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The authors are solely responsible for the content of the Working Paper.

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Do the Winners Take It All? Provincial Population Development in Thailand

Abstract

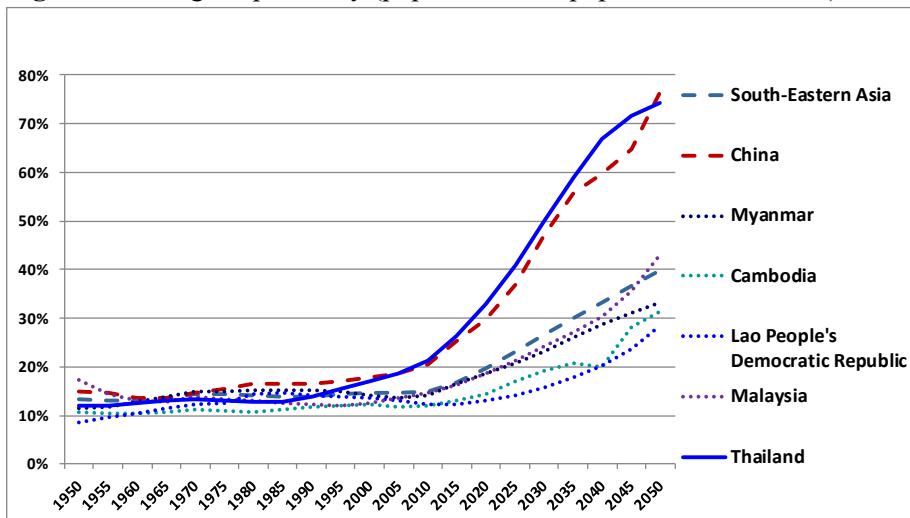
In this article, we present a decomposition model to estimate the impact of migration on the potential labor force in Thai provinces in the inter-census period 2000-2010. Using this model we divide population change for the working age population into two components: on the one hand, the impact of change due to population aging and on the other change due to either population gains or losses as a result of migration. The analyses presented are predominantly based on secondary data from the 2000 and 2010 Population and Housing Census in Thailand, provided by the National Statistical Office of Thailand. While migration slightly mitigated the impact of aging of the potential labor force in Thailand, in most of the Thai provinces in- and out-migration contributed much more to change in the working age population than natural change. Selective migration resulted in a highly polarized population distribution: a limited number of “winner” provinces with population gains due to in-migration in all four 10-year age groups of the working age population together with a higher educated population, versus the majority of the provinces experiencing population losses in at least one of the four age groups and a much lower educated population. This unequal provincial population development makes it ever more important to consider provincial differences in age-composition when designing aging policies for Thailand. As the decomposition model is generally applicable it can be applied in all countries with limited migration data and significant labor migration dynamics to examine selective migration at different geographical scales.

Keywords: Thailand; population aging; migration; labor; population projections; education

Introduction

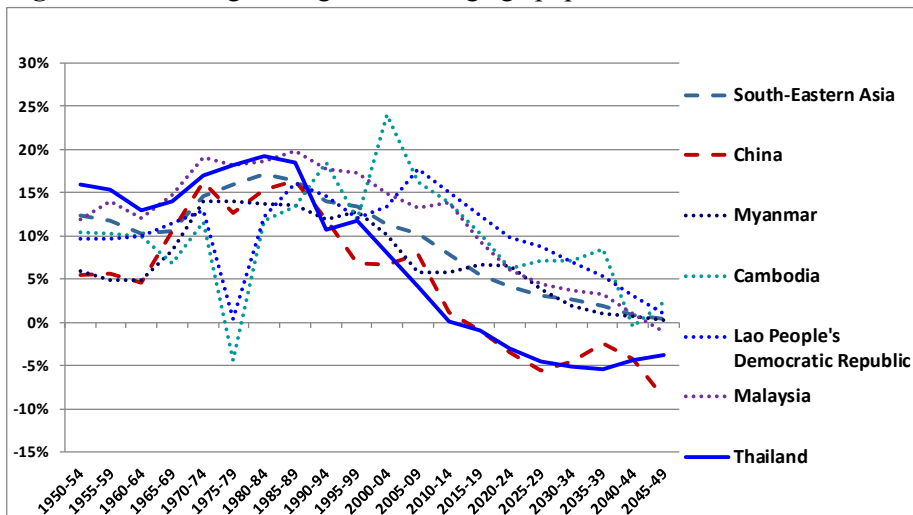
Thailand is aging more rapidly than other low- and middle-income countries in Asia. Over the last 25 years, old age dependency (OAD¹) increased from 13.9 in 1990 to 26.3 in 2015. This is an even more significant increase than observed in China and a much stronger increase than experienced by its neighbouring countries Cambodia, Lao People’s Democratic Republic, Myanmar and Malaysia. This development, which is the result of Thailand’s fast fertility decline starting in the late 1960s, is expected to continue during the next decades (Figure 1). Thailand is also one of the first countries in South-Eastern Asia confronted with a shrinking size of the working age population (WAP)². This too is expected to continue for several decades (Figure 2).

Figure 1. Old age dependency (population 60+/population 20-59*100)



Source: United Nations (2017), medium variant

Figure 2. Percentage change in working age population, 1950/55 – 2045/50



Source: United Nations (2017), medium variant

¹ Old age dependency (OAD) calculated as the population aged 60 and over divided by the population aged 20-59 expressed in percentages.

² Working age population (WAP) defined as the population aged from 20 to 59.

Until recently, the share of the working age population in Thailand was relatively large and increasing. This will change rapidly (United Nations 2017), triggering fears what this might entail for future economic growth as an increasing share of the population will be depending on the output produced by a decreasing share of the working age population (UNFPA 2017; World Bank 2016). Different definitions of the working age population, i.e. different lower and/or upper age limits of the potential labor force - though having an effect on the size of the working age population - will not change the expected trend in the share. In all cases, the share of the working age population of Thailand will start to decline within a decade from now. This declining share of the working age population, also known as demographic burden (Van der Gaag and De Beer 2015), is an important indicator of foreseeable challenges in terms of e.g. labor supply and support of the growing number of older Thais.

All other things remaining equal, the described demographic changes in Thailand may result in declining economic prospects at a time when the country is still trying to escape the so-called “middle-income trap” (Chalise 2016; Jitsuchon 2012; Kyozyuka 2016). This trap refers to the phenomenon in which middle-income economies are not able to move on to becoming high income economies. Even though there is no consensus on what explains the middle-income trap, and there is even doubt whether it does exist (The Economist 2017), there are several likely determinants of growth slowdowns that are applicable to Thailand. Among them are population-related factors, such as shortages of skilled and unskilled labor and a mismatch between the skills demanded in the labor market and the skills provided by graduates (Jitsuchon 2012). Given the history of fertility decline in Thailand and based on experience elsewhere, it is unlikely that fertility in Thailand will increase significantly beyond current levels in the near future. At the same time, continuous increases in life expectancy are likely. Both developments together mean a continuation of population aging, a trend that might be mitigated by large-scale immigration from abroad of people of working age but neither reversed nor halted.

