

Harnessing Singapore's Longevity Dividends: The Generational Economy, Society and Polity

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An Introduction to Demographic or Longevity Dividends

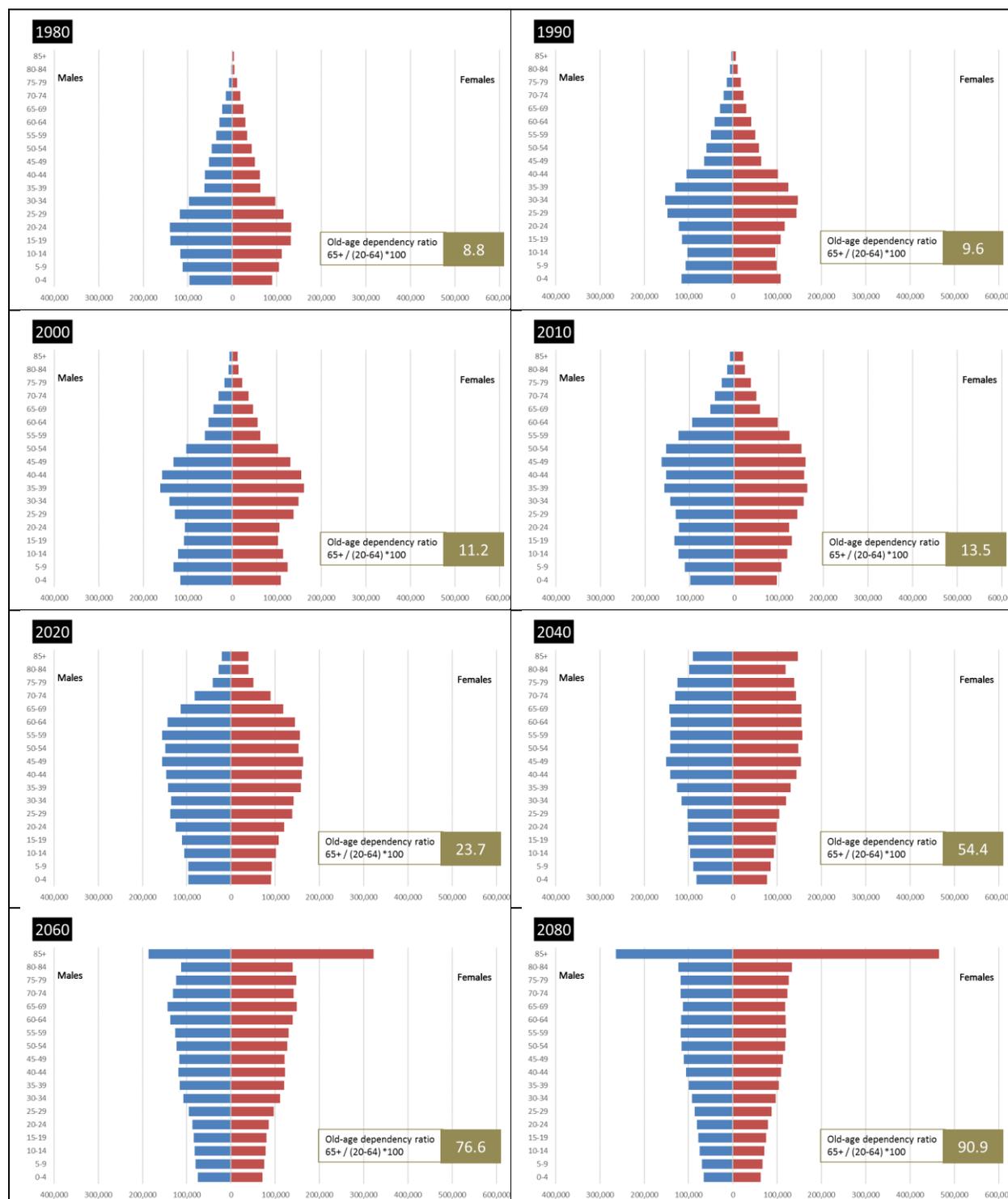
Population matters have always been an integral part of Singapore's national development story, given that we are a small city-state with no natural resources. The post-Second World War baby boom, coupled with substantial human capital investments in health and education and followed by fertility decline, allowed Singapore to capture its first demographic dividend.

This first demographic dividend arose from the greater proportion of people of working ages engaged in productive employment relative to those who consume more than they earn (predominantly the young and the old). This contributed to about a third of Singapore's GDP per capita growth in the period between 1965 and 2000 (Bloom & Williamson, 1998, Ogawa et al., 2009).

The drop in fertility that contributed to the first demographic dividend, however, also leads to its reversal as the population ages (see [Fig. 1](#), next page), with growth in old-age population exceeding growth in the labour force, leading to lower economic growth assuming no change in output per worker, labour force participation and employment rates.¹ The Institute of Policy Studies (IPS) projects that Singapore's old-age dependency ratio will rise by more than ten-fold, from having just under nine elder Singaporeans for every 100 persons of working age in 1980, to 91 elder Singaporeans per 100 working age persons in 2080. We estimate this reversal of the first demographic dividend from population ageing to represent a drag of 1.5% points on Singapore's annual GDP per capita growth from 2011 to 2060 ([Fig. 2](#), page 3).

