons are living alone, which is one of the determinants of care demand.

Figure 3.3: Older Persons Living Alone, by Subnational Level (%)



Sources: Census of Cambodia (2008), India (2009), Indonesia (2010), Iran (2011), Malaysia (2000), Philippines (2010), Thailand (2000), Viet Nam (2009) through IPUMS International. That of China (2010), Japan (2010), Myanmar (2014), and the Republic of Korea (2010) were from each country's Statistics Bureau, compiled by the Authors.

Box 2: Projection of Living Arrangements of Older Persons in Japan

Household projections by the National Institute of Population and Social Security Research (IPSS), Japan, show the living arrangements for all household heads. However, living arrangements of other household members are not available. To compensate for this shortage, the IPSS published projections of living arrangements of older persons aged 65 and over in 2012 and 2017. The 2017 revision was produced to supplement the household projections based on the 2010 census of Japan.

Five types of living arrangements were defined as follows:

(1) Living alone

(2) Living with a spouse only

(3) Living with child(ren)

(4) Living with other person(s)

(5) Living in an institutional household

If an older person lives with at least one child, his/her living arrangement is classified as (3) regardless of whether his/her spouse co-resides or not. If he/she does not live with a child but with a person other than a spouse or a child, his/her living arrangement is defined as (4) regardless of whether his/her spouse co-resides.

The number of older people living alone was already included in the household projection. Also available in the projection was the number of elderly heads living with a spouse only. The number of elderly spouses living with a head only was projected by applying the distribution of husbands and wives by age taken from contingency tables in the 2010 census, assuming that the distribution does not change in the future.

Since the number of institutionalised people was also available in the household projection, the remaining task was to distinguish types (3) and (4). The ratio (4) / {(3) + (4)} in 2010 was calculated from the census. This ratio was assumed to decline as the proportion of households other than nuclear family declined. The future value of this ratio was calculated so that the odds ratio was preserved.

The proportion of older persons living alone (1) are projected to increase from 11.6% in 2010 to 16.3% in 2035 for men, and from 20.8% in 2010 to 23.4% in 2035 for women. This increase is offset by the decrease of proportion of those living with a spouse only (2). The proportion of older persons living with child(ren) do not change for men from 2010 to 2035 and for women from 2020 to 2035 (IPSS, 2017).

Box 3: Law on the Protection of the Rights and Interests of the Elderly (People's Republic of China)

In China, population ageing has been proceeding rapidly, so the construction of long-term care system is one of the most important policy challenges. The Law on the Protection of the Rights and Interests of the Elderly, the basic law of an ageing society, was enacted in 1996. This law defining older persons as those 60 years and over draws the basic ideas of ageing policy and stipulates measures such as support by family members, mutual help in the community, social security, education, cultural life, facility development, life-long education, social participation, and others. In particular, this law emphasises support by family members, such as payment obligation of children for their elderly parents' health care.

This law was amended in 2012 to address further population ageing and the increase of 'empty nest' elderly households. The amended law further emphasises the obligations of sons and daughters to support their elderly parents, including periodical visits if the children live apart from elderly parents. The number of lawsuits related to this law, such as elderly parents suing their children who do not periodically visit them, has increased significantly since the amendment in 2012.

The law also stipulates the role of national and local governments. Article 30 provides for the phased implementation of long-term care policy by the national government. Articles 37 and 38 provide for social services for older persons, such as health care and long-term care by local governments, and Article 46 is on human resource development for elderly social service. In other words, this law defines the government's role based on the role of the family.

Box 4: Migration and Living Arrangements of Older Persons in Malaysia

As in other developed countries, the percentage of older persons living alone are rising in Malaysia. In 2000, about 7% of 1.4 million people 60 years and over live alone (UN, 2017b). With respect to demographic characteristics, lone residence is observed amongst the older groups and females. In geographic terms, older persons living alone are concentrated in rural areas. The data indicates that 9% of those in rural areas and 5% of those in urban areas are living alone (UN, 2017b). The distribution of other living arrangements also differ widely. Most of all, the percentage of those living with children is lower in rural areas (64%) than those in urban areas (72%) (UN, 2017b). This implies that rural–urban migration of young people is one reason for the lower percentage of rural older persons living with their children.

Internal migration played a significant role in the economic development of Malaysian society. The official concern over unbalanced economic and geographical distribution by ethnicity resulted in a policy that aimed at freeing Bumiputera from subsistence agriculture to more modern sectors in the urban areas (Swee-Hock, 2015). The New Economic Policy resulted in urbanisation of all ethnic groups, especially the Malays. The proportion of urban population among Malays increased from 15% in 1970 to roughly 70% in 2010. Consequently, the ethnic composition of urban areas changed drastically. While Chinese made up 58.5% of the urban population in 1970, their share declined to 28.9% in 2010. In contrast, Malay's share increased from 27.6% to 47% during the same period (Tey, 2014).

Migrants tend to be young. A major characteristic of migrants after 2000 is that women migrants outnumbered men among those aged 20–29 years. This may be explained by the strong labour demand of factories in urban areas that employ female workers (Tey, 2014). Another reason may be the pull of colleges and universities that are concentrated in urban areas (Tey, 2014), given that more women than men are enrolled in higher education. At the same time, the educational attainment of Malays grew substantially. This is partly due to the preferential policy that gives advantage to Malays enrolled in higher learning (Swee-Hock, 2015).

Traditionally, Malaysian families provided care for older family members at home, and the use of long-term care facilities was uncommon (Swee-Hock, 2015; Da Vanzo and Chan, 1994). Due to the rapid outmigration of young adults, a growing number of older people are living separately from their children. The study conducted in rural Malaysia (Evans et al., 2018) found that Malays tend to receive support from nearby adult children living in local areas. Chinese older persons, whose children tend to live far, receive support from friends and neighbours (Evans et al., 2018). Assistance from outmigrant children was mostly financial and informational, and practical assistance was either substituted by money or provided solely during periods of ill health.

Box 5: Population Ageing, Intergenerational Caregiving, and Migration in Indonesia

While sustaining a relatively higher level of population growth among East and Southeast Asian countries, Indonesia is expected to undergo rapid population ageing in the next few decades. According to the latest official population projections released by Statistics Indonesia (BPS) in August 2018, the proportion of the population aged 65 years and above will increase from the current level of 6% to 14% in 2045, when the total population will reach 310 million (BPS, 2018). Given the inadequacy of social safety and institutionalised care schemes for older people, rapid population ageing raises challenges to meet the growing demand for caregiving in Indonesia.

As in many other Asian countries, the traditional social norm that adult children should support their parents is embedded in the intergenerational relationships in Indonesia. From a demographic perspective, this is sustained by the extended family system, where the family is the potential source of informal care for older people. In the 2010 census, for instance, over 35% of the total older persons lived in a three-generation household (BPS, 2012). The proportion of those living with children and grandchildren are higher for the older population; 40% for those aged 70–79 years and 44% for those 80 years and over. The high proportion of older people living in a multi-generation household imply the importance of family members as primary caregivers.

The sustainability of these caregiving arrangements through intergenerational support has been increasingly challenged particularly in rural areas, where fertility decline and outmigration have accelerated population ageing at a faster pace than in urban areas (UNFPA, 2014). Rapid population ageing and the traditional caregiving regime can impede migration, or residential mobility, of the young-adult population, one of the most salient dimensions of Indonesian demography (Rammohan and Magnani, 2012). The impact of population ageing and the growing demand for aged care on population mobility is expected to be greater in rural areas, where the traditional norm on the extended family system is more persistent and the institutionalised welfare and caregiving services are underdeveloped.

As a result of continuing fertility decline, the shrinking family size and the declining number of siblings reduce the availability of informal care resources for older people in the future, while increasing the physical and physiological burdens on each family member, particularly at a younger age. These demographic and institutional settings will possibly challenge the role of Indonesia as a major supplier of overseas migrant care workers in the Asia-Pacific region.

Chapter 4

Supply of Long-term Care: Long-term Care Workforce

1. Definition of Long-term Care Workforce

Traditionally, family members provide long-term care for older persons. However, the number and proportion of older persons are increasing and the number of family members living together is decreasing or even becoming zero. In addition, even though family members are living together, the degree of care is becoming more than what the family member can offer. Professional care, through the social provision system, is surging.

In the analogy of health systems where the workforce such as doctors or nurses, infrastructure such as hospital or health centres, and health finance and expenditure are the main components, the long-term care system can be composed of three aspects: workforce, place of care as home or facility, and finance. In this report, first two – workforce and facility issues – are discussed.

Long-term care workforce is somewhat difficult to define. For countries of the Organisation for Economic Co-operation and Development (OECD), several international comparative researches have already been carried out (Fujisawa and Colombo, 2009; Colombo et al., 2011; OECD, 2015). For non-OECD countries, which are middle- and low-income yet rapidly ageing, the research is ongoing. Health workers, notably nurses, play an important role in long-term care. In addition, lower-skilled care workers are included in the framework of the long-term care workforce. Domestic workers play an important role as caregivers in certain countries. In between, specialised occupations have been created in several countries. Certainly, many categories of occupations are involved in the long-term care of older persons, which are difficult to define, and which vary among countries. This chapter examines the situation of the long-term care workforce in terms of the number employed by category of occupation from several data sources of the target countries.