Due to large differences in the composition of the population between provinces – be it age, educational attainment, or sector of economic activity – the consequences of demographic change will not be taking place uniformly across the country. While declining fertility and mortality are important determinants of aging, internal and international migration – people moving between provinces as well as between Thailand and (surrounding) countries – also contribute to regional differences in population composition. According to the latest Thai census, 21.8% of the population were living outside their province of birth in 2010, and 9.4% reported having migrated during the preceding 5 years (National Statistical Office of Thailand 2010). In general, lower fertility and mortality rates entail that the population in urban areas is aging more quickly, but due to selective outmigration of young people, rural regions will likely still age faster than urban ones. Also, many socio-economic developments at sub-national level are directly related to regional demographic change. The risk of social exclusion for instance is higher in areas with weak economic performance, and economic prospects may be worse in regions with disproportionately high proportions of older people. To be able to cope successfully with demographic change, therefore, demographic analyses at national level are not sufficient. To map differences in demographic development between the 76 provinces of Thailand plus Bangkok is just as important. With few exceptions (for example by Keeratipongpaiboon (2012a)), most existing research focuses on the national or regional level, neglecting developments on the provincial level. We aim to fill this void.

To successfully address challenges of demographic change at the provincial level it is important to take into account the impact of migration flows. Unfortunately, detailed internal and international migration statistics by province are not available. In this paper we present a simple decomposition model to estimate the impact of migration on the potential labor force in Thai provinces within the inter-census

period 2000-2010. Using this model we divide population change for the working age population into two components: 1) the impact of change due to population aging, and 2) change due to either population gains or population losses due to migration.

The organization of this paper is as follows. In the next section, we introduce the data and methods used for our analyses. In the following section we present our results. We focus on 1) the decomposition of changes in the working age population into natural change and population gains and losses due to migration, 2) the decomposition of changes in old age dependency, and 3) differences between different types of provinces. In the discussion part of the paper we relate our results to existing literature on elderly care and labor market issues, while in the concluding section we review the main topics addressed.

Data and methods

The analyses presented in this paper are predominantly based on secondary data from the 2000 and 2010 Population and Housing Census in Thailand, provided by the National Statistical Office of Thailand (n.d.a, n.d.b). For the decomposition model we used detailed tables on population by age and sex on provincial level. The decomposition contains the following steps:

- (1) To estimate the impact of population aging we calculate a ‘natural change only’-development. For this development we assume that the population aged 10-49 present in 2000 will only change due to mortality and cohort replacement. In the absence of provincial mortality data, we estimate national survival rates for the period 2000-2010 for ten year age groups based on the United Nations life table survivor estimates for males and females for Thailand for the periods 2000-2005 and 2005-2010 (United Nations 2017). Applying the survival rates to the age groups 10-19, 20-29, 30-39 and 40-49 of 2000 results in the working age population aged 20-59 in 2010 given that there was no migration between the two censuses³.
- (2) To estimate the impact of migration in terms of net gains or net losses, we calculate for each ten-year age group a cohort-change ratio (CCR) between the census of 2000 and of 2010. For example, to calculate the CCR for age group 10-19, we used the following formula:

$$CCR_{10-19} = P_{20-29,2010} / P_{10-19,2000}$$

In which

CCR_{10-19} : cohort-change ratio for age group 10-19

$P_{20-29,2010}$: population aged 20-29 as of 1 September 2010 (Census 2010)

$P_{10-19,2000}$: population aged 20-29 as of 1 April 2000 (Census 2000)

The CCRs for the age groups 20-29, 30-39 and 40-49 are calculated in a similar way. Each CCR larger than the corresponding survival rate refers to net population gains in the province; each CCR smaller than the corresponding survival rate refers to net population losses from the province.

- (3) To calculate the impact of in-migration in each age group in the working age population, we assume that the population in 2000 will change due to mortality, aging and population gains through arrivals, but we disregard population losses due to departures. That means that we use the CCRs to

³ Wherever we refer to the inter-census period 2000-2010, strictly speaking we refer to a period slightly longer than 10 years since the inter-census period refers to the exact period of 1 April 2000 to 1 September 2010. To take into account that this period covers 125 months, we multiplied the estimated survival rates based on the UN life table survivors by 120/125.

calculate population change in a certain age group only if the CCR outnumber the survival rate. Otherwise we use the survival rate.

- (4) To calculate the impact of out-migration, we assume the opposite: we use the CCRs to calculate population change only if the survival rate outnumber the CCR, otherwise we use the survival rate.

Given that we do not have provincial survival rates, the above calculations ignore sub-national differences in mortality since we apply the national pattern to all provinces. In case of higher provincial than national mortality we may erroneously allocate the difference between the CCR and survival rate to out-migration; in case of lower mortality to in-migration. As we focus on the age range 10-49, however, differences between national and provincial survival are expected to be small.

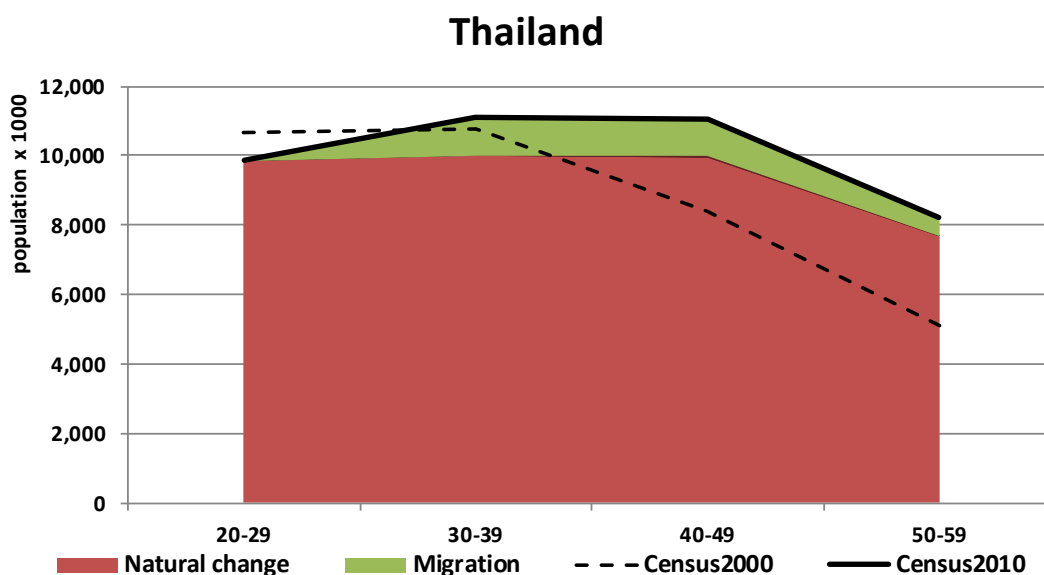
Results

In this section, we show how differences in natural change (the combined effect of cohort replacement and mortality) and migration contributed to changes in the working age population and population aging in the provinces of Thailand between the censuses of 2000 and 2010.

