Long Term Care Insurance

Financing, pricing and risk considerations

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Health Insurance Committee

SINGAPORE ACTUARIAL SOCIETY

Long Term Care Insurance

Contents

The purpose of this Paper

The purpose of this paper is to discuss and explain the high-level financing, design and risk considerations behind long-term care (LTC) private insurance plans and public schemes and examine how these considerations are applied to the new CareShield Life scheme in Singapore.

For further details and reference, the reader may refer to the 2017 paper prepared by the Population Issues Working Group (PIWG) of the International Actuarial Association (IAA), *Long-Term Care: An Actuarial Perspective on Societal and Personal Challenges*[1].

[1] https://www.actuaires.org/LIBRARY/Papers/PIWG_LTC_Paper_April2017.pdf

1. What is Long-term Care Insurance?

Long-term care (LTC) insurance collectively refers to the range of private insurance plans and public schemes intended to cover the costs of care for long-term disability, resulting from a person's inability to perform everyday activities of daily living. Many have personally experienced the amount of effort which providing care takes and the financial burden on families, when their parents or grandparents become dependent on care provided by others. In an age in which families are generally smaller and people are living longer, there are fewer resources available while, at the same time, the cost of care and the length of the time over which it must be provided is increasing. Each of us faces the risk that we will depend on our children or social security systems at a time when we will be most frail and dependent. LTC insurance seeks to ease this burden on the individual and on society by putting in place a system of collective financial support.

Under an LTC insurance plan or scheme in general (Figure 1), a healthy insured pays premium up to a certain age (but can be for life-time) or until disability[2] occurs, at which point the insured may receive regular disability benefits to support the costs associated with LTC. Usually, such regular disability benefits are payable over the disability duration (e.g. $500 per month while disabled), with the benefits ceasing upon death, recovery from disability or reaching the maximum payout limit, if any.

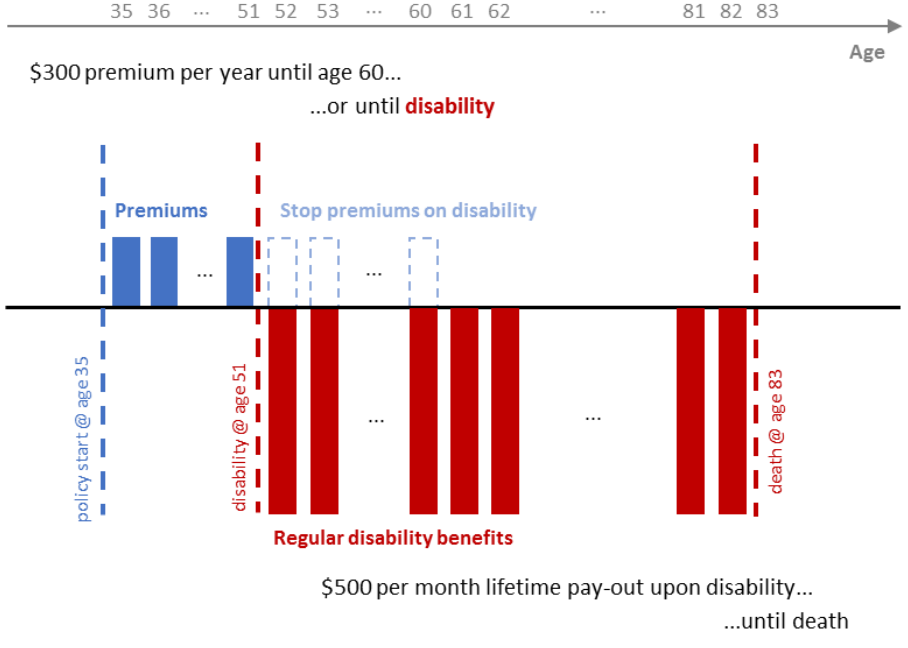

Figure 1: Example of LTC insurance

Such regular disability benefits can take the form of cash benefits or reimbursement-type benefits:

- Cash benefits: regular (e.g. monthly) cash benefits to the insured, which could be indexed to inflation.
- Reimbursement-type benefits: reimbursement or disbursement of the actual recurring long-term care costs (e.g. nursing home expense), subject to some limits, arising from disability.

The benefit trigger depends on the definition of disability in the insurance contract or scheme rules. The definition of disability varies by market and product, but usually refers to a person's inability to independently perform some minimum (e.g. 3) out of a specified number (e.g. 6) of activities of daily living (ADLs) or when they suffer from cognitive impairments. A typical set of ADLs are: washing, dressing, feeding, toileting/continence, mobility and transferring.

[2] To be precise, it should be "long-term care dependency" rather than "disability", which may or may not lead to long-term care dependency. However, since "disability" is more commonly used when discussing about long-term care insurance, it is decided to simply use "disability".

1.1. Public long-term care coverage in US, France and Singapore

As Singaporeans gear up for the launch of the CareShield Life scheme, which is an enhancement of the existing ElderShield scheme administered by private insurers, it may be instructive to look to other markets where LTC plans and schemes have played a significant part in older age long-term care financing, to see what lessons we can learn from their experience.

The United States and France were chosen for comparison as their respective LTC insurance environments developed along different paths and can be contrasted. Germany and Japan also have fairly mature LTC insurance systems. These systems are described in the IAA paper referred to earlier.

The United States of America (US) offers mean-tested LTC cover through Medicaid for low-income Americans. Medicaid is the chief public funder of long-term care services, paying for 40% of total LTC cost in 2010. US Medicare pays for some post-acute care, accounting for 24% of total LTC spending, and private LTC insurance pays for 9%[3]. In France, the introduction[4] of the publicly-financed universal *Allocation Personnalisée d'Autonomie* (APA) scheme has led to a growth of a private supplementary LTC insurance market.