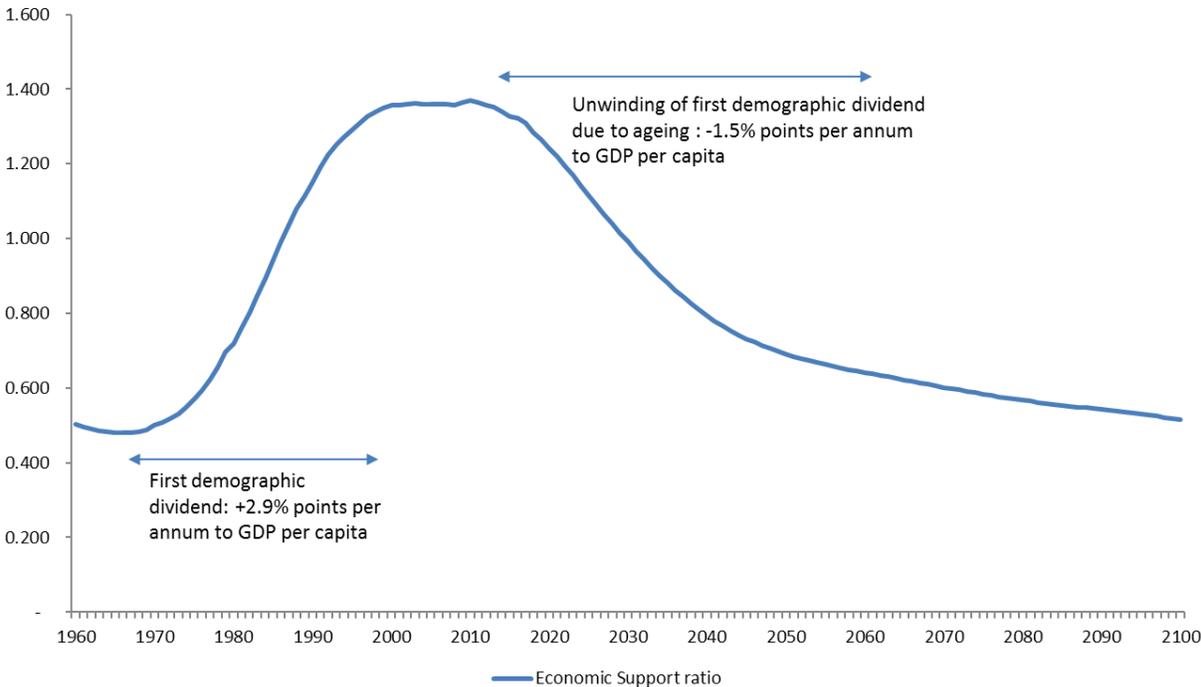
¹ Singapore reached an inflection point in 2012 when, after over 30 years of an improving trend, the country's age-dependency ratio began to rise as the increase in old-age dependency ratio overtakes that of the young-age dependency ratio. The age-dependency ratio takes the ages between 20 and 64 as the years that approximate best to the working ages. The **young-age dependency** is the ratio of population aged 19 and below to 100 persons aged between 20 and 64, whilst the **old-age dependency** is the ratio of population aged 65 years and above to 100 persons aged between 20 and 64. The total age-dependency ratio is the sum of the young-age and old-age dependency ratios.

Fig. 1. Singapore Population Pyramids: Age Structure of the Population (1980–2080)



Source: Department of Statistics, Census of Population for 1980–2010; Institute of Policy Studies projections for 2020 onwards. See footnote 1 for the definition of the old-age dependency ratio.

Fig. 2. Singapore’s Economic Support Ratio² (1960–2100)



Source: Institute of Policy Studies estimates³

The loss of economic productive potential from the changing age structure of the population may be mitigated through immigration (which we consider in a later part of this background paper, see page 9), or may be offset with other demographic or longevity dividends.

Other Longevity Dividends: Health, Education, Savings/Investments and Technology

The conditions that eventually result in an ending of the first demographic dividend may, however, lead to a second dividend (Mason and Lee, 2006), assuming individuals and the government are forward-looking and respond to the effects of an ageing workforce and population. With longer life expectancy, individuals have greater incentives to invest in their human capital, especially in

² The Economic Support Ratio is the ratio of effective producers to effective consumers. This metric modifies the traditional support ratio calculation that counts each person of working age (say, 20–64 years) as supporting dependents (0-19, 65+ years) equally. In reality, effective economic productivity and consumption varies considerably by age, and the Economic Support Ratio weighs producers and consumers according to their age-specific profiles of labour income and consumption.

³ IPS’ resident population projections from 2017–2100 are based on an assumed total fertility rate of 1.3 births per woman, increase in life expectancy at birth of 2.0 years in each decade, and net in-migration of 20,000 per annum.

health and education. Such increased investments in human capital should result in improved productivity over potentially longer working lifespans.

Another societal response to living longer can also be the accumulation of savings to help sustain consumption at older ages. If invested effectively in the domestic economy, these savings can result in capital deepening and an increase in productivity per worker. If invested abroad, those savings would lead to an increase in gross national income.

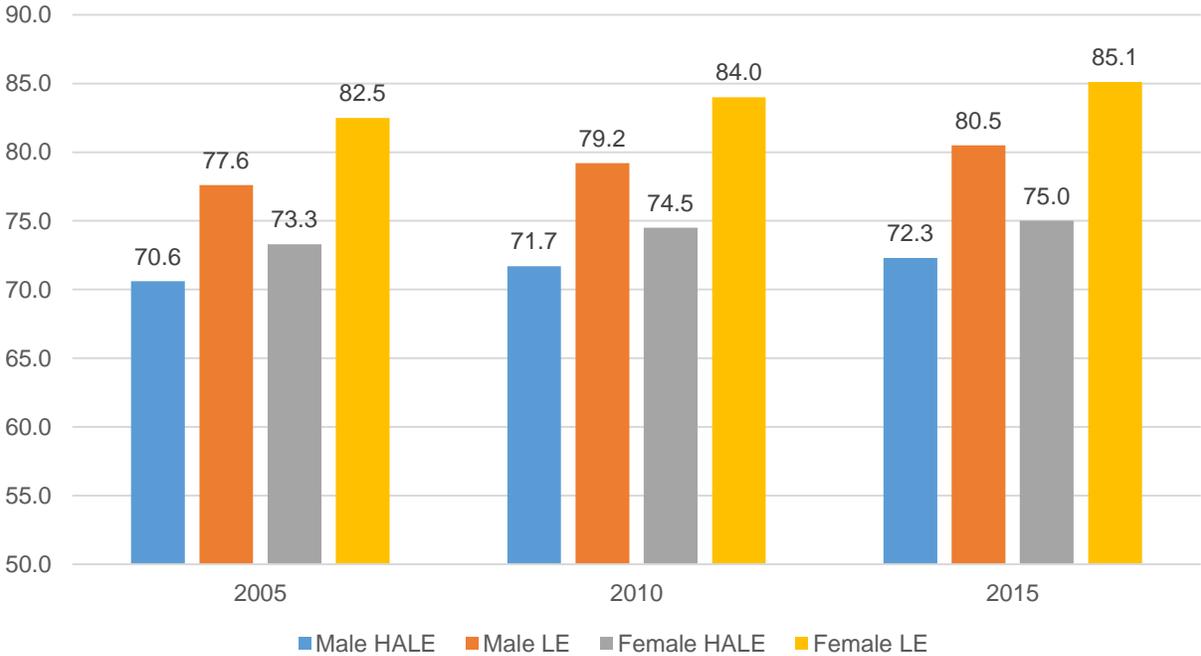
We highlight these sources of demographic (or what we might call longevity) dividends below.

Healthspan

At around 83 years as of 2017, Singapore's life expectancy is among the highest in the world. Singapore's health-adjusted life expectancy (HALE), which estimates the average number of years a person can live in full health, has also been rising. Between 2005 and 2015, male and female life expectancy at birth rose from 77.6 and 82.5 years to 80.5 and 85.1 years, respectively, an increase of 2.9 years for males and 2.5 years for females. HALE for both sexes increased about 1.7 years over that period (Fig. 3).