Decomposing changes in the working age population

In the period 2000-2010, the working age population of Thailand increased from 35 to 40.3 million people. Figure 3 shows the inter-census development in each of the four 10-year age groups of the working age population. This figure clearly shows the increase as well as the shift in the age composition

Figure 3. Working age population in 2000 and 2010 and decomposition of its change between 2000 and 2010



Source: National Statistical Office (n.d.a, n.d.b), United Nations (2017); own calculations

Note: The dashed line shows the population by age group according to the census 2000 and the black line the population by age group according to the census 2010. The red area in the figure shows which age structure would have been observed in 2010 if only natural changes had occurred, while the green area shows the additional population gains due to migration from abroad.

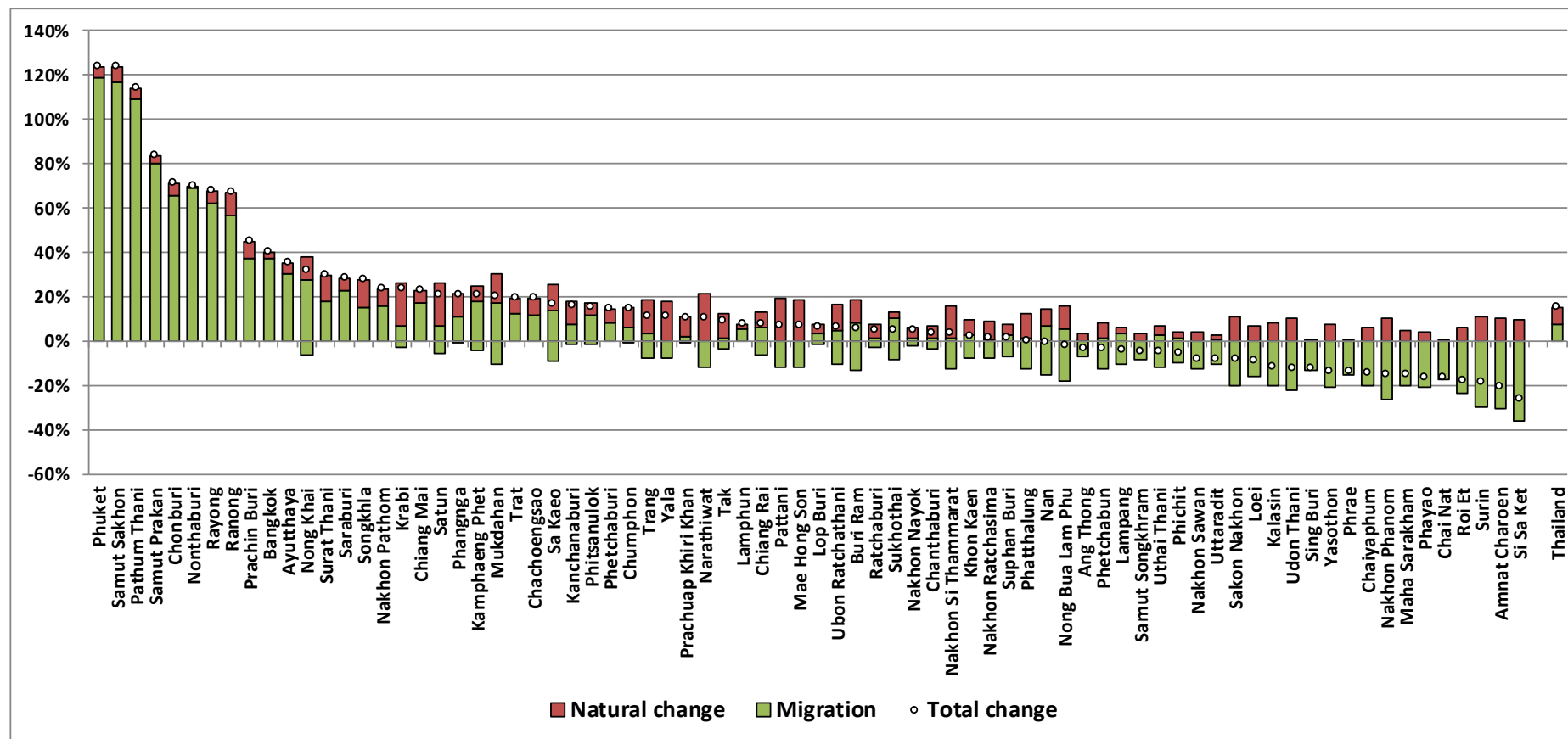
of the working age population towards higher age-groups: large increases in the age groups 40-49 and 50-59, hardly any increase in the age group 30-39 and a small decline in the age group 20-29. Without migration the growth of the working age population would have been about half of the total increase (7 percent), old age dependency would have been slightly higher (22.4% versus 21.4%), and the average age slightly lower (39.1 instead of 39.4). Thus, for Thailand as a country migration did slightly mitigate the impact of aging of the potential labor force due to cohort replacement and mortality.

In most of the Thai provinces in-migration and out-migration contributed much more to change in the working age population than natural change⁴. While in the intercensus period (2000-2010) the working age population of Thailand increased by 15 percent, changes in the working age population of the provinces varied from -27 percent in Si Sa Ket to +124 percent in Phuket (Figure 4).

Twenty of the provinces gained people in all four ten-year age groups of the working age population. In three of them the size of the working age population even more than doubled in the intercensus period (Phuket, Samut Sakhon and Pathum Thani). Of the remaining provinces, 22 lost people in one or more of the age groups due to departure and 34 gained population in some age groups and lost people in others (as illustrated by part of the green bar above and below the x-axis in Figure 4). In general, losses of youngsters were to some extent compensated by gains of older adults, both contributing to aging of the working age population. In 27 of the provinces the absolute size of the working age population declined (i.e. negative “total change” in Figure 4). Provinces like Mae Hong Son, Pattani and Narathiwat would have seen a decline in their working age population due to net migration losses, but natural change actually led to a small increase.