2. Long-term Care Workforce within the Framework of the Health Workforce

In its endeavour to develop the health workforce, the World Health Organization (WHO) compiled and produced the health workforce report and database by country (WHO, 2018). Internationally established medical professions such as doctors, nurses, and midwives are well covered in the database unlike long-term care workers whose coverage is not adequate.[2] In the database, two categories – personal care worker and community health worker – can potentially be part of the long-term care workforce. The database lists personal care workers in 48 countries in the world, and only 5 countries in Asia (Table 4.1). Not only the number of countries is limited but also the number of workers varies. The database also lists community health workers in eight Asian countries.

[2] Except for the country report of Japan which provides information on the human resources for long-term care (WHO, 2017).

Table 4.1: Number of Potential Long-term Care Workforce in WHO Health Workforce Database

	Year	Number
Personal Care Worker		
Armenia	2014	5,041
Israel	2014	100,333
Kyrgyzstan	2014	990
Mongolia	2002	3,758
Uzbekistan	2014	50,649
Community Health Worker		
Bangladesh	2012	73,838
China	2011	1,126,443
Iran	2004	25,242
Mongolia	2010	437
Myanmar	2012	3,397
Nepal	2004	16,206
Pakistan	2010	11,510
East Timor	2004	10

Source: The 2016 update, Global Health Workforce Statistics, WHO, http://www.who.int/hrh/statistics/hwfstats/, compiled in Hayashi (2018).

Community health workers have been trained mainly in child and maternal health with limited time and resources to promote primary health care and to develop the district health system. Table 4.1 shows that the number is significant. In the context of population ageing and increasing care need of older persons, these community workers can be a potential care workforce with adequate training.

Nurses are included in the database and some of them are anticipated to be engaged in the care of older persons. However, it is not possible to disaggregate the number of nurses by their domain of activities in this database. Social workers play an important role in long-term care, but they are not included in the health workforce; hence, they are not included in the database. Domestic workers are not included either.

3. Long-term Care Workforce by Occupation

In some Asian countries, housemaids or domestic workers are in charge of the long-term care of older persons at home. In some countries, home helpers or home service persons are trained and dispatched to families seeking care. Social workers are professionals in charge of welfare and often work at public offices, but sometimes work as caregivers or caregiving managers at home or in facilities. Specialised professions – such as Certified Care Worker, Care Manager in Japan, or Care Helper in the Republic of Korea – were created, along with the development of the social care system in each country; the number also increased. In addition to these categories of long-term care workforce, health workforce ranging from doctors, dentists, nurses, physical therapist, occupational therapist, speech-language-hearing therapists as well as dietitian are also involved with long-term care.

For example, in Japan, various categories of occupation are involved in long-term care (Table 4.2). Slightly over 2 million people, which corresponds to around 3.5% of the total workforce, are engaged in the long-term care industry. Comparing two data sources – the Survey of Institutions and Establishments for Long-term Care conducted by the Ministry of Health, Labour and Welfare covering long-term care providers, and the Population Census conducted by the Statistics Bureau – one can see that the occupations can be roughly classified into three categories: health, care, and other. Included under the health category are occupations such as doctors, nurses, or physical therapists who can be employed also in the health sector. The care category includes occupations that can be found only in the long-term care industry. The other category includes cooks, drivers, cleaners, and clerical workers who can be engaged in other industries but are also indispensable to maintain long-term care services. Of the total long-term care workforce, 73% is engaged in the care category. They are the main long-term care workers who manage and conduct long-term care. However, the health category, comprising 10.7% by the Population Census or 17.1% by the MHLW Survey of the total long-term care workforce, is significant. Among them, nurses comprise the largest share, followed by physical therapists and dietitians. The difference between the two data sources might be due to the undercounting of health professionals who work for both the health and long-term care industries, and the possible omission of the 'other' category in the MHLW Survey. While this survey gives a much-detailed count by occupation, the Population Census gives clear headcounts of those engaged in the long-term care industry.

Table 4.2: Long-term Care Workforce in Japan, by Occupation

MHLW Survey (2015)			Population Census (2015)[b]		
Occupation[a]	**Number**	**%**	**Occupation[a]**	**Number**	**%**
Doctor, Dentist	16,630	0.8	Doctor, Dentist	2,790	0.1
Pharmacist	2,429	0.1	Pharmacist	890	0
Public health nurse, Midwife, Nurse, Assistant nurse	259,578	11.9	Public health nurse, Midwife, Nurse, Assistant nurse	161,250	7.9
Registered dietitian, Dietitian	26,066	1.2	Dietitian	20,750	1
Dental hygienist	1,221	0.1	Dental hygienist	760	0
Physical therapist	33,642	1.5	Physical therapist, Occupational therapist	21,880	1.1
Occupational therapist	18,510	0.8			

Speech-language-hearing therapist	3,494	0.2	Orthoptist, Speech-language-hearing therapist	1,350	0.1
Judo-orthopaedist	5,864	0.3	Masseuse, Judo-orthopaedist	1,790	0.1
Masseuse	4,051	0.2			
Psychiatric social worker	100	0	Other health workers	8,030	0.4
'Health' Subtotal	**371,586**[c]	**17.1**	**'Health' Subtotal**	**219,490**	**10.7**
Head of facility	6,888	0.3	Manager	23,200	1.1
Certified care worker	630,582	28.8	Other social welfare professions	191,310	9.3
Certified social worker	21,926	1			
Care manager, etc.	260,022	11.9	Caregiver, Home helper, etc.	1,293,880	63.1
Caregiver, Home helper, etc.	682,955	31.2			
'Care' Subtotal	**1,602,374**[c]	**73.2**	**'Care' Subtotal**	**1,508,390**	**73.5**
Cook	46,540	2.1	Cook	96,930	4.7
Other	166,036	7.6	Driver, Cleaner, Clerical worker, Other	225,240	11
'Other' Subtotal	**212,576**	**9.7**	**'Other' Subtotal**	**322,170**	**15.7**
TOTAL	**2,186,536**	**100%**	**Total**	**2,050,050**	**100%**

Note :

[a] Similar occupational categories of the MHLW Survey and the Population Census are matched for comparison, and they are not identical.

[b] Employed in the industry of long-term care in the Population Census (2015). Long-term care industry is defined here as Minor Groups of '85n Welfare services for the aged and care services' and '85p Home-visit care services' of Medium Group of '85 Social insurance, social welfare and care services' of Major Group of 'P. Medical, health care and welfare'.

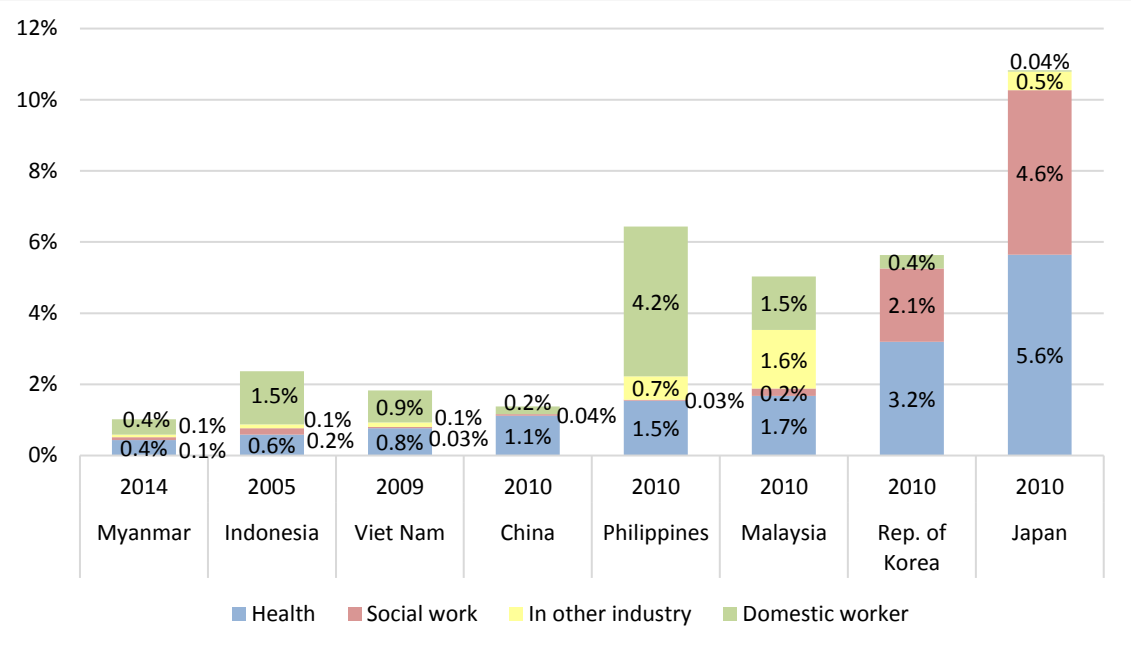
[c] The subtotals of the MHLW Survey are not identical due to the rounding of the numbers according to the survey coverage rate.