If these gains in HALE are projected into the future, there will be almost 860,000 healthy Singaporeans 65 years and above in 2030, more than double the number in 2015. Elder Singaporeans aged 65 years and above will have an additional 450,000 healthy life years in 2030 as compared to that cohort in 2015; this represents human capital potential of more than one-fifth the size of the resident labour force in 2015. The likelihood is that the 2030 cohort of elder Singaporeans will also be better educated than their predecessors, extending the productivity potential even further (see next section).

Fig. 3. Singapore Resident Male and Female Health-Adjusted Life Expectancy (HALE)



Source: Ministry of Health, 2017, [Population and Vital Statistics](#)

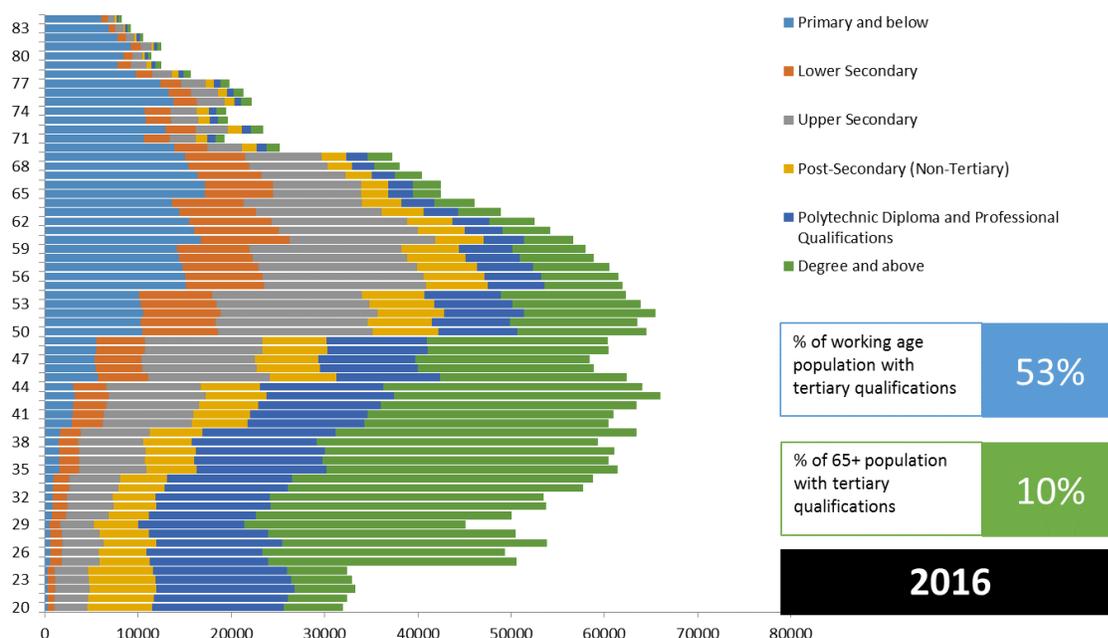
Note, however, that whilst HALE for Singaporean residents increased in the 10-year period to 2015, overall life expectancy at birth increased even more, indicating that, despite enjoying more healthy years, Singaporeans are living more years in an unhealthy state, mainly with chronic long-term diseases, including mental health issues, disability and mobility limitations.

To ensure this longevity dividend is captured, the health policy objective becomes not only that of extending overall life expectancy at birth, but also providing the conditions for the smallest possible gap between HALE and overall life expectancy. This is likely to involve both public health interventions as well as population-level adjustments towards healthier lifestyles.

Education

Singapore's education system is acknowledged as one of Asia's success stories (OECD, 2011). Significant improvements in educational attainment have raised the share of the resident population with tertiary education: In 2016, 30% of the population in their 20s who were not in full-time education had a university degree or more, up from 5% as recently as in 1990. More than half of the working age population have some form of tertiary educational qualification; and whilst there is still a large group of primarily older persons with lower than secondary school education (29%), 10% of the population aged 65 years and older have some form of tertiary educational qualification (Fig. 4).

Fig. 4. Singapore Resident Population 20+ Years by Age and Highest Educational Attainment (2016)



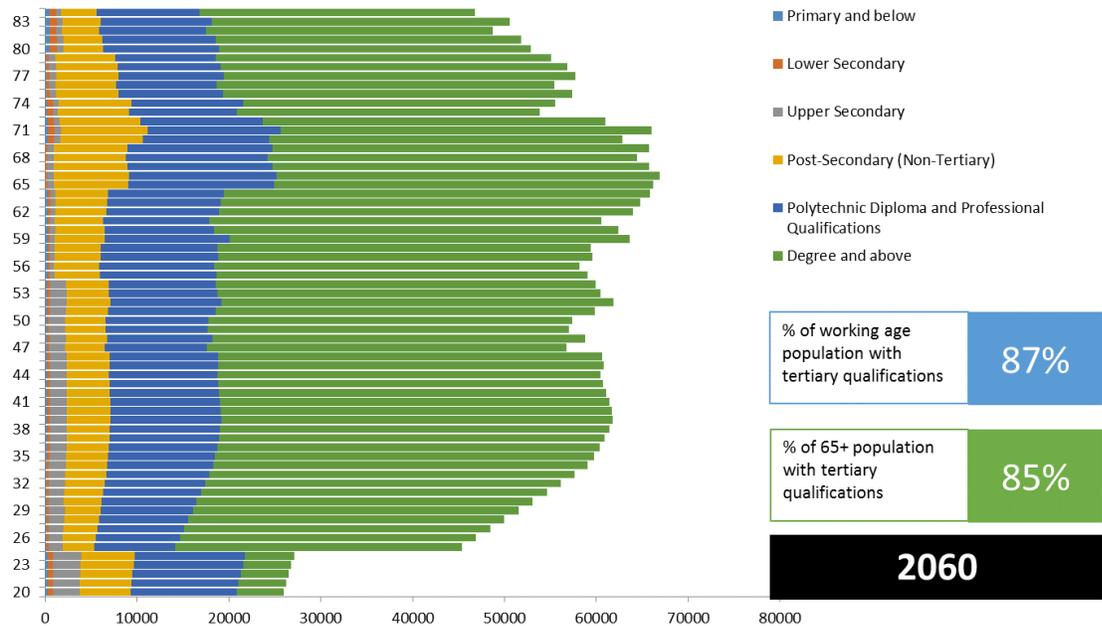
Source: Institute of Policy Studies estimates, based on data from Department of Statistics, Census of the Population, 2010.

With continued human capital investments, extrapolating the educational expansion achieved between 2000 and 2010 through to 2060 suggests that, by then, 87% of the working age resident

population will have tertiary educational qualifications, as will 85% of the population aged 65 years and above (Fig. 5). This represents a substantial increase in Singapore’s human capital potential that can contribute to productivity gains, and improve individual and societal well-being.