⁴ In- and outmigration on the provincial level capture the combined effect of both national and international migration.

Figure 4. Percentage change in the working age population (age 20-59), 2000-2010, by type of change



Source: National Statistical Office (n.d.a, n.d.b), United Nations (2017); own calculations

Note: Bueng Kan included in Nongkhai since Bueng Kan did not exist before 2011

Decomposing changes in old age dependency

Differences in old age dependency (OAD) over time can also be decomposed in change that is due to natural change and change due to migration. Overall, OAD for Thailand in 2010 was 21.4 percent. This average masks a lot of diversity across provinces: the lowest level was observed in Samut Sakhon (8.1%) and Phuket (11.9%), whereas Chai Nat and Sing Buri have the highest old age dependency (35.2% and 33.0%, respectively). Apart from Samut Sakhon and Ayutthaya, old age dependency increased in all provinces between 2000 and 2010, varying from a rise of 0.02 percentage points in Ranong to 14.1 percentage points in Roi Et. In addition to Roi Et, the relative increase in OAD was over 80 percent in Nong Bua Lam Phu, Maha Sarakham and Kalasin. While in these four and several other provinces aging due to natural change has been intensified by outflows of migrants, in Samut Sakhon and Ayutthaya large inflows of migrants reversed the increasing trend in OAD (Figure 5).

A clear dichotomy: the “Winner provinces” versus the rest

The decomposition of population change in the provinces of Thailand reveals a clear dichotomy: a limited number of provinces with population gains due to selective in-migration in all four age groups of the working age population (the so-called “winner provinces”) versus the majority of the provinces experiencing population losses due to negative net-migration in at least one of the four ten-year age groups (the “rest provinces”). Figure 6 provides a map of the two types of provinces including the relative size of the population in all Thai provinces in 2010. A list of the winner provinces is given in Table 1.

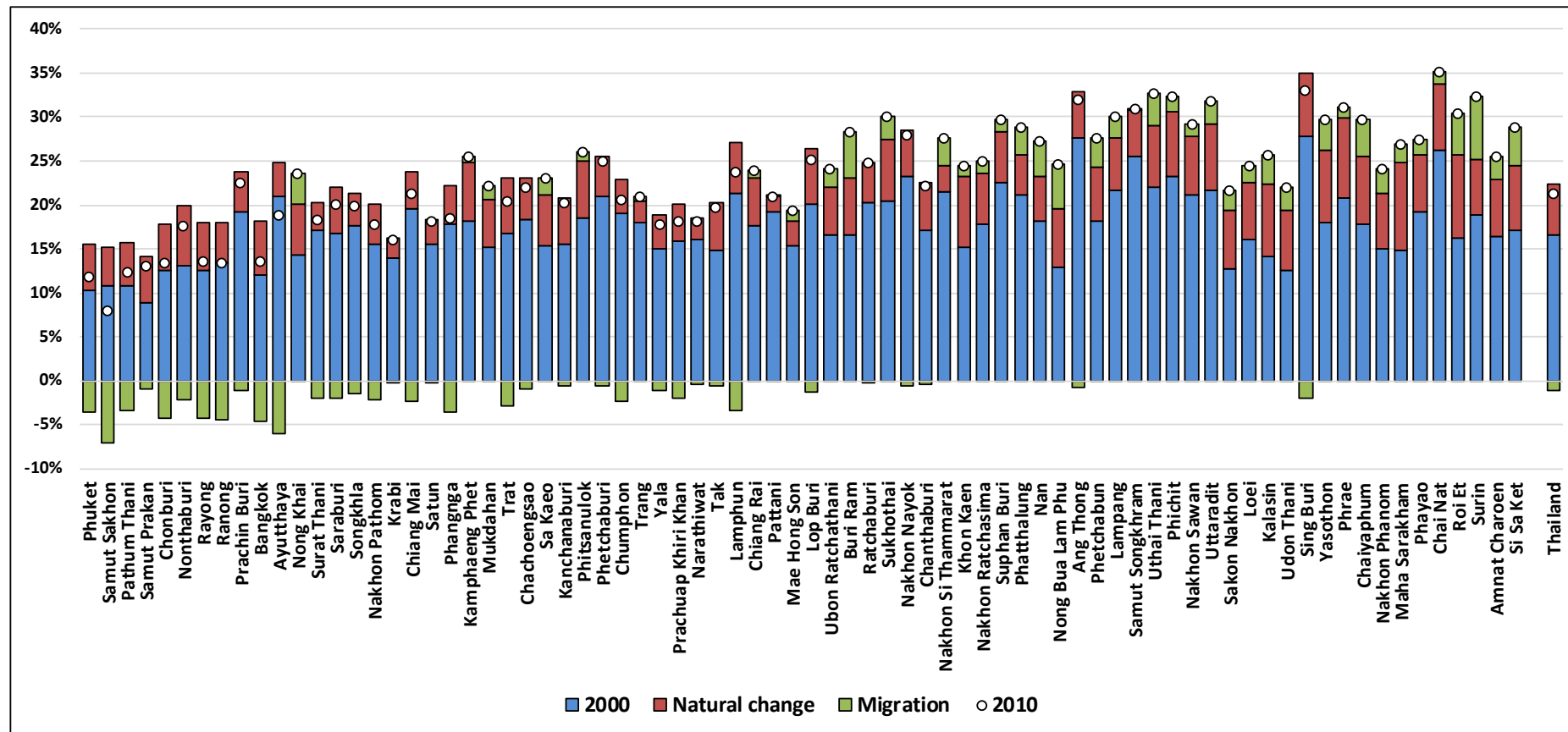
Table 1. Provinces with population gains in age groups 20-29, 30-39, 40-49 and 50-59 (winner provinces)

1. Ayutthaya (C)	6. Lamphun (N)	11. Phuket (S)	16. Samut Sakhon (C)
2. Bangkok	7. Nakhon Pathom (C)	12. Prachinburi	17. Saraburi (C)
3. Chachoengsao (C)	8. Nonthaburi (C)	13. Ranong (S)	18. Songkhla (S)
4. Chiang Mai (N)	9. Pathumthani (C)	14. Rayong (C)	19. Surat Thani (S)
5. Chonburi (C)	10. Phetchaburi (C)	15. Samut Prakan (C)	20. Trat (C)

Note: Regional information in parentheses (C=Central, N=North, S=South)

Thirteen of the 20 winner provinces are concentrated in the Central region around Bangkok. Three of them – Chachoengsao, Rayong and Chonburi – represent the so called Eastern Economic Corridor (EEC), an initiative that was initiated in 2016 and hence after our period of analysis. However, these three provinces have seen industrial development long before and are likely to continue to benefit from selective in-migration of people of working-age. Also Bangkok itself as well as selected provinces in the North (Chiang Mai and Lamphun) and the South (Phuket, Ranong, Surat Thani and Songkhla) fall in the winner category, also them being centers of economic activity. In total, slightly less than 40 percent of the population lived in these 20 provinces in 2010. In 2000 their share was still 32 percent. While at least one of the provinces of North and South Thailand belongs to the winner provinces, not a single province in the Northeast belongs to this group.