Source: Survey of Institutions and Establishments for Long-term Care, Ministry of Health, Labour and Welfare; Population Census, Statistics Bureau of Japan; compiled by Hayashi (2019).

4. Comparison of Long-term Care Workforce

In the context where the long-term care industry is yet to be developed, it would be useful to compare the existing workforce, which is related to the long-term care industry, at large (hereinafter referred to as care workforce). In the census, the workforce is classified by industry and occupation. Among the 21 sections of industry classified in the International Standard Industrial Classification, 'human health and social work activities' can be the main component of the care workforce. This industry is further divided into health and social work (Annex 2, Table 1). However, in some countries, care-related occupations are classified outside of 'human health and social work activities'. So, those care-related occupations are selected to add to the care workforce (as listed in Annex 2, Table 2). Further, if domestic workers are providing long-term care, then they should be counted. In summary, the care workforce is composed of those working in the industry of 'human health and social work activities', care-related occupations engaged outside of the industry of 'human health and social work activities', and domestic workers. The care workforce was calculated using available census data around 2010. Due to the different sizes of the total workforce of each country, the proportion to the total workforce was compared (Figure 4.1).

Figure 4.1: Proportion of Care Workforce in East and Southeast Asia



Note: 'Health' is Division 86 and 'Social work' is Divisions 87 and 88 in Annex 2, Table 1. 'In other industry' designates care-related occupations in industries other than the health and social work industries. This figure was not retrievable in Indonesia, China, and the Republic of Korea. 'Domestic worker' does not include those in the health and social work industries in Malaysia, the Philippines, Viet Nam, and Indonesia. Overseas workers in the Philippines are excluded.
Sources: Censuses of the Philippines and Viet Nam, SUPAS (sample survey) of Indonesia through IPUMS International. Data of China, Japan, Malaysia, Myanmar, and the Republic of Korea are from the respective countries' census data. Compiled by Authors.

There is a wide variation in the proportions. In Myanmar, the proportion of those engaged in health was only 0.4% of the total workforce whereas it was 5.6% in Japan. The wider disparity existed for social work such that the proportion was almost non-existent in Viet Nam (0.03%), the Philippines (0.03%), China (0.04%), and Myanmar (0.08%), whereas certain proportions were observed in the Republic of Korea (2.1%) and Japan (4.6%). As described in the previous section, in Japan, the long-term care workforce is included in the category of social work. The workforce in the social work category would be the potential long-term care workforce. Those countries with an almost-zero proportion of social work might be facing a severe shortage of long-term care workforce in the future. Although the shortage of care workers is a serious problem in Japan, it is better than other countries so far.

On the care-related occupations engaged outside of the human health and social work activities, shown as 'in other industry' in Figure 4.1, the proportion of Malaysia is noticeable at 1.6%. Outside of the industry of human health and social work activities, care-related occupations are engaged in public administration, manufacturing, and education. They might be working in public hospitals, health centres, or university hospitals.

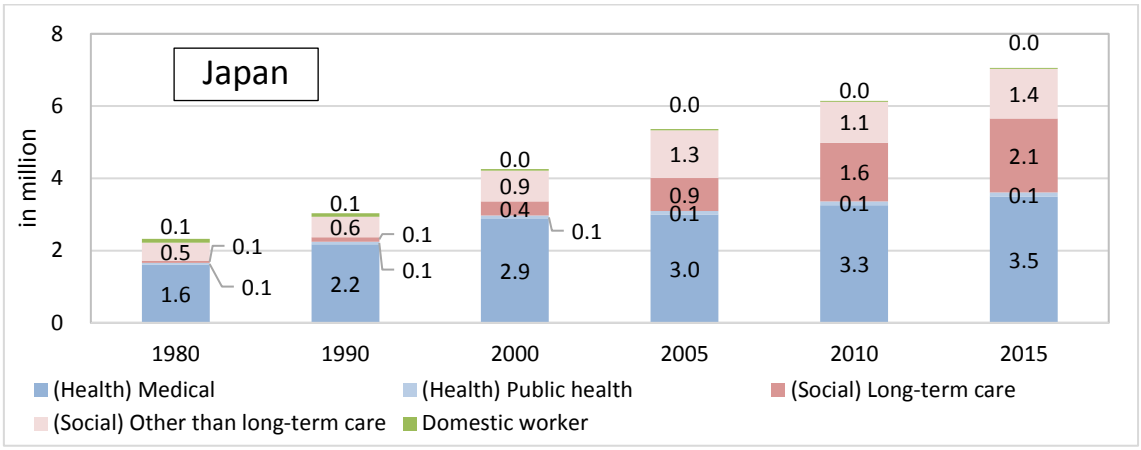
The proportion of domestic workers also vary among countries – with Japan having the smallest proportion at 0.04% and the Philippines having the highest at 4.2%. In the Philippines, Indonesia, and Viet Nam, the proportion is more than or the same level as the health and care workforces. Also, in Malaysia, there is a sizeable proportion of as much as 1.5%. In view of a shortage of care workforce in the world, the abundance of domestic workers can be a clue to a solution.

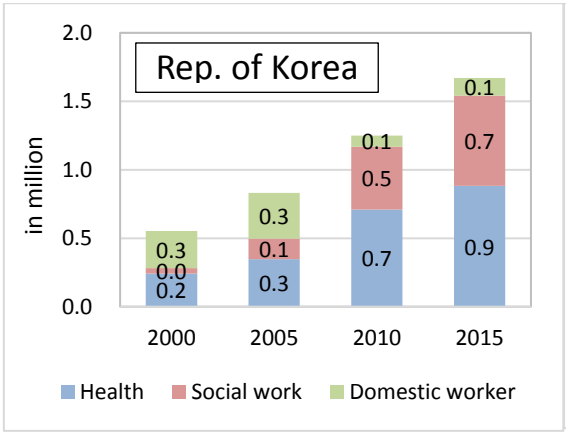
5. Chronological Trend of Care Workforce

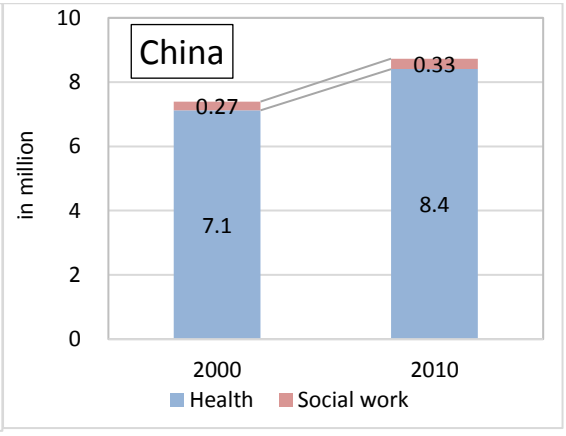
In most countries, the number of health and care workers has been increasing recently (Figure 4.2). For example, in Japan, the health and care industry workers totalled only 2.2 million in 1980 and grew more than threefold to 7.0 million in 2015. The increase was first rapid in the medical sector, doubling from 1980 to 2000. Then there was a marked increase in the social work sector, especially of long-term care workforce, growing fivefold from 2000 to 2015. The start of the long-term care insurance system in 2000 certainly contributed to this increase. Among the economists, the economic impact of the long-term care insurance system was not proved unanimously, but its effect on job creation is undeniable. In the Republic of Korea also, the workforce of 'social work' category increased sharply between 2005 and 2010. The introduction of the long-term care insurance in 2008 must have affected this increase.

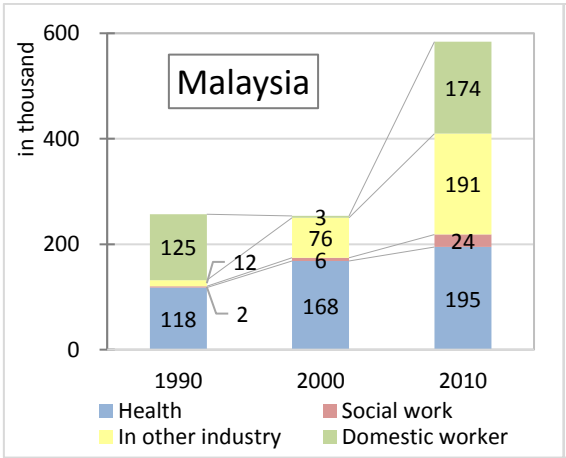
For China, although the total workforce of the health and social industries increased, the health sector was overwhelmingly predominant than the social work sector. The workforce of 'social work' category increased by 22% from 2000 to 2010. However, considering the 4.7 million needing care in 2015 (Table 2.1), which is double than that of Japan's 2.0 million, there is obviously a shortage of professional caregivers in China.