Note that the effects of this educational dividend could be limited by diminishing returns to education, especially when the large majority of the population have advanced educational credentials, or from obsolescence of this accumulated human capital: an 85 year-old degree-holder in 2060 might have obtained her highest educational qualifications in the 20th century. The effect of ageist attitudes in the workplace, as well as more broadly in society could also restrict older worker participation rates.

Fig. 5. Singapore Resident Population 20+ Years by Age and Highest Educational Attainment (2060)



Source: Institute of Policy Studies projections, based on data from Department of Statistics, Census of the Population, 2000 and 2010.

Savings and Investments

Over their life-course, those in the working ages typically produce more than they consume on average (accumulating a surplus), whilst children and the elderly consume more than they produce (resulting in a deficit). Societies have different approaches of re-allocating resources from surplus to deficit ages, but these methods generally follow two broad methods: through transfers or savings.

The first method relies on transfers from those in surplus ages to those in deficit ages. These transfers may be private, with familial transfers between parents to their children, and from adults to the elderly predominating especially in Asian societies such as in Singapore. Some of these private transfers may be between households, but intra-household transfers generally are more

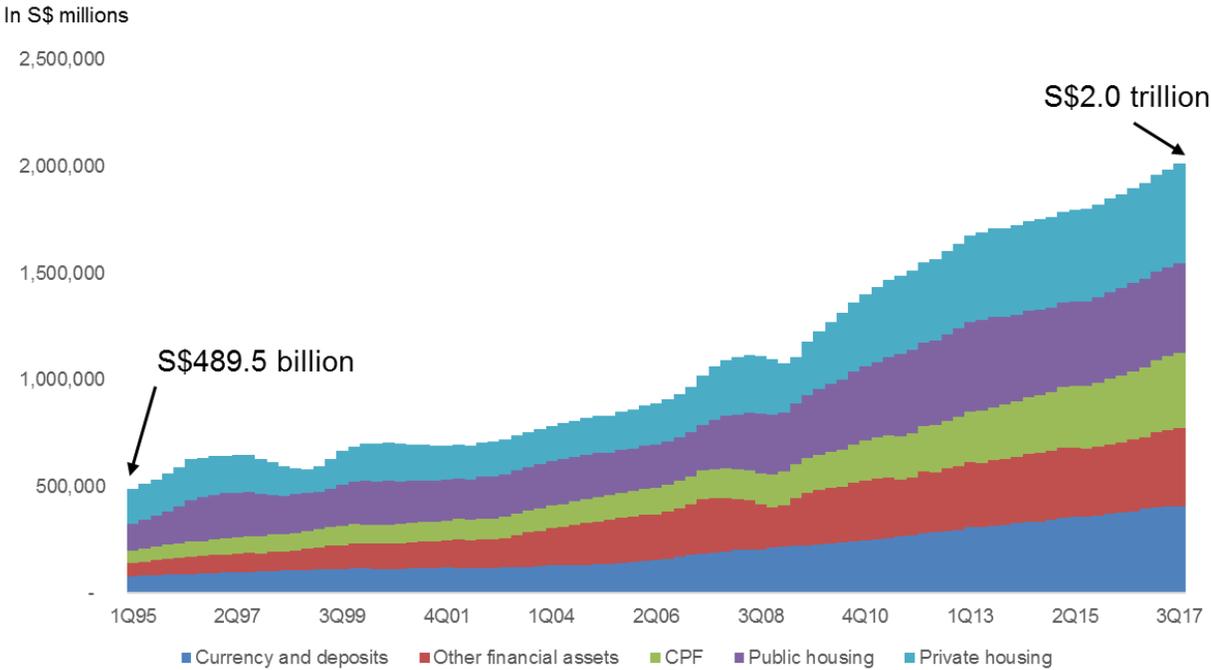
important. Other transfers may be intermediated by the public sector, with public programmes for education, health, housing and other social programmes financed out of taxation.

The second method depends on capital markets, where those in surplus ages accumulate capital, and in turn rely on their capital income (interest, dividends, rentals, and other investment income), or by liquidating their assets to support their consumption in old age when they are no longer working.

For Singaporean households, these savings will be in the form of Central Provident Fund contributions, the build-up of housing equity in the purchase of public or private property and other financial assets. This savings accumulation by the household sector can be seen in [Figure 6](#), with aggregate Singaporean household assets totalling \$2.0 trillion as at September 2017, according to data from the Department of Statistics. Household assets have more than quadrupled since early 1995.

The Singapore government has also accumulated savings. The Net Investment Returns Contribution (NIRC) arising from public sector savings (derived from the accumulation of fiscal surpluses and net capital receipts of the government) contributed \$14.4 billion, or 17% to the public sector budget in FY2016. In FY2014, the NIRC of \$8.7 billion was a little in excess of the amount set aside in that fiscal year for the Pioneer Generation Fund (\$8.3 billion).

Fig. 6. Household Assets (1Q1995–3Q2017)



Source: Department of Statistics, 2017, Household Sector Balance Sheet (End of Period), Quarterly

Technological Advancement Complements Longevity Dividends

Greater investments from these accumulated savings into innovation and technology can boost these longevity dividends. Medical advancements focused in the area of underlying degenerative

ageing processes could continue to add healthy and productive life-years to the population, whilst artificial intelligence (AI) and automation could complement an increasingly better-educated older workforce. Technological advancements in the area of robotics, AI and sensors could assist in the care of the elderly, and the negative effect of a shrinking and older workforce may be offset by the introduction of appropriate technology.

At the same time, innovation and technological advancement may yield unequal economic outcomes, with the immediate impact of the introduction of new, disruptive technologies likely to affect older workers most acutely.

Harnessing Longevity Dividends: Policies, Institutions and Behaviours

These demographic or longevity dividends are predicated on effective policies, institutions, norms and behaviours that allow the full economic and social benefit to be accrued. For example, if a country's capital markets are insufficiently well developed or managed, then savings may not be channelled effectively into productive investments, or the fruits of economic growth and innovation may become unevenly distributed leading to deep societal divisions.

Relying solely on individual savings to finance old-age consumption can also accentuate income and wealth inequalities, and may not be the most efficient means to hedge low probability, high-impact risks. Other mechanisms,⁴ such as tax-financed transfers and social risk pooling (or national insurance schemes) are alternative methods to finance old-age consumption that do not rely on familial assistance (that will become increasingly less reliable for more Singaporeans given demographic trends).