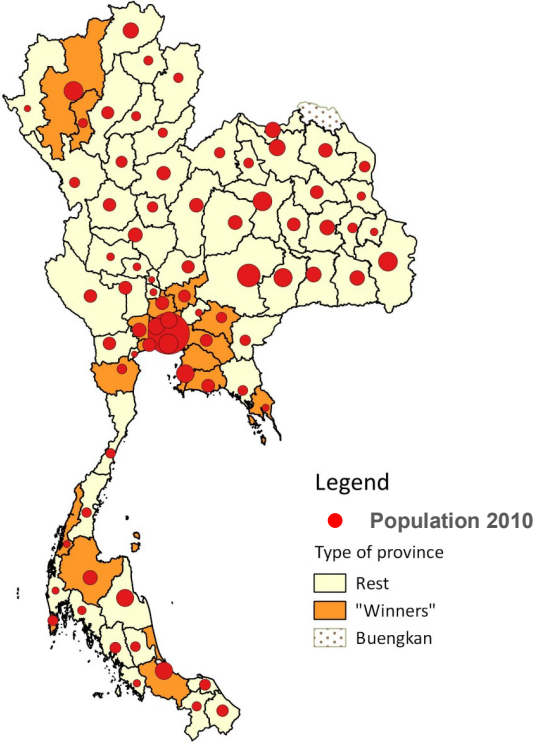
Figure 5. Old age dependency (60+/20-59) in 2000 and 2010 and contribution of natural increase and migration to the observed change



Source: National Statistical Office (n.d.a, n.d.b), United Nations (2017); own calculations

Note: Bueng Kan included in Nongkhai since Bueng Kan did not exist before 2011

Figure 6. Winner provinces and provincial population in Thailand, 2010



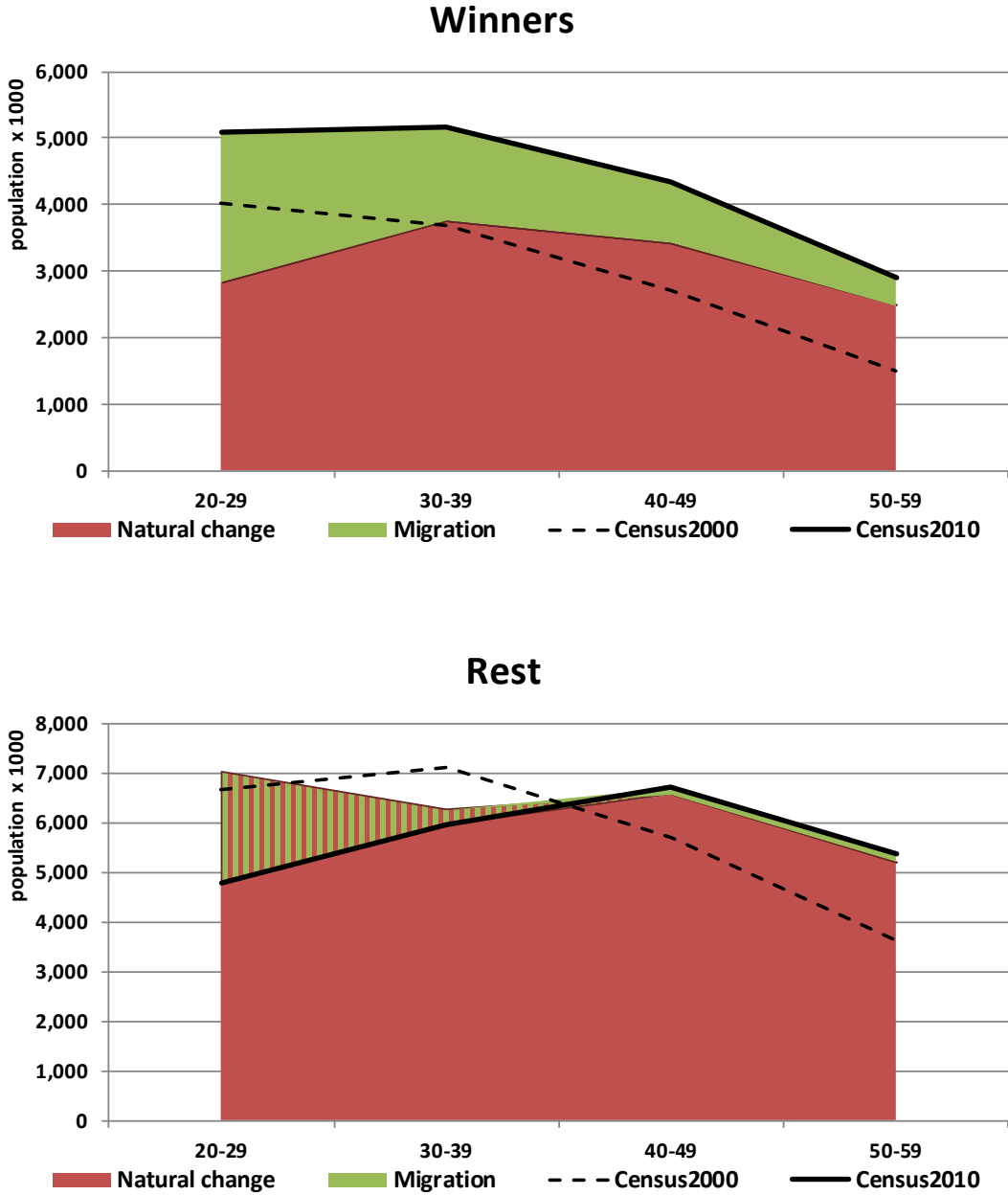
Source: National Statistical Office (n.d.a, n.d.b), United Nations (2017); own calculations
 Note: “Winners” refer to provinces with positive net migration across all four 10-year age-groups of the working-age population (ages 20-59) between 2000 and 2010

The average development of the working age population aggregated over the winner provinces clearly shows the significant increase of the size of the potential labor force due to in-migration (Figure 7, top graph), from a rise of 5 percent in case of natural change only to 46.8 percent including population gains due to arrivals. Overall, in-migration results in a rejuvenation of the working age population, with a decline of the average age from 39.4 in case of natural change only to 37.9 including arrivals.