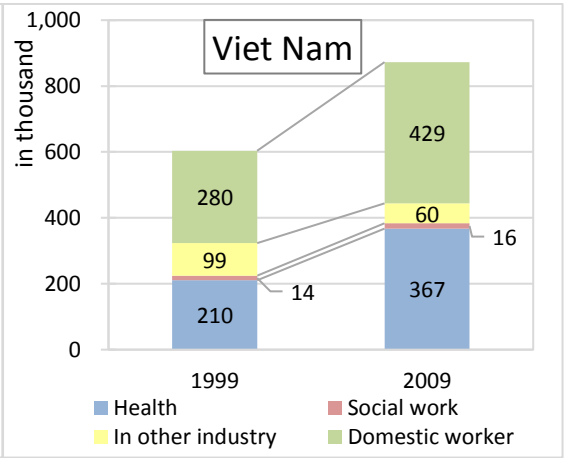
Figure 4.2: Trend in the Number of Care Workforce

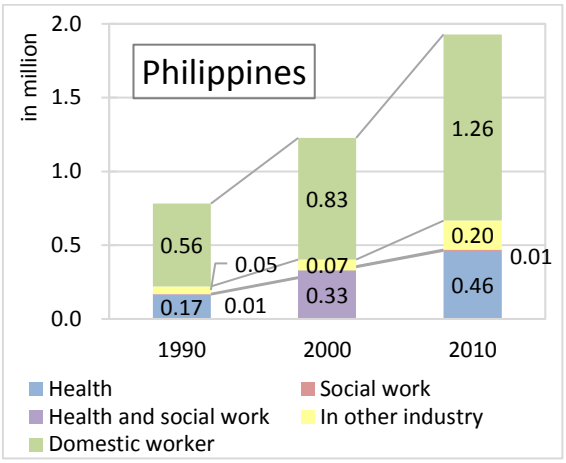










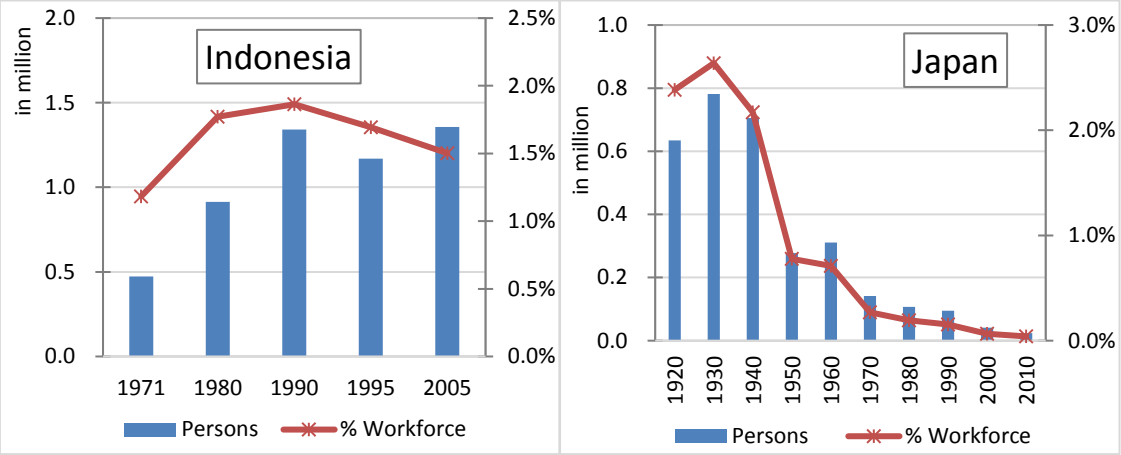


Sources: Censuses of the Philippines and Viet Nam, SUPAS (sample survey) of Indonesia through IPUMS International. Data of China, Japan, Malaysia, Myanmar, and the Republic of Korea are from the respective countries' census data. Compiled by Authors.

As for domestic workers, the trend is ambiguous. In the Philippines (Figure 4.2), domestic workers have been continuously increasing since 1990, but this straightforward increase is not found in Indonesia where the number of domestic workers oscillated recently and the proportion to the total workforce has been declining since 1990. Also, in Malaysia, according to the Labour Force Survey, domestic workers decreased from 219,900 in 2001 to 106,200 in 2017. However, in the census data, domestic workers counted 125,000 in 1990, 3,000 in 2000, and 174,000 in 2010, showing no consistent trend, probably due to the definition and category change (Figure 4.2). The continuous decline observed in the Labour Force Survey should be further examined.

In Japan, both number and proportion have been dramatically decreasing since the 1930s (Figure 4.3). This decline is explained by the cultural practice of not having maids at home, by the smaller family and house sizes which reduce the need for maids to come and work, and by the decrease of potential labour due to the increased educational level of women (Koizumi, 2012).

Figure 4.3: Trend in the Number of Domestic Workers (in million persons)



Note: Philippine data includes overseas workers.
Sources: Censuses of the Philippines and Indonesia through IPUMS International; Japan by the Statistics Bureau. Compiled by Authors.

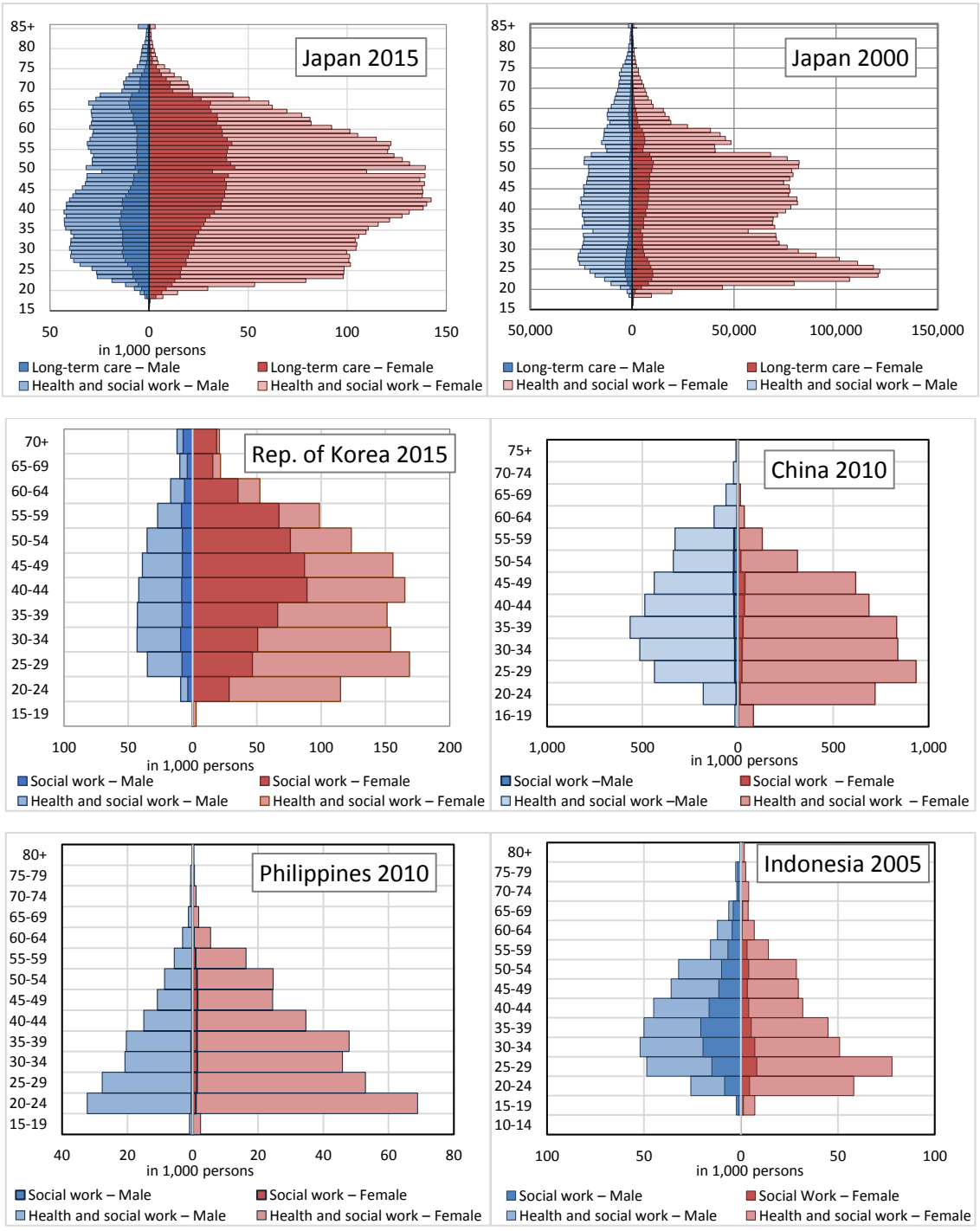
In China, the 2010 census count of domestic workers is very small (1.6 million or 0.4% of the total workforce). However, according to the report published by the Ministry of Commerce, the number of domestic workers counted 23.26 million in 2015 and further increased to 25.42 in 2016 (Ministry of Commerce of China, 2017). According to this report, 16.3% of them were engaged in elderly care in 2016. This implies that there were 4.14 million long-term care workers in the form of domestic workers in 2016, more than double than the 1.6 million domestic workers in 2010. Due to the different sources of data, the difference is not all explained by the increase of elderly care workers at home. However, the recent increase of domestic workers is brought by a new business model – O2O, Online to Offline, a mobile-phone and Internet-sharing business model, and most of whose service providers started around 2014 to 2016. The increase of domestic workers, which also meets the demand for long-term care, can be happening through new technology.