Taxation-based financing

Some countries rely heavily on taxes and public transfers to finance old-age consumption, with old-age social support in the form of tax-financed pensions representing 8.2% of OECD countries' GDP in 2016 (OECD, 2016). The equivalent in Singapore is 0.3% of GDP in FY2016, with the introduction of the Silver Support Scheme.⁵

The social and political compact in Singapore is one based on low taxation levels in a progressive tax structure to keep the economy competitive, with targeted assistance via public transfers for those who need it the most. As expenditure on social needs rise, given the country's demographic

⁴ All three methods of old-age consumption financing discussed here can be seen in Singapore's "3M+S" system of healthcare financing. Medisave is a mandatory savings scheme for medical expenditure administered as part of the Central Provident Fund system, whilst MediShield Life is a national health insurance scheme that provides lifelong coverage for hospitalisation. Medifund, the third "M", is a tax-financed endowment fund for patients facing financial difficulties with remaining medical expenditures after exhausting other means such as their savings and insurance. The "S" in "3M+S" refers to tax-funded subsidies provided by the government under means-tested eligibility criteria.

⁵ The Silver Support Scheme is part of a wider suite of schemes (e.g., healthcare subsidies, GST Voucher) that the government has put in place in recent years to support the elderly Singaporeans aged 65 years and above who had low life-time incomes and who have little or no family support. See more details here: <https://www.silversupport.gov.sg/>

trajectory, there is however a recognition that tax revenues will have to rise in tandem (Lee, 2012; Seow, 2017).

Tax increases will have an effect on economic competitiveness, an important matter for a global city-state such as Singapore with an open economy. The acceptance of tax increases⁶ to finance increased social spending will depend on the type of taxes raised (e.g., consumption, income or estate); what the incremental fiscal revenues will be used for; how the increases are communicated; and, in some part, on the level of inter-generational solidarity amongst the population (given that tax-payers are mostly in the working-age groups).

Social Risk Pooling

Individuals have great difficulty hedging longevity risk. Whilst there is private insurance available to cover the risk of untimely death and catastrophic health shocks, there is much less that individuals can do to reduce the risk of outliving their retirement resources (in particular their financial and leasehold housing assets).

However, Singapore has well-established schemes that help Singaporeans with their longevity, such as the CPF LIFE or MediShield Life, which provide lifelong coverage for Singaporeans' retirement income needs and hospitalisation expenses respectively. These schemes are a form of social risk pooling, and provide an efficient and cost-effective way for people to manage the risks of catastrophic health shocks and longevity.

Other examples where social risk pooling can be applied are for employment shocks (e.g., unemployment or wage loss insurance schemes); for long-term care (e.g., universal long-term care insurance schemes); and other longevity risks such as housing (co-operative or community-based senior living programmes).

The concept of social risk pooling is predicated on some element of intra- and inter-generational solidarity in society. The issue of moral hazard in social risk pooling can be mitigated through effective policy design and social norms against bad behaviour by participants in the risk pool, whilst concerns over the actuarial fairness of premium pricing and reserving for future claims can be reduced if there is a strong sense of inter-generational solidarity in society.

What About Immigration?

Immigration has historically been a major element in Singapore's population policies. As of June 2017, permanent resident and non-permanent resident foreigners comprised 39% of Singapore's total population of 5.6 million (Department of Statistics, 2017), up from 14% in 1990.

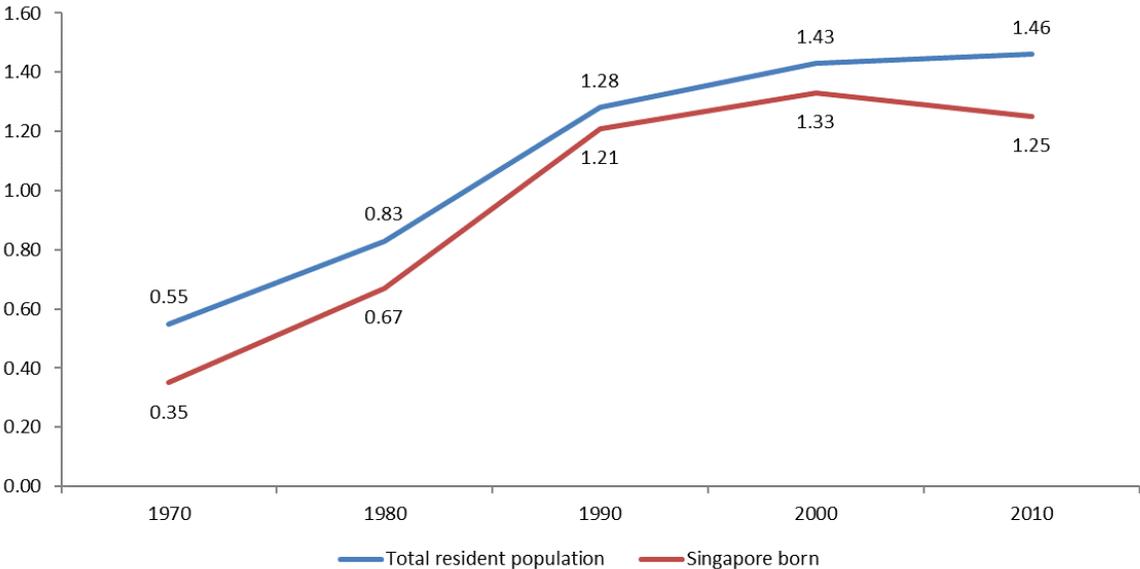
With Singapore's TFR at ultra-low⁷ levels since 2003, the unwinding of the first demographic dividend amongst the local-born population is already in evidence ([Fig. 7](#), next page). The Economic Support Ratio (ESR) amongst the Singaporean-born population peaked in the 2000s,

⁶ Or the increased utilisation of the returns from investing national reserves, which represented 20% of total government expenditure in FY2016.

⁷ Ultra-low fertility levels are defined as total fertility levels below 1.3 births per woman (Jones, 2012). In 2016, Singapore's resident total fertility rate (TFR) was 1.20, with 41,251 births recorded in the year. The peak year of births in Singapore was in 1958 with 62,495 births when the TFR was 6.20.

with the increase in the ESR for the total resident population from 2000 to 2010 showing the positive effects of immigration on mitigating the economic impact of population ageing.

Fig. 7. Economic Support Ratio: by place of birth (1970-2010)



Source: Institute of Policy Studies estimates, using Population Census data published by Singapore Department of Statistics

There are limits, however, to how much immigration can offset the reversal of the first demographic dividend from population ageing. Immigrants also grow old, and an ever-larger intake of immigrants would be needed to prevent the total resident population ESR from declining in the future.