The overall development of the working age population in the rest provinces is quite different (Figure 7, bottom graph). These provinces experience on average a substantial decline of the younger part of the working age population (20-39) with hardly any increase in the age groups 40-49 and 50-59. In case of natural change only, the size of the working age population in these provinces would have risen by 8.5 percent. Due to out-migration of the young, the final result is a decline of 1.2 percent and an increase of the average age from 39 in case of natural change only to 40.5.

Table 2 summarizes the aggregated population development in the two different types of provinces and in Thailand overall and shows the changes between the censuses of 2000 and 2010. While the size of the total population in the winner provinces grew substantially, from 19.2 to 26.0 million, the population in the rest of Thailand slightly declined, from 41.7 to 40.7 million. On average, the winner provinces have relatively large, young and well educated potential labor forces, and low young and old age dependencies.

Figure 7. Working age population in 2000 and 2010 and decomposition of its change between 2000 and 2010, two types of Thai provinces, 2000-2010



Source: National Statistical Office (n.d.a, n.d.b), United Nations (2017); own calculations

Note: The dashed line shows the population by age group according to the census 2000 and the black line the population by age group according to the census 2010. The red area in the figure shows which age structure would have been observed in 2010 if only natural changes had occurred. The green area shows the additional population gains due to migration from abroad. The green-red striped area refers to the reduction of the size of the working age population due to out-migration compared to how it would have been in case of natural change only.

Table 2. Demographic and socio-economic characteristics of Thailand overall, winner provinces, and remaining provinces, 2000 and 2010

	Winners (20)		Rest (56 ^a)		Thailand (76 ^a)	
	2000	2010	2000	2010	2000	2010
Population (millions)	19.2	26.0	41.7	40.7	60.9	66.7
Share population	32%	39%	68%	61%	100%	100%
Pop age 20-59 (WAP ^b ; millions)	11.9	17.5	23.1	22.8	35.0	40.3
Share WAP	62.1	67.3	55.3	56.0	57.4	60.4
Change size WAP 2000-10		46.8%		-1.2%		15.1%
Change share WAP 2000-10		8.3%		1.3%		5.1%
Average age WAP	36.4	37.9	37.7	40.5	37.3	39.4
YAD ^c (0-19/20-59)	46.7	33.0	63.1	52.9	57.5	44.3
OAD ^d (60+/20-59)	14.3	15.7	17.7	25.7	16.6	21.4
Employment rate (15+) ^e	70.6	73.5	75.4	74.3	73.3	73.5
% Employment in agriculture ^e		24.7		61.5		43.6
% At least Secondary education (age 30-59)		54.7		29.2		39.6
^a number of provinces; Buengkan included in Nongkhai since Buengkan did not exist yet in 2000 ^b WAP: working age population ^c YAD: young age dependency ^d OAD: old age dependency ^e Calculated as the arithmetic average of provincial rates						

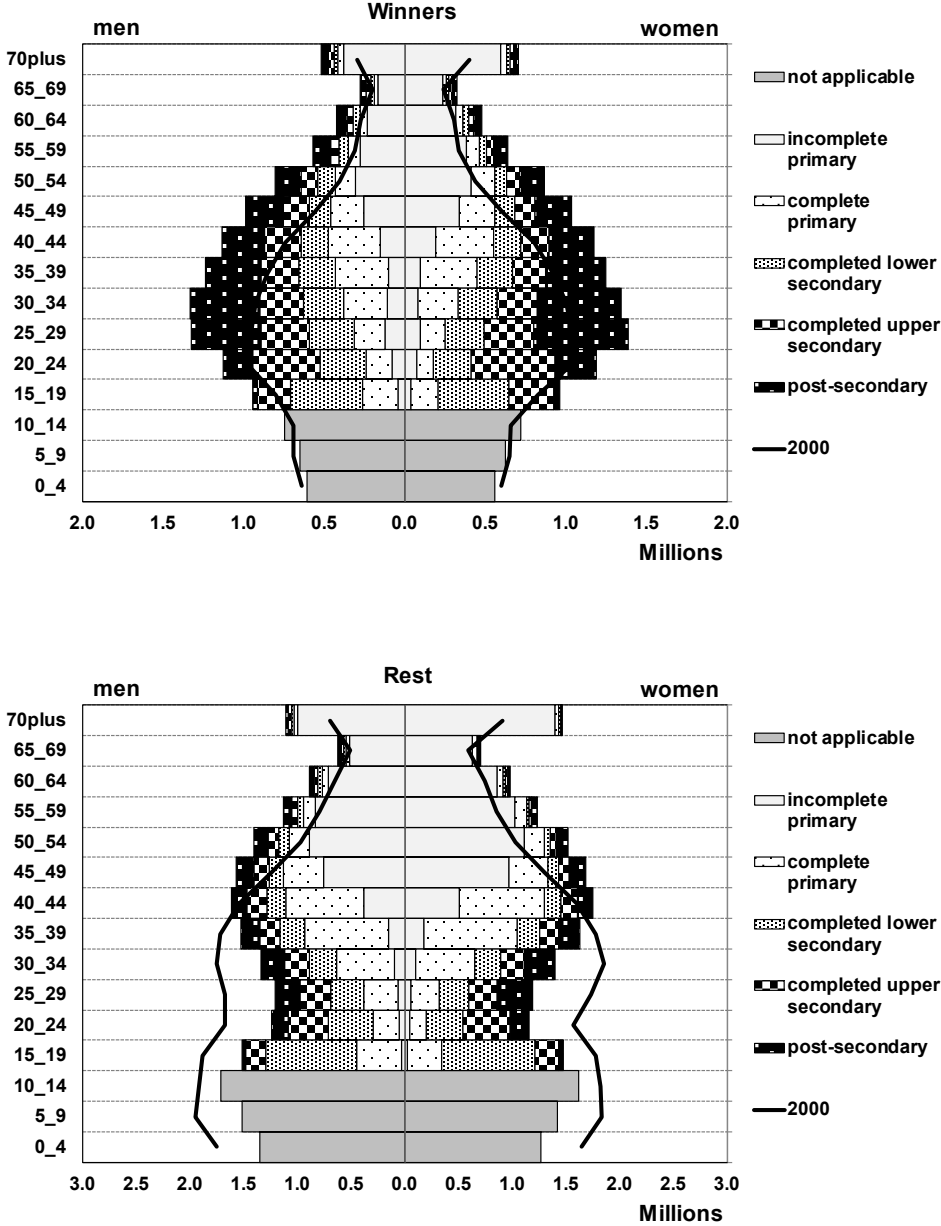
Source: National Statistical Office of Thailand (n.d.a, n.d.b); own calculations.