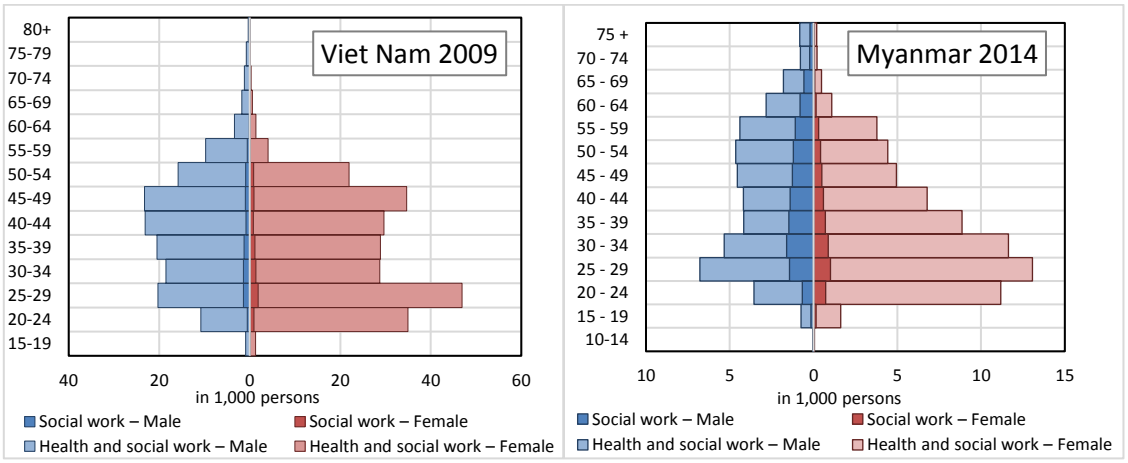
6. The Demographic Structure of the Care Workforce

Each occupation has its specific demographic profile. Figure 4.4 shows the distribution of health and care workforce by age and sex. The health and social care workforce is generally female dominated. In Japan in 2015, the peak of female workers was found in their 40s, whereas for men, the peak was in the 30s. It was different in 2000 when young women in their 20s dominated the workforce. They worked in the health industry as nurses, for example, before they got married and quit. However, recently women's work–life balance changed; fewer women were quitting and more women started or continued to work at an older age in this industry. This shift from young to middle-aged women is even more obvious in the long-term care workforce. The workforce pyramid in the Republic of Korea looks somewhat similar to that of 2000 Japan; it has the peak at the younger age for women. However, if we limit the scope to social work, middle-

aged women are predominant. For China, the Philippines, Indonesia, Viet Nam, and Myanmar, the pyramids show a similar form, young women are abundant. The peak age category of female workforce in health and social work is 25–29 years for Japan, the Republic of Korea, China, Indonesia, Viet Nam and Myanmar, and younger (20–24 years) in the Philippines. This difference might be due to the differences in the job entry system.

Figure 4.4: Care Workforce Pyramid





Sources: Censuses of the Philippines and Viet Nam, SUPAS (sample survey) of Indonesia through IPUMS International. Data of China, Japan, Malaysia, Myanmar, and the Republic of Korea are from the respective countries' census data. Compiled by Authors.

Chapter 5

Supply of Long-term Care: Care Facility

In societies where sending parents to a care facility is shameful for children, the number of long-term care facilities is limited. However, the surging increase of older persons and the transformation of the long-term care provision system can change traditional culture quickly. This change is under way in Japan. In addition, former socialist countries such as China or Viet Nam have collective dwelling as a norm of living arrangement, and facility-based living might be accepted easily.

In a population census, every household – either family-based ordinary household or collective households – is counted. Collective households normally include dormitories, prisons, military stations, and care facilities for older persons. This time, census data on collective households disaggregated by age are available for Japan, Indonesia, and Myanmar; other data sources on elderly facilities are obtained for the Republic of Korea, China, and Viet Nam. Assuming that elderly welfare facilities are for older people aged 65 years and over, the proportion of facility population was calculated. Such proportion is highest in Japan (5.9%), followed by Myanmar (3.2%), the Republic of Korea (3.1%), and China (3.0%). The proportion in Viet Nam (0.6%), Malaysia (0.4%), and Indonesia (0.01%) is very low (Table 5.1).

Table 5.1: Facility Population of Older Persons

Country	Year	Population		%	Source	
		In Facility	Older Persons	In Facility	Facility Population	Population of Older Persons
Indonesia	2010	1,420	11,992,430	0.01%	Census	Census
Malaysia	2016	8,025	1,895,030	0.4%	Department of Social Welfare	UN2017
Viet Nam	2014	39,053	6,132,204	0.6%	Ministry of Labour, Invalids and Social Affairs	UN2017
China	2015	3,024,000[a]	135,178,504	2.2%	Authors' estimate[a]	UN2017
Myanmar	2014	89,436	2,808,127	3.2%	Census	Census
Rep. of Korea	2015	268,650	6,569,082	4.1%	Ministry of Health and Welfare and National Health Insurance Service[b]	Census
Japan	2015	1,998,669	33,868,000	5.9%	Census	Population estimate

[a] China's facility population is obtained by multiplying the number of available facility beds (6,727,000 in 2015, Ministry of Civil Affairs) with the supposed occupancy rate of 45%.

[b] The Facility population of Rep. of Korea is the sum of the elderly welfare facility capacity reported by the Ministry of Health and Welfare and the healthcare institute (hospital) capacity reported by the National Health Insurance Service. In 2015, the total capacity of elderly welfare facilities was 180,024 and that of healthcare institutes was 88,626, totalling 268,650.

The comparison is difficult as the definitions and sources are inconsistent. However, this is a first trial to compare roughly the volume of those living outside the ordinary family–based household.

The facility population is increasing steadily in Japan and in the Republic of Korea. According to Japan's population census. In Japan, the facility population totalled 640,106 in 1990; 1,023,991 in 2000; 1,667,861 in 2010; and 1,998,669 in 2015. In Korea, 180,024 persons were living in elderly welfare facilities in 2015, up from 148,344 persons in 2010, according to the Elderly Welfare Facility Statistics. The speed of increase from 2010 to 2015 in Japan and the Republic of Korea is similar.

In China, the number of care facilities sharply rose due to the construction rush promoted by government policy. In 2015, there were 116,000 facilities with 6.73 million beds. However, not all these beds were occupied. We assumed the occupancy rate of 45% and calculated the facility population as 3 million. If we only observe the capacity and compare the ratio to the care need (in person), China has more facility capacity compared to Japan (Table 5.2). The construction of elderly facilities is booming in China, but it is doubtful if it corresponds to the needs.

Table 5.2: Comparison of Facility Capacity and Care Need between China and Japan

2015	Facility Capacity (million beds): a	Care Need (million persons: b	b/a
China	6.73	4.72	0.70
Japan	2.00	2.03	1.02

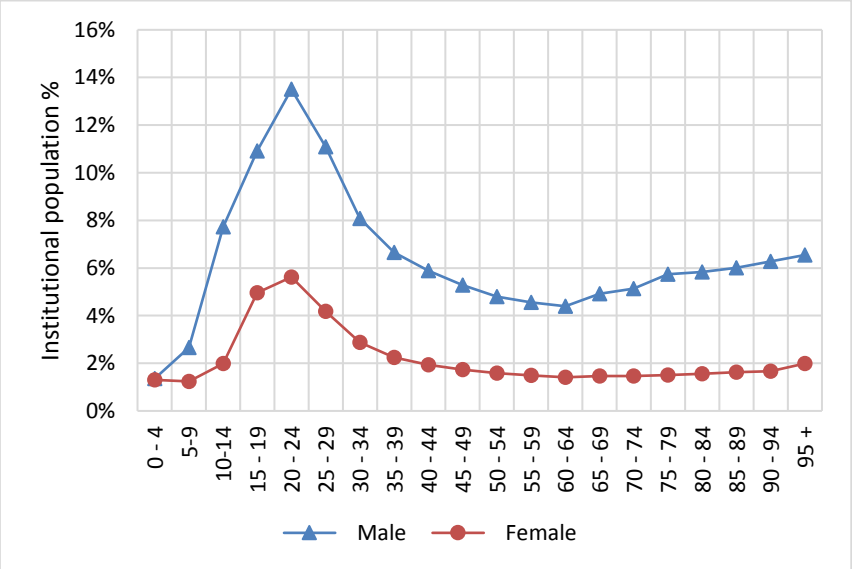
Note: As the facilities are almost full in Japan, facility capacity is assumed to be the same as facility population.
Sources: Table 2.1 and Table 5.1

In Viet Nam, the elderly facilities have been existing in the framework of social welfare. As of 2014, 39,053 older persons were living in 428 facilities throughout Viet Nam.[3] Although this type of welfare facility is often not considered as a care facility, it does provide care and food for older persons who need assistance.