Whilst official government policy continues to be one of openness to immigration (especially of skilled labour) with an average annual intake of 30,000 new permanent residents, there is recognition that a well-calibrated immigration policy is only one measure to mitigate the economic effects of population ageing. As Prime Minister Lee said in his 2012 New Year’s message: “A vibrant economy needs enough workers and talent, yet we run into physical and social constraints if we admit too many foreign workers too quickly. Diversity enriches our society, but only provided new arrivals adopt our values and culture.”

Attitudes Towards Inter-Generational Solidarity in Society

Individual and societal choices about transfers (familial support, taxation or social risk pooling) and the effectiveness of savings-driven investment will be affected by the level of inter-generational solidarity in society. As such, in November and December 2017, the Institute of Policy Studies conducted a nationally representative telephone survey of 2,000 Singaporean citizens and permanent residents aged 21 years and above on their attitudes towards inter-generational issues and the use of national reserves, amongst other matters.

An initial review of the survey results indicates a few key areas of interest that will have particular relevance for the subject matters for discussion at Singapore Perspectives 2018:

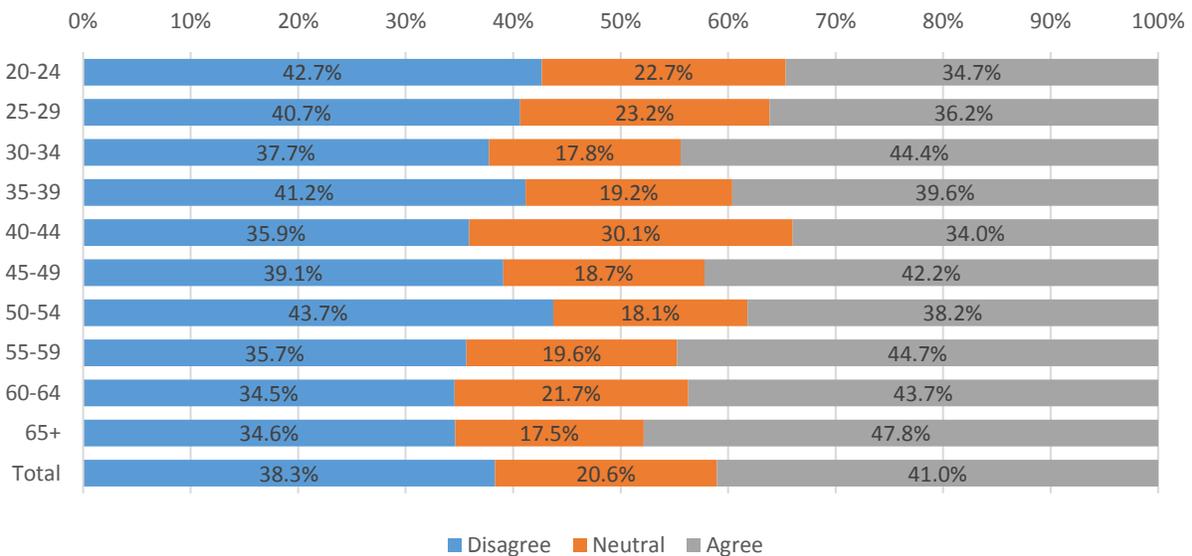
- 1) Notions of generational self-reliance and Singaporeans' bequest motivations.
- 2) How should we pay for higher social spending on the elderly?
- 3) After family, who should take care of the elderly in society?
- 4) Ageism in the workplace

Notions of Generational Self-Reliance and Singaporeans' Bequest Motivations

Survey respondents were asked whether they agreed or disagreed with (or had a neutral stance to) a series of statements about generational self-reliance and whether older generations should set aside their assets as an inheritance for the young.

The **greatest proportion of respondents (41%) believe that each generation should take care of itself** ([Fig. 8](#), next page). However, **a surprising proportion (38%) disagreed with the statement**, perhaps due to feelings of inter-generational solidarity. Younger respondents aged below 40 years were more likely to disagree with the statement, whilst respondents aged 60 years and above were more likely to agree. This age differential is suggestive of an underlying notional sense of inter-generational solidarity amongst younger respondents, who would be expected to take care of older generations.

Fig. 8. Statement: “Each generation should take care of itself, without the need to be supported by other generations”⁸



Source: IPS Survey for Singapore Perspectives 2018

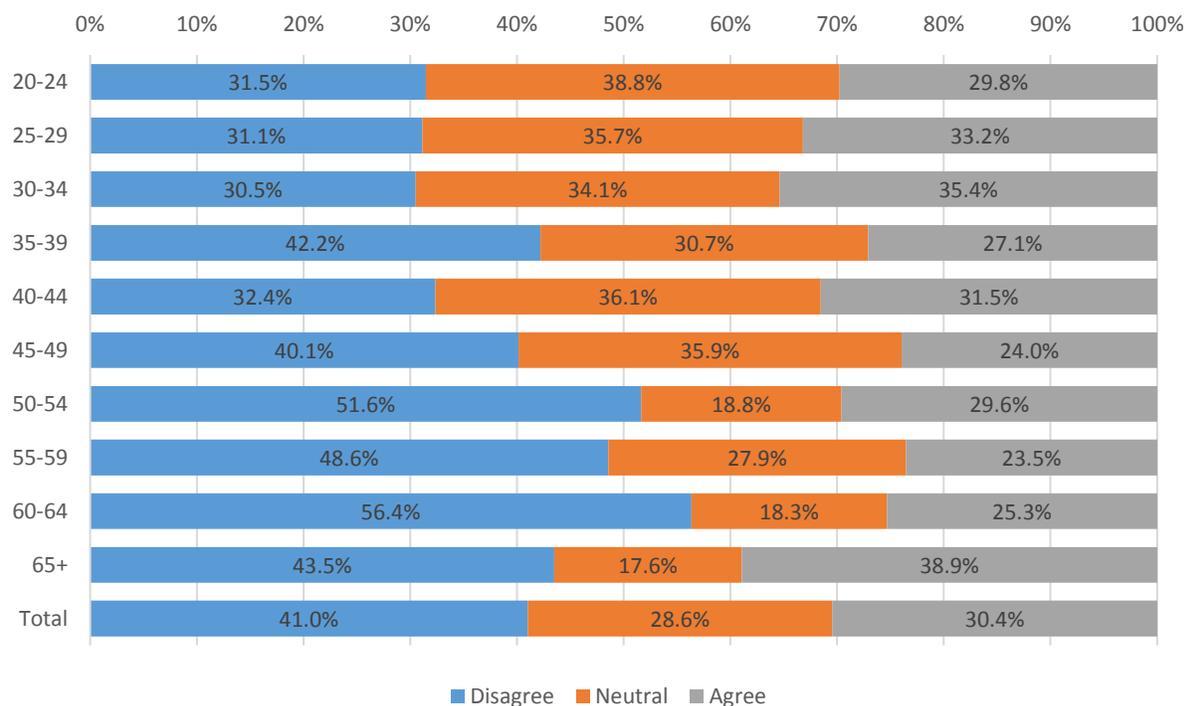
A number of academic studies have highlighted strong bequest motivations amongst Singaporeans (Phang, 2004; Asher & Kimura, 2015), especially for leaving property assets as an inheritance for the younger generation. However, **a surprising proportion of respondents in our survey (41%), disagreed with a statement that older generations should set aside assets as an inheritance for the young** (Fig. 9, next page). In particular, respondents aged 50-64 years were much more likely to disagree with this statement.