Figure 8 shows the population pyramids for the two types of provinces. This figure clearly shows the much higher share of working age population and a significantly lower share of the population aged 70+ in the winner provinces. Figure 8 also provides information on the age-specific level of educational attainment⁵. Apart from much larger working-age populations, the winner provinces also have a substantially higher educated adult population. Compared to the remaining provinces, a significantly higher share of their population completed lower and upper secondary education or even gained a post-secondary degree.

Although the size of the working age population in the rest provinces declined in the intercensus period, the share of the working age population in 2010 slightly outnumbered the share in 2000, still leaving some room for economic growth. The declining employment rate, high percentage of employment in agriculture and the low percentage of inhabitants with at least completed secondary education, however, point to substantially less favourable economic prospects in the rest provinces compared to the winner provinces.

⁵ The large share of the population with incomplete primary education above age 40 is due to the fact that compulsory education in Thailand was only 4 years until a legal extension to 6 years in 1961 which began to be enforced in 1963 (Bhuapirom 1978). Compulsory education was hence lower than the 6 years needed to complete primary education (4 years of lower and 2 (initially 3) years of upper primary education).

Figure 8. Population pyramids by age, sex and highest level of educational attainment, two types of Thai provinces, 2010



Source: National Statistical Office (n.d.a, n.d.b); own calculations

Note: “Winners” refer to provinces with positive net migration across all four 10-year age-groups of the working-age population (ages 20-59) between 2000 and 2010

Discussion

The decomposition of the working age population development in the intercensal period showed a clear dichotomy between Thai provinces: a limited number of winner provinces with population gains due to selective in-migration in the working age population versus the rest of the provinces experiencing population losses in the potential labor force. In their analysis of population distribution patterns in all Thai provinces in 2000, Paudel, Lim and Dureh (2015) found three distinct patterns of age-composition:

a classical population pyramid in 27 southern and north-eastern provinces, an age composition that peaks at young adult ages in the majority of the central provinces and Phuket, and a pattern that dips at young adult ages in most of the northern provinces. Paudel et al. (2015) assume that selective migration is one of the reasons behind the different age compositions. Our decomposition confirms the importance of migration. The age pattern of the winner provinces mainly coincides with the second group of provinces of Paudel et al. (2015), while the age composition of the rest provinces shows more variability.

Provinces with large shares of older persons, relatively low levels of economic growth and low levels of household income stand side by side with provinces with relatively large shares of working age population, high economic growth and increasing household income. How will this development contribute to income and wealth inequalities that are already large and growing in Thailand? If education levels are increasing in provinces with unfavourable economic prospects for the young population, the question is whether this young generation will stay or will migrate to already more prosperous provinces. It may require considerable efforts of national and local governments to control this process properly. Another open question is whether those who are currently of working age and are living and working outside their provinces of birth will return, and if so, at what age and whether the decision to return is selective. A study for Buri Ram, a north-eastern province, found that the probability to return was negatively correlated with education, and that having remaining family at origin household increased the likelihood to return (Piotrowski and Tong 2010). However, this study looked at return migration before the year 2000. In a more recent study where the authors analysed return migration to Buri Ram, Nakhon Phanom, and Ubon Ratchathani, Junge et al. (2015) found a significant difference in terms of educational attainment and employment type, depending on whether migrants returned to their home village or another location in their home province. It remains to be seen whether current and future internal migrants will show similar behavior. The fact that the population of prime working ages in most provinces has been reduced due to previous out-migration could also entail less pressure and incentives to out-migrate for the current generation (Hall 2011). On the other hand, in their longitudinal analysis of migrant streams from selected communities in Buri Ram between 1984 and 2000, Garip and Curran (2010) showed that while migrants are on average younger and more educated than the overall population, in general migration becomes less-selective in terms of age and sex as migration experience accumulates, but not in terms of education and wealth. Furthermore, they showed that selectivity persists if migration experience is not equally accessible to all community members. Inequality in migration history, therefore, may have contributed to the diverging pattern between 2000-2010 and, if this continues, may intensify this pattern in the future.

As far as international migration to Thailand concerns, the great majority of migrants are low-skilled workers that come from Cambodia, Laos and Myanmar (Hall 2011). The question is how long this so far seemingly abundant pool of cheap labor that is critical for the Thai economy will remain available; with increasing economic development in the sending countries, the desire to work in Thailand might decrease. The fact that Thailand still does not have a comprehensive, long-term migration policy (Huguet et al. 2012) adds to the uncertain future of both migrants who are already in the country as well as prospective future migrants.

The described developments have consequences in a range of policy areas. Provinces that experienced noticeable outmigration of parts of its working age population and an increase in its old age dependency will face a very different situation when it comes to the task of taking care of older persons than the winner provinces. In absolute as well as in relative terms the former have more persons aged 70 and over, which represents the age-groups where the majority of older Thais reported having one or more functional limitations or difficulties in (instrumental) activities of daily living (ADL and/or IADL)

(Knodel et al. 2015). As the number of years that 60-year old Thais can expect to live with a mobility limitation differs across regions, with the Central region ranking best and the north-eastern region ranking worst (Apinonkul et al. 2016), this probably reinforces the unfavourable prospects of the rest provinces.

In Thailand, support of the elderly is predominantly provided by the family, comprising financial as well as emotional and care support. Adult children working away from their parents are usually providing financial support, and thanks to modern technology like mobile and smart phones contact between the generations has become easier (Knodel and Saengtienchai 2007). Yet, providing care in this context of changing living arrangements remains a very important issue to be dealt with (Knodel et al. 2010). In order to allow persons to age-in-place, Thailand is focusing on models to provide community-based long term-care (Prachuabmoh 2015). The exact requirements will vary between provinces, due to the degree of aging and the extent of out-migration of the young generation. These differences will have to be taken into account when designing care programs across the country. The difference in age composition between the winner and the rest provinces also reflects the phenomenon of grandparents often being the care-taker of grandchildren while the parents are working elsewhere in Thailand, due to poor economic prospects in their home provinces (Knodel et al. 2015). These so-called skip-generation households where only grandparents and their grandchildren are present pose a particular challenge. A related issue is access to health care for those older adults who live in rural areas. Despite the introduction of universal healthcare in 2002 and the presence of local health centers, access to health care can still be problematic for those with very limited financial resources and mobility constraints (World Bank Group 2016). Local initiatives that provide support with transportation and home-care have been shown to be able to improve the situation, but they are not yet available everywhere where there is need for them. Given the described population developments, demand for such services is likely to increase.