The proportion of older persons in Myanmar who are in facilities are as high as 3.2%. Most or 76% of them are in religious centres, and they are the monks. Although these religious centres are not for long-term care, the proportion increases with age (Figure 5.1); as many as 6.5% of men aged 95 years old and over are in these facilities. This is explained by the cohort effect, that older men tend to be more permanent monks than younger men. Although the religious centres are not supposed to provide long-term care, a significant proportion of older men are living in collective dwelling which should be considered in the provision of long-term care.

[3] Statistical database of social security - social work, The Department of Social Protection, Ministry of Labour, Invalids and Social Affairs (in Vietnamese)
http://trungtambtxh.btxh.gov.vn/NguoiDung/Dangnhap/tabid/58/Default.aspx?returnurl=%2f

Figure 5.1: Institutional Population in Myanmar, by Age and Sex (2014)



Source: Population census of Myanmar. Special tabulation by Authors.

Chapter 6

Conclusion and Way Forward

In East and Southeast Asia, the proportion of older persons are increasing, and the number of older persons will double in 20 years from 2015 in most of the countries except Japan. The quickly increasing elderly population will necessarily create the demand for long-term care.

In 2015, 8.7 million older persons in East and Southeast Asia needed care. This number would nearly double in 2030, and triple in 2045. This care need might be difficult to be supplied by family members. The number of older persons who live alone has been increasing, especially in provinces with massive outmigration of young people.

The care industry has been growing in the region and the workforce is increasing substantially. However, compared to the health sector, the social work sector is still underdeveloped. In Japan and the Republic of Korea, since the start of the public long-term care insurance system in 2000 and 2008, respectively, the increase of long-term care workforce is apparent, although the numbers are always considered in shortage. For China and Southeast Asia, the workforce engaged in the social work sector is increasing but in absolute shortage. The role of domestic workers is limited in Japan and the Republic of Korea, but they will certainly play a role in China and Southeast Asia in the future. The O2O business model[4] has developed rapidly in China and is already offering a considerable amount of long-term care services. To cope with the sharp increase of care demand in the region, systems providing quality service should be created using new technology.

The stigma for long-term care facilities might not be persistent in the face of surging demand. In some countries, hospitals provide long-term care; in others, social welfare facilities might evolve to cope with the care demand of older persons.

Data comparison among countries would shed light on the existing challenges. Rapid increase of care need, which might be aggravated by the increased number of lone-living older persons in rural areas, should be addressed with a system providing long-term care, which would need quality care workers, appropriate care facilities or other means. Policy dialogues within the region should be encouraged.

[4] Online to Offline, provision of domestic work through mobile phone and Internet.

References

ASEAN (Association of Southeast Asian Nations) (2017), 'Chairman's Statement of the 20th Asean Plus Three Commemorative Summit,' 14 November 2017, Manila, Philippines, https://asean.org/chairmans-statement-of-the-20th-asean-plus-three-commemorative-summit-3/ (accessed 29 March 2019).

Baillargeon, J. and G.S. Wilkinson (1999), 'Characteristics of the Healthy Survivor Effect Among Male and Female Hanford Workers', *American Journal of Industrial Medicine*, 35(4), pp.343–47.

Berger, N., J.V. der Heyden, and H. van Oyen (2015), 'The Global Activity Limitation Indicator and Self-rated Health: Two Complementary Predictors of Mortality', *Archives of Public Health,* 73, p.25.

BPS (Badan Pusat Statistik) (2012), *Population of Indonesia: Result of Indonesia Population Census 2010*. Jakarta: BPS.

BPS (Badan Pusat Statistik) (2018), *Proyeksi Penduduk Indonesia 2015–2045: Hasil SUPAS 2015 (Indonesia Population Projections 2015–2045: Results of SUPAS 2015)*. Jakarta: BPS.

Colombo, F., A. Llena-Nozal, J. Mercier, and F. Tjadens (2011), 'Help Wanted? Providing and Paying for Long-Term Care'*, OECD Health Policy Studies*, Paris: OECD Publishing.

Commission on Population, Philippines (2016), Current Trends and Patterns of Internal Migration in the Philippines, unpublished internal document.

Da Vanzo, J. and A. Chan (1994), 'Living Arrangements of Older Malaysians: Who Co-resides with their Adult Children?', *Demography*, 31(1), pp.95–113.

Evans, N., P. Allotey, J.D. Imelda, D.D. Reidpath, and R. Pool (2018), 'Social Support and Care Arrangements of Older People Living Alone in Rural Malaysia', *Ageing & Society*, 38(10), pp.2061–81.

Fujisawa, R. and F. Colombo (2009), 'The Long-Term Care Workforce: Overview and Strategies to Adapt Supply to a Growing Demand', *OECD Health Working Papers*, No. 44, Paris: OECD Publishing.

Havighurst, R.J. (1961), 'Successful Aging', *The Gerontologist*, 1(1), pp.8–13.

Hayashi, R. (2015), 'Formation of Megacities in the Era of Population Ageing - Mobility Comparison between China, Japan and South Korea', *IPSS Working Paper Series* (E) No. 24.

Hayashi, R. (2018), 'Demand and supply of long-term care for the older persons in Asia - Situational analysis and future projection', *2017 Report of Health Labour Science Research Grant 'Comprehensive study of aging populations and migration in East Asian/ASEAN countries' (H27-Chikyukibo-Ippan-001)*, pp.73–89 (in Japanese).

Hayashi, R. (2019), 'Demographic trend of long-term care workforce', *2018 Report of Health Labour Science Research Grant 'Research on population analysis, future projections, and its application corresponding to new trends in declining birth rates and aging from an international and regional perspective' (H30-Seisaku-Shitei-003)*, pp.105–23 (in Japanese).

IPSS (National Institute of Population and Social Security Research) (2017), 'Projection of Living

Arrangements of Elderly People', *IPSS Research Report* No. 71.

Katz, S., A.B. Ford, R.W. Moskowitz, B.A. Jackson, and M.W. Jaffe (1963), 'Studies of Illness in the Aged - The Index of ADL: A Standardized Measure of Biological and Psychosocial Function', *Journal of American Medical Association*, 185(12), pp.914–19.

Koizumi K. (2012), *Jochu ga ita Showa*, Kawade Shobo Shinsha (in Japanese).

Lawton, M.P. and E.M. Brody (1969), 'Assessment of Older People: Self-Maintaining and Instrumental Activities of Daily Living,' *The Gerontologist*, 9(3), pp.179–86.

Manton, K.G. (1982), 'Changing Concepts of Morbidity and Mortality in the Elderly Population', *The Milbank Memorial Fund Quarterly. Health and Society*, 60(2), pp.183–244.

Ministry of Commerce of China (2017), *2017 Report on Domestic Service Occupation Development in China* (in Chinese).

OECD (Organisation for Economic Co-operation and Development) (2015), *International Migration Outlook 2015.* Paris: OECD Publishing.

Rammohan, A. and E. Magnani (2012), 'Modelling the Influence of Caring for the Elderly on Migration: Estimates and Evidence from Indonesia', *Bulletin of Indonesian Economic Studies*, 48(3), pp.399–420.

Reher, D. and M. Requena (2018), 'Living Alone in Later Life: A Global Perspective', *Population and Development Review*, 44(3), pp.427–54.

Statistics Singapore (2019) Birth and Fertility, SingStat Table Builder, https://www.tablebuilder.singstat.gov.sg (accessed 29 March 2019).

Swee-Hock, S. (2015), *The Population of Malaysia,* Second Edition. Singapore: Institute of Southeast Asian Studies.

Tey, N-P. (2014), 'Inter-state Migration and Socio-demographic Changes in Malaysia,' *Malaysian Journal of Economic Studies*, 51(1), pp.121–39.

UN (United Nations) (1997),'Principles and Recommendations for Population and Housing Censuses Revision 1', *Statistical Papers Series M*, No. 67/Rev.1, ST/ESA/STAT/SER.M/67/Rev.1, New York, NY: UN Department of Economic and Social Affairs, Statistics Division.

UN (United Nations) (2014), *Report of the Washington Group on Disability Statistics*, E/CN.3/2014/10, UN Economic and Social Council, Statistical Commission.

UN (United Nations) (2017a), *World Population Prospects: The 2017 Revision*, DVD Edition, Department of Economic and Social Affairs, Population Division.