We therefore need to ask if the bequest motivation is less salient than commonly assumed, or is longevity risk forcing especially those Singaporeans in the “sandwiched” generation⁹ to consider reserving their assets for their own old-age security?

⁸ Respondents were asked to rate their responses to a series of statements on a five-point scale (1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly Agree). For the purposes of this initial analysis, we have aggregated the responses denoting agreement or disagreement. All the survey results here are presented weighted by age and housing type.

⁹ Those in the “sandwiched” generation have a dual dependency: they may be caring for both the younger and the older generations.

Fig. 9. Statement: “Older generations should set aside money, property or other assets as inheritance for the young”



Source: IPS Survey for Singapore Perspectives 2018

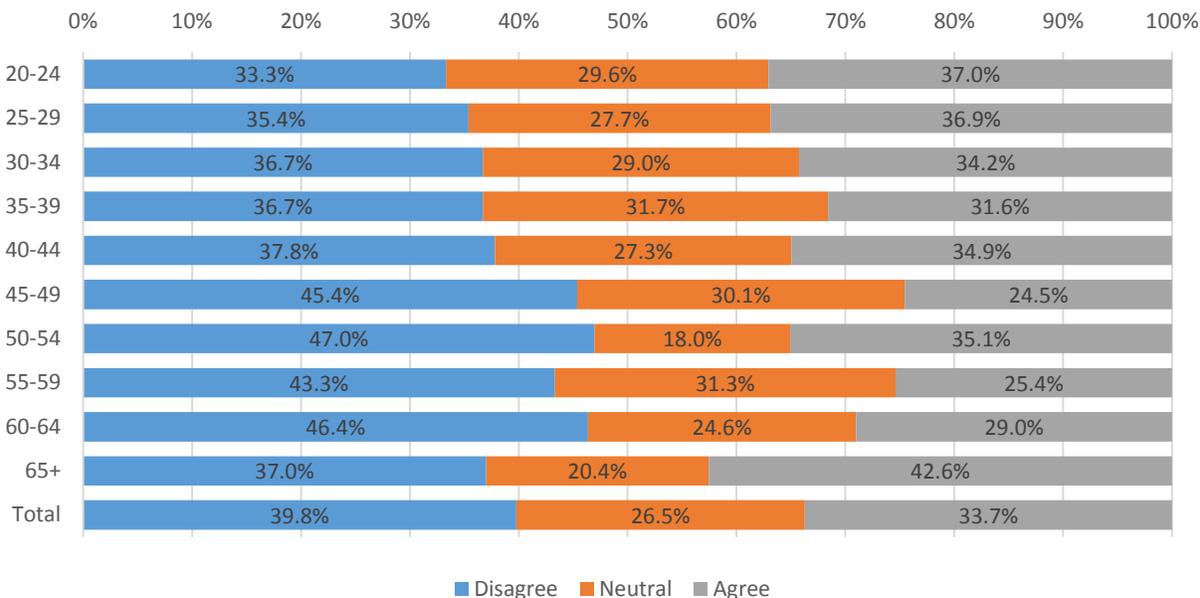
How Should We Pay for Higher Social Spending on the Elderly?

Our survey posed some questions about increasing taxation (Fig. 10, next page) or using a larger share of the returns from investing national reserves (Fig. 11, next page) to finance higher social spending on the elderly. We obtained mixed responses to both questions, with **slightly more respondents (40%) disagreeing to paying higher taxes to fund increased social spending on the elderly.**

Whilst there were more neutral responses to the question on using a larger share of the returns from investing national reserves to finance higher social spending, **more respondents agreed (37%) to the statement than disagreed with it (26%).**

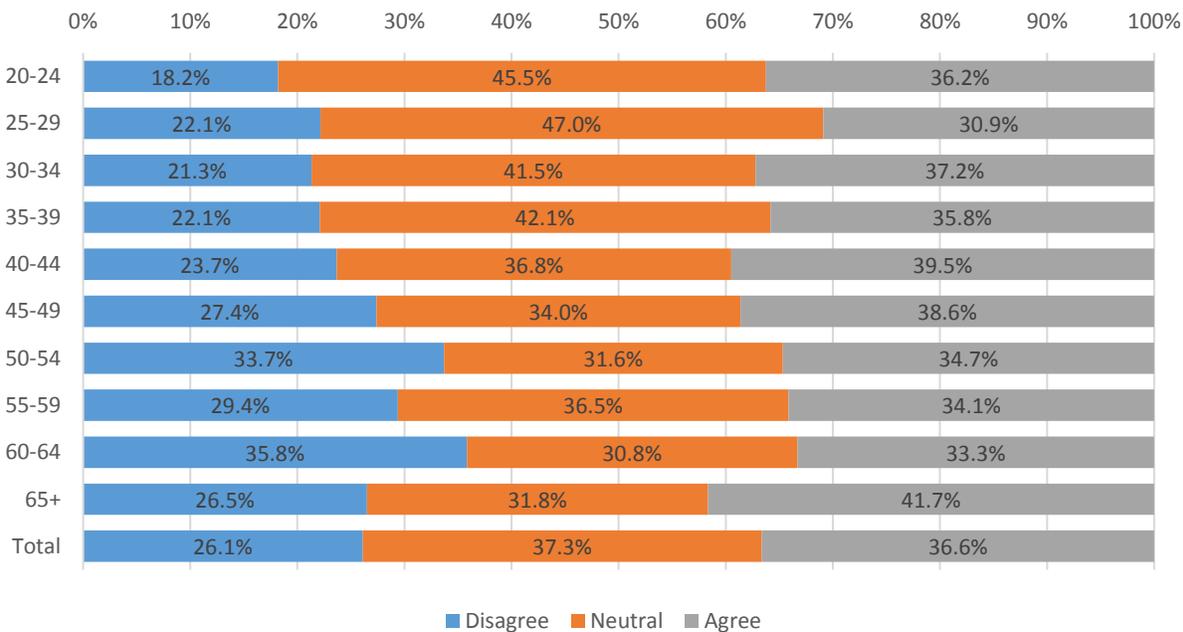
For both questions, respondents aged 45–64 years were more likely to disagree to paying higher taxes (Fig. 10) rather than tapping on national reserves, and to agree to using a larger share of the net investment returns to finance current social spending for the elderly. This age group experiences the highest tax burden and may be feeling the greatest uncertainty about financing their own post-retirement living expenses.