Apart from labor input in terms of potential working age population, economic growth depends on actual labor market participation and productivity, which will become ever more important with the prospect of a declining potential labor force. As economic sectors differ broadly across winner and rest provinces, also employment opportunities and productivity potential vary widely between both types of provinces. Much of Thailand's economic activity is concentrated around the Bangkok area and the industrial areas in the south-east of the country and there is a huge urban-rural gap. At the same time, the share of employment in the agricultural sector – a sector with low productivity – in Thailand is still high, especially in the rest provinces. This is due to low educational attainment levels in rural areas, certain subsidy schemes that target workers in agriculture, and the way the minimum wage is set up (Klyuev 2015).

Another bottleneck is the obvious mismatch between labor supply and demand (Pholphirul 2017), not only in terms of quantity, but also in terms of quality or skills-mismatches. This applies especially to low-skilled workers that aspire to improve their suitability to the labor market through additional schooling. As many available training programs are not demand-driven the quality of labor supply often does not meet labor demand (Jitsuchon 2012). Contrary to countries that managed to move on to be high-income countries, Thailand did not yet develop a proactive innovation or research and development policy necessary to increase its competitiveness (Jitsuchon 2012; Warr 2012). Given the expected labor shortage, it will be crucial to remedy this situation and to equip graduates with the skills that are on demand by employers. The benefits of Thailand 4.0, a national strategy that aims to transform the Thai economy away from a manufacturing towards an innovative and service-based one, will only materialize if the future labor force has the necessary skill base (ASEAN today 2016). Past education reforms did

show some effects but the education system still lacks crucial elements and substantial differences between urban and rural areas prevail (Hallinger and Bryant 2013; OECD/UNESCO 2016). Many parents who can afford it send their children to private schools at the primary, secondary and tertiary level. Naturally, these institutions are concentrated in larger cities, aggravating the differences in quality of education between urban and rural areas.

It is clear that Thai future older adults will be different in many ways from today's (Hermalin et al. 2007). Due to changes in the population's education composition, accompanying changes in the structure of employment, and expected improvements of the health status of older persons, in the future more older persons may be able to actively participate in the labor force than today. Notwithstanding the official retirement age of age 60, also today the age at which people leave the labor force varies significantly across education level and sector of employment. The official retirement age only applies to workers in the public sector and those working for state enterprises. The private sector has no age limit and it is up to each company whether they keep older workers beyond the age of 55 (Keeratipongpaiboon 2012b). Those who are working until very high ages are often doing so out of financial need, whereas those who can voluntarily retire around age 60 tend to receive a pension (and constitute a minority of older adults). This means that national policies that are currently being discussed and implemented with the aim to keep Thais economically active until higher ages need to be tailored towards those who are leaving the labor force at relatively young ages. Employment rates in agriculture are naturally higher than in other sectors, and efforts to increase economic activity will have to focus on those employed outside of agriculture in formal jobs. If successful, this would increase employment rates of older adults in the winner provinces, reducing differences across provinces. We have to note, however, that the almost equal employment rates portrayed in Table 2 for the two groups of provinces, calculated as the arithmetic average of the provincial rates, is hiding differences in age-specific employment rates: Since the population in the rest provinces is on average significantly older than in the winner provinces (cf. Table 2 and Figure 8), the fact that employment rates for ages 15+ are so similar is hinting at significantly higher age-specific employment at older ages in the remaining provinces. It can be expected though that because of a decline in the share of employment in the agricultural sector – a foreseeable development – aggregate employment of the population 15+ will decline in the rest provinces.

Conclusion

While demographic developments in Thailand at national and regional level are well established, only few studies consider developments on provincial level. One of the bottlenecks is limited data availability, particularly with respect to migration. To take this hurdle we proposed a decomposition model to reveal migration patterns and used the model to estimate the impact of migration on the potential labor force in Thai provinces, making use of data from two recent population and housing censuses. This model is generally applicable and will be of interest for researchers and policy makers in other countries with limited migration data and significant labor migration dynamics as well, as for example Myanmar and Cambodia.

The decomposition of provincial working age population developments showed that population aging and migration resulted in a highly polarized population distribution in Thailand. On one end there are only a few selected provinces with a higher educated population together with net in-migration in the working-age population in the inter-census period. The majority of provinces, however, has a much lower educated population and lost adults of prime ages. As a result, the latter provinces are aging faster than the so-called winner provinces. We can argue, therefore, that the winners do take it all, and that

this unequal development in terms of age-structure and educational attainment between the two groups of provinces will make it ever more important to consider the provincial differences in age-composition when designing policies for Thailand's aging population. Challenges that are often dealt with on the national level, like the expansion and sustainability of pension systems for various groups of the population, financing of health care and establishing long-term care provisions, have to account for province-specific contexts. For example, elderly care in provinces where young adults are to a large degree absent will have to be organized differently compared to provinces where a substantial younger population is present.

If the demographic developments and the diverging pattern of 2000-2010 prevail in the current decade, by 2020 not only almost all provinces will be confronted with both a smaller size and share of the working age population, but also the differences between the two types of provinces will have been intensified. This may have severe impacts on regional cohesion in Thailand.

Having said this, Thailand is also one of the great development success stories of a low-income country that became an upper-middle income country within the time-span of less than one generation (World Bank 2017). If Thailand succeeds to alleviate the most negative consequences in the "left-behind" provinces, the polarized population structure itself may not have to be an insuperable difficulty to make its ambitions come true to become a high-income country in the near future.

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In this article, we present a decomposition model to estimate the impact of migration on the potential labor force in Thai provinces in the inter-census period 2000-2010. Using this model we divide population change for the working age population into two components: on the one hand, the impact of change due to population aging and on the other change due to either population gains or losses as a result of migration. The analyses presented are predominantly based on secondary data from the 2000 and 2010 Population and Housing Census in Thailand, provided by the National Statistical Office of Thailand. While migration slightly mitigated the impact of aging of the potential labor force in Thailand, in most of the Thai provinces in- and out-migration contributed much more to change in the working age population than natural change. Selective migration resulted in a highly polarized population distribution: a limited number of “winner” provinces with population gains due to in-migration in all four 10-year age groups of the working age population together with a higher educated population, versus the majority of the provinces experiencing population losses in at least one of the four age groups and a much lower educated population. This unequal provincial population development makes it ever more important to consider provincial differences in age-composition when designing aging policies for Thailand. As the decomposition model is generally applicable it can be applied in all countries with limited migration data and significant labor migration dynamics to examine selective migration at different geographical scales.

The Netherlands Interdisciplinary Demographic Institute (NIDI) is an institute for the scientific study of population. NIDI research aims to contribute to the description, analysis and explanation of demographic trends in the past, present and future, both on a national and an international scale. The determinants and social consequences of these trends are also studied.

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