UN (United Nations) (2017b), *Living Arrangements of Older Persons: A Report on an Expanded International Dataset*. UN Department of Economic and Social Affairs, Population Division.

UNDP (United Nations Development Programme) (2018), *Human Development Report 2018*. New York, NY: UNDP.

UNFPA (United Nations Population Fund) Indonesia (2014), 'Indonesia on the Threshold of Population Ageing', *UNFPA Indonesia Monograph Series: No. 1*, Jakarta: UNFPA Indonesia.

WHO (World Health Organization) (2001), *International Classification of Functionning, Disability and Health: ICF.*

WHO (World Health Organization) (2010), *Measuring Health and Disability: Manual for WHO Disability Assessment Schedule WHODAS 2.0.*

WHO (World Health Organization) Regional Office for the Western Pacific (2017), *Human resources for health country profiles: Japan,* https://iris.wpro.who.int/handle/10665.1/13631 (accessed 29 March 2019).

WHO (World Health Organization) (2018), *Global Health Workforce Statistics, The 2018 update*, http://www.who.int/hrh/statistics/hwfstats/ (accessed 29 March 2019).

Annex 1: Setting the Care Need Rate for Persons Aged 85 Years and Over

Empirical observation shows that the care need by age group 65–69, 70–74, 75–79, and 80–84 years is almost identical in four countries (China, Japan, the Republic of Korea, and Germany). For the older age group, 85–59, 90–94, and 95+ years, care need is highest in Japan, followed by Germany, the Republic of Korea, and China. This order is similar to the level of life expectancy – the higher the life expectancy, the higher the care need rate (Annex 1, Table 1).

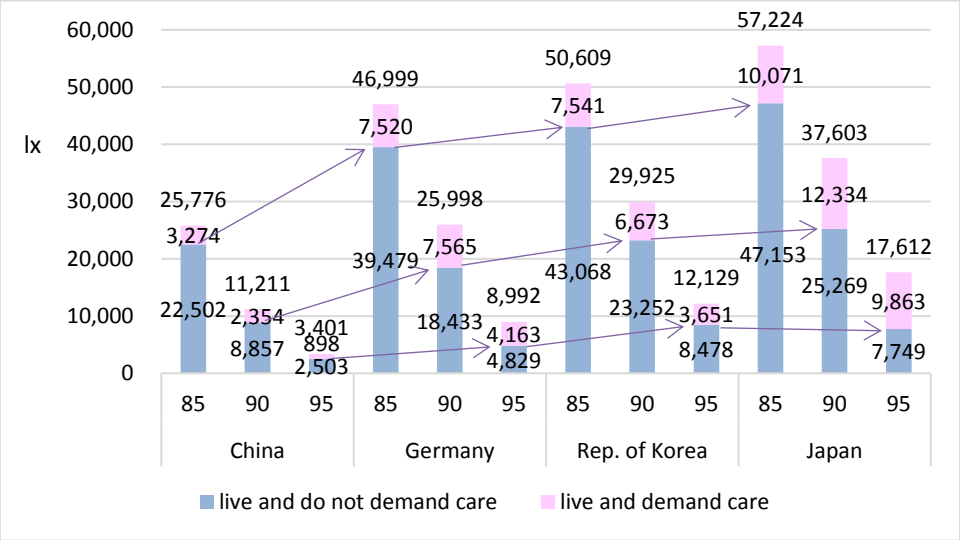
Annex 1, Table 1. Care Need Rate and Life Table Functions (both sexes)

Age	2010	2015	2015	2015
	China	Rep. of Korea	Germany	Japan
	Cannot live independently	Care grade 1–3	Nursing care level II+III	Care level 3–5
65–69	1.5%	0.8%	1.3%	1.0%
70–74	2.7%	2.0%	2.2%	2.0%
75–79	4.3%	4.2%	3.9%	4.1%
80–84	8.0%	8.0%	8.2%	8.8%
85–89	12.7%	14.9%	16.0%	17.6%
90–94	21.0%	22.3%	29.1%	32.8%
95+	26.4%	30.1%	46.3%	56.0%
e_x (expectation of life at age x in life table)				
85	5.21	6.82	6.23	7.70
l_x (survivors at age x in life table)				
85	25,776	50,609	46,999	57,224
90	11,211	29,925	25,998	37,603
95	3,401	12,129	8,992	17,612

Sources:
China – Population census 2010. Compiled by Authors.
Rep. of Korea: National Health Insurance Service, Long-term Care Insurance Statistics 2015. Special tabulation by Authors.
Germany – Nursing care statistics, Federal Statistical Office.
Japan: Survey of Long-term Care Benefit Expenditures, October 2015, Ministry of Health, Labour and Welfare.
Life table functions – World Population Prospects: The 2017 Revision, United Nations Population Division.

This is to say, in a country where people can live longer, some survive because care need is available, whereas in a country where people die more easily, some die before receiving care. Annex 1, Figure 1 shows a theoretical schema for this. For example, in China, out of 100,000 persons born, 25,776 persons survive at the age of 85. Among these 25,776 persons, 3,274 need care and 22,502 do not need care. In Japan, 57,224 persons survive at the age of 85, among those, 10,071 need care and 47,153 do not need care. In Japan, people have more chances of surviving; there are three times more persons who need care, but more than double live without needing care compared to China. The higher the survivorship (lx), the higher the care need rate. This is to say that the healthy survivor effect (Baillargeon and Wilkinson, 1999) or a form of the dynamic equilibrium (Manton, 1982) is present.

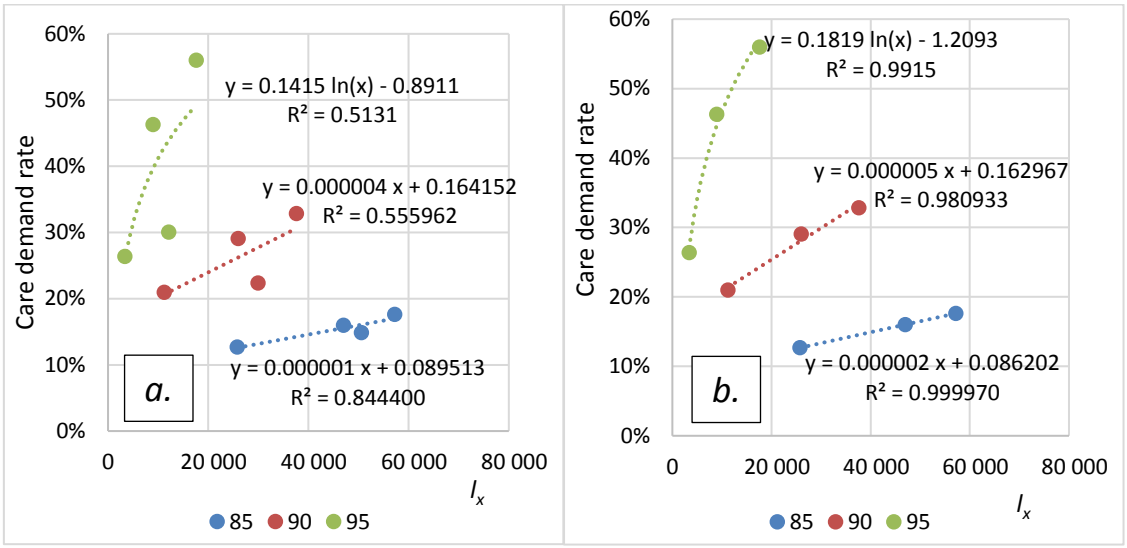
Annex 1, Figure 1 Theoretical Schema of l_x (Survivors) With and Without Care Need



Note: According to the Sullivan method of calculating healthy life expectancy, Lx, instead of lx, should be used. Due to the data availability, lx is used here as an alias for Lx for the purpose of visualising the theoretical schema.
Sources: Same as Annex 1, Table 1.

Considering this relationship between life table functions and care need rate, the estimation formulae were established using the data of the four countries. Annex 1, Figure 2 shows the relationship between l_x (survivors in life table at age 85, 90, 95 years) and care need rate of respective 5-year age groups starting with 85, 90, 95 years old, for four countries (a) and three countries except the Republic of Korea (b). Linear regression was employed for ages 85 and 90 years, and the logarithmic regression was employed for age 95 years. Although the data of three countries (b) gives a much better R^2 (correlation coefficient), formulae using four countries data (a) were used to estimate the care need in Chapter 2.