Fig. 10. Statement: “Would you be comfortable paying for higher social spending on the elderly through higher taxation instead of tapping on the national reserves?”



Source: IPS Survey for Singapore Perspectives 2018

Fig. 11. Statement: “Should Net Investment Returns (NIR) used to fund social expenditure for the current generation be increased, and the amount reserved for future generations be likewise decreased?”



Source: IPS Survey for Singapore Perspectives 2018

After Family, Who Should Take Care of the Elderly in Society?

Three core principles underlie Singapore’s approach to social welfare: (1) self-reliance, (2) family as the first line of social support, and (3) the concept of Many Helping Hands (MHH). Our survey asked respondents to rank four sectors (family, community, employers and the government) in order of importance of bearing the responsibility for taking care of older people.

Given strong familial ties, family was ranked first by 73% of respondents (Fig. 12). However, the government ranks second, with 69% of respondents ranking the government either first or second in importance of bearing the responsibility for taking care of older people. This is in contrast to the MHH concept, which incorporates the family as the first line of social support, followed by the community, whilst the role of the government is to establish the policy framework, and provide the underlying infrastructure and resources for the other sectors to deliver the care.

This survey result points to a disconnect in expectations about who might be responsible for providing care for the elderly in the absence of familial support, with people looking to the government to be the next in line to take care of the elderly, as opposed to the community under the MHH concept. It could also point to a belief that the capacity of the community to deliver support for the elderly is insufficient for this sector to bear this responsibility.

Fig. 12. Statement: “The responsibility for taking care of older people in society should be mainly borne by (Rank all options in order of importance)”

	Rank 1	Rank 2	Rank 3	Rank 4
Family	73.4	14.7	6.8	5.1
Community	3.0	24.9	45.4	26.8
Employers	2.0	13.3	27.6	57.1
Government	21.7	47.1	20.2	11.0

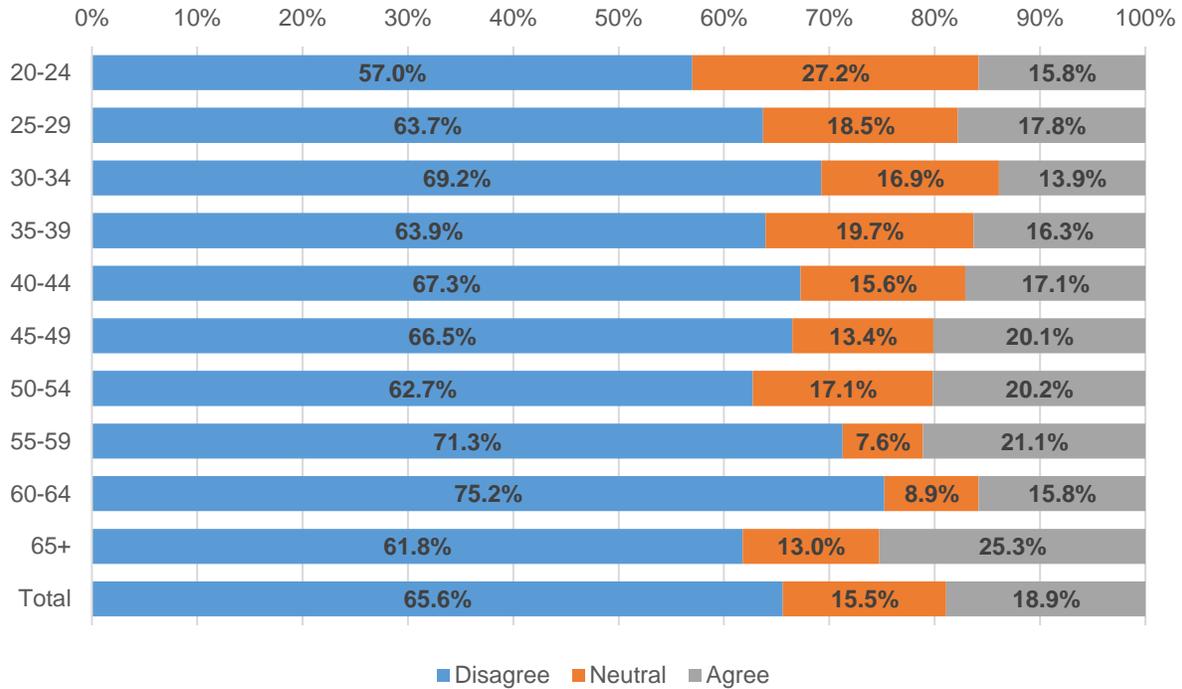
Source: IPS Survey for Singapore Perspectives 2018

Ageism in the Workplace: What do People of Different Ages Think?

Almost two-thirds of our survey respondents (66%) disagreed with the statement that older workers aged 55 and above do not face age discrimination. Whilst respondents aged 55–64 years were more likely to disagree with this statement (73% on average), almost two-thirds of younger respondents aged 25–54 years also disagreed with this statement. This shows that younger people are also aware of age discrimination in the employment market, and suggests

some sympathy for older workers. Younger workers might also be voicing out fears of confronting age discrimination themselves when they are older (Fig. 13).

Fig. 13. Statement: “Older workers (aged 55 and above) in Singapore do not face age discrimination when looking for work”



Source: IPS Survey for Singapore Perspectives 2018

Singapore Perspectives 2018 Conference, 22 January 2018: “Together”

We hope the Singapore Perspectives 2018 Conference, entitled “Together”, will contribute to the national discourse on Singapore’s demographic trajectory, and how, if demography is destiny, we may urgently shape the mind-sets, policies and decisions today for the best outcomes for our current and future generations.

This background paper provides some points for discussion during the conference, during which we hope to address these questions, amongst others:

- What policies, institutions, and social and behavioural norms do we need to adapt, to enhance the standing of our longer-living Singaporeans as assets to society, rather than as a burden?
- How do we sustain economic competitiveness and dynamism given an ageing workforce, and how to ensure maximum participation of Singapore’s labour in economic growth?
- How might the government apply taxation policies and utilise national reserves within the principles of fiscal sustainability and inter-generational equity, to promote a dynamic and inclusive economy and society?
- How should our social care, social security and retirement funding systems be updated to enable Singaporeans to live longer lives successfully?
- Will Global City Singapore be “no country for old men”, or will it be a city-state for all ages?
- To whom will Singapore belong, if the citizens of Singapore do not replace themselves?

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Some papers on Singapore which we hope will also help contribute to the discussion:

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