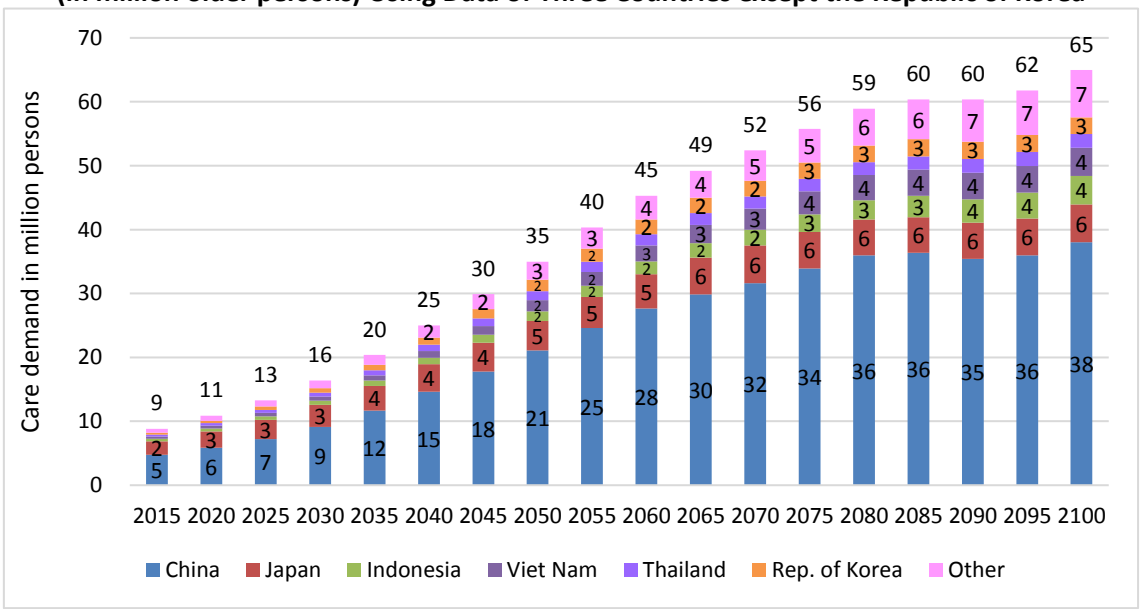
Annex 1, Figure 2 Age-specific Care Need Rate and Life Table Function (l_x)



Source: Calculated by Author.

While there is no reason to exclude the Republic of Korea at this stage, care need is estimated using the better-fitting formulae of three countries data (b), and is shown in Annex 1, Figure 3 and Annex 1, Table 2 for reference. The estimates tend to be larger.

Annex 1, Figure 3 Care Need Estimates in East and Southeast Asia (in million older persons) Using Data of Three Countries except the Republic of Korea



Source: Estimated by Authors.

Annex 1, Table 2 Estimates of Care Need in East and Southeast Asia (in 1,000 older persons)

Using Three Countries' Data except the Republic of Korea

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
China*	4,748	5,863	7,235	9,128	11,667	14,648	17,800	21,119	24,601	27,673	29,843	31,614	33,900	35,985	36,376	35,440	35,960	38,021
Japan	2,120	2,567	3,007	3,442	3,890	4,278	4,483	4,593	4,877	5,355	5,780	5,906	5,746	5,610	5,555	5,619	5,765	5,939
Indonesia	383	445	536	665	834	1,039	1,266	1,508	1,751	1,992	2,232	2,478	2,734	3,019	3,337	3,687	4,055	4,431
Viet Nam	376	442	526	641	801	1,041	1,369	1,756	2,145	2,522	2,891	3,268	3,636	3,956	4,137	4,164	4,180	4,407
Thailand	301	386	491	618	776	967	1,186	1,409	1,606	1,758	1,857	1,903	1,929	1,978	2,065	2,149	2,178	2,173
Rep. of Korea	287	391	527	691	889	1,132	1,431	1,756	2,048	2,261	2,404	2,488	2,542	2,610	2,676	2,724	2,660	2,602
China, Taiwan	147	187	234	293	372	475	599	719	809	878	941	1,004	1,047	1,049	1,040	1,030	991	950
Philippines	136	165	201	249	308	377	452	533	625	734	861	1,009	1,177	1,360	1,554	1,759	1,981	2,227
Myanmar	84	96	115	141	172	202	233	263	293	322	351	384	418	450	478	499	517	536
North Korea	73	87	105	122	146	180	217	260	300	334	362	389	427	476	523	564	598	633
China, Hong Kong	69	87	108	132	164	212	274	335	383	416	441	472	501	520	519	503	484	491
Malaysia	56	74	97	126	163	207	258	319	394	485	595	725	867	1,000	1,099	1,165	1,220	1,293
Singapore	29	41	57	78	106	142	184	226	263	293	319	341	357	373	393	413	424	433
Cambodia	18	23	28	37	48	61	75	97	119	149	186	230	277	322	357	399	443	497
Lao PDR	8	9	10	13	16	20	24	31	38	48	59	71	84	97	109	121	134	147
Mongolia	4	4	5	7	9	12	16	20	24	29	33	38	42	46	50	56	64	75
China, Macao	3	3	5	7	9	14	19	25	30	34	38	42	48	55	57	55	53	55
Timor-Leste	1	1	2	2	3	3	4	4	5	6	7	9	12	17	21	27	34	41
Brunei	1	1	1	2	2	3	4	6	7	9	11	12	14	15	16	17	18	18
Total	**8,845**	**10,874**	**13,291**	**16,391**	**20,374**	**25,014**	**29,895**	**34,979**	**40,320**	**45,298**	**49,212**	**52,383**	**55,757**	**58,937**	**60,363**	**60,390**	**61,759**	**64,970**

* Excluding Taiwan, Hong Kong, and Macao.

Source: Estimated by Authors.

Annex 2: Care Industry and Occupation

Annex 2, Table 1 Composition of Industry of Human Health and Social Work Activities

	Group	Class	Description
Division 86			**Human health activities (Health)**
	861	8610	Hospital activities
	862	8620	Medical and dental practice activities
	869	8690	Other human health activities
Division 87			**Residential care activities (Social work)**
	871	8710	Residential nursing care facilities
	872	8720	Residential care activities for mental retardation, mental health, and substance
	873	8730	Residential care activities for the elderly and disabled
	879	8790	Other residential care activities
Division 88			**Social work activities without accommodation (Social work)**
	881	8810	Social work activities without accommodation for the elderly and disabled
	889	8890	Other social work activities without accommodation

Source: United Nations (2008), *International Standard Industrial Classification of All Economic Activities, Revision 4*, Statistical Papers, Series M No.4/Rev.4, Statistics Division, Department of Economic and social Affairs, https://unstats.un.org/unsd/publication/seriesM/seriesm_4rev4e.pdf (accessed 29 March 2019).

Annex 2, Table 2 Care-related Occupation and Domestic Workers

Care-related Occupation

ISCO-08 Code				Description
2	Professionals			
	22	Health professionals		
		221	Medical doctors	
			2211	Generalist medical practitioners
			2212	Specialist medical practitioners
		222	Nursing and midwifery professionals	
			2221	Nursing professionals
			2222	Midwifery professionals
		223	Traditional and complementary medicine professionals	
			2230	Traditional and complementary medicine professionals
		224	Paramedical practitioners	
			2240	Paramedical practitioners
		226	Other health professionals	
			2261	Dentists
			2262	Pharmacists
			2263	Environmental and occupational health and hygiene professionals
			2264	Physiotherapists
			2265	Dieticians and nutritionists
			2266	Audiologists and speech therapists
			2267	Optometrists and ophthalmic opticians
			2269	Health professionals not elsewhere classified

3	Technicians and associate professionals			
	32	Health associate professionals		
		321	Medical and pharmaceutical technicians	
			3211	Medical imaging and therapeutic equipment technicians
			3212	Medical and pathology laboratory technicians
			3213	Pharmaceutical technicians and assistants
			3214	Medical and dental prosthetic technicians
		322	Nursing and midwifery associate professionals	
			3221	Nursing associate professionals
			3222	Midwifery associate professionals
		323	Traditional and complementary medicine associate professionals	
			3230	Traditional and complementary medicine associate professionals
		325	Other health associate professionals	
			3251	Dental assistants and therapists
			3252	Medical records and health information technicians
			3253	Community health workers
			3254	Dispensing opticians
			3255	Physiotherapy technicians and assistants
			3256	Medical assistants
			3257	Environmental and occupational health inspectors and associates
			3258	Ambulance workers
			3259	Health associate professionals not elsewhere classified
	33	Business and administration associate professionals		
		334	Administrative and specialized secretaries	
			3344	Medical secretaries
		341	Legal, social, and religious associate professionals	
			3412	Social work associate professionals
5	Service and sales workers			
	51	Personal service workers		
		515	Building and housekeeping supervisors	
			5152	Domestic housekeepers
	53	Personal care workers		
		532	Personal care workers in health services	
			5321	Health care assistants
			5322	Home-based personal care workers
			5329	Personal care workers in health services not elsewhere classified

Domestic workers

ISCO-08 Code				Description
9	Elementary occupations			
	91	Cleaners and helpers		
		911	Domestic, hotel, and office cleaners and helpers	
			9111	Domestic cleaners and helpers

Source: ILO (2012), *International Standard Classification of Occupations – Structure, group definitions and correspondence tables*, https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_172572.pdf (accessed 29 March 2019).