	US Medicare and Medicaid[5]	France APA	Singapore CareShield Life
Benefit	Reimbursement. **Medicare**[6], the federal program for the elderly and disabled. However, it does not cover LTC provided by either custodial or non-skilled workers, but only provides medically necessary care in skilled nursing facilities or, if ordered by a doctor, rehabilitative care in one's home. **Medicaid**, the federal/state health program, covers long term care but only for people who are poor or who become poor paying for long-term care or medical care. Covers nursing home and personal care at home.	Cash benefits which are to be used for covering long-term care costs, with limitations on the use of cash[7]. The cash must be used in accordance with a care plan prescribed by locally managed geriatric assessment teams, which focus primarily on aid services. In effect, **not dissimilar from reimbursement-type benefits**, since the cash benefits may be restricted to the admissible long-term care costs.	Cash benefits
Benefit period	**Medicare**: Limited home care based on needs. It covers skilled nursing facility care for up to 100 days following a hospital stay of at least 3 days. **Medicaid:** Life-time	Lifetime	Lifetime

[3] "*Help Wanted? Providing and Paying for Long-Term Care*", Chapter 7 Pg. 228, OECD (2011)
[4] Introduced in 2002. Loi n° 2001-647 Article 21.I (in French)
https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=LEGITEXT000005631242&dateTexte=vig
[5] While the comparison table focuses on the LTC-related benefits of Medicare and Medicaid, it is worth highlighting that both Medicare and Medicaid cover beyond LTC. Medicare (covers the elderly and disabled) and Medicaid (covers the poor) would, where applicable, cover other medical services and supplies that are medically necessary to treat health conditions.
[6] https://www.medicalnewstoday.com/articles/323858.php
[7] https://www.service-public.fr/particuliers/vosdroits/F10009 (in French)

	US Medicare and Medicaid[5]	France APA	Singapore CareShield Life
Benefit trigger	Each State has the flexibility to determine the eligibility criteria. Triggers could be chronic illness or physical or mental disability.	Meeting the loss of autonomy definitions under *groupe iso-ressources* (GIR[8]) 1 to 4 groupings	Unable to perform at least 3 out of 6 activities of daily living (ADLs)
Monthly LTC benefit	Not applicable	Benefit payable to whoever is severely disabled (meeting GIR 1 to 4 definitions), living either at home or in a nursing home. Monthly pay-out dependent on the degree of disability and type of care (home care/nursing home). Since 1st January 2019, the maximum pay-out has been capped[9] at: – For GIR 1: €1,737.14 per month – For GIR 2: €1,394.86 per month – For GIR 3: €1,007.83 per month – For GIR 4: €672.26 per month	S$600 per month in 2020
Benefit increment	Not applicable	Yes, yearly reviewable	Targeting 2% per annum for the first 5 years, until the cohort turns 67 or successful claim is made - the increment will be reviewable thereafter.
Monthly benefit co-payment	For Medicare Part B, $185 in year 2019 as deductible. State may require Medicaid recipients to be responsible for a small co-payment.	Co-payment progressively increases with monthly income, subject to a floor and cap[10]: – less than or equal to €810.96 per month: 0% – greater than €810.96 and less than or equal to €2,986.58 per month: progressively increase from 0% to 90% – above €2,986.58 per month: 90%	No co-payment requirement
Funding mechanism	**Medicare**: Part A: payroll, income tax Part B: Medicare premium and Congress funds **Medicaid**: Federal and state funds	Pay-as-you-go, i.e. current claims are paid with current resources	Pre-funding, i.e. current premiums in excess of current claims and other expenses are accumulated to fund future benefits. Taxes are not used to fund the scheme.
Monthly premium	For **Medicare Part B,** monthly premium was $134 per month in 2018.[11]	Not applicable: APA is financed by taxes.	S$206 for male age 30; S$253 for female age 30, rising with age at entry Premiums may be paid by withdrawal from Medisave[12].

[8] https://www.service-public.fr/particuliers/vosdroits/F1229
[9] https://www.service-public.fr/particuliers/vosdroits/F10009
[10] https://www.service-public.fr/particuliers/vosdroits/F1802
[11] https://www.medicalnewstoday.com/articles/323858.php
[12] Medisave is a national medical savings scheme in Singapore, where members set aside part of their income to pay for future medical-related expenses

	US Medicare and Medicaid[5]	France APA	Singapore CareShield Life
Premium duration	Premiums of Medicare Part B are payable for whole of life.	Not applicable, all public funded	Payable till age 67 or 10 years, whichever is longer
Administrator	Government (Federal or State, as applicable)	Government	Government
Coverage	US citizens and permanent residents	Residents in France aged 60 or older[13]	Singapore citizens and permanent residents Optional for existing cohorts (born 1979 or earlier); Compulsory for future cohorts (born 1980 or later): Future cohorts will be covered regardless of any pre-existing severe disabilities.

US Medicare explicitly limits coverage for long-term care. Medicaid provides support that is critical to persons who need long-term care, but that support is available only after all other resources have been exhausted. Due to funding deficiencies at both the state and federal government levels, long-term health care may increasingly need to be funded by individuals through either out-of-pocket savings or private insurance plans[14].

Under both the French APA and Singapore CareShield Life, the benefits are not designed to exhaustively cover all potential LTC needs and circumstances for everyone. Development of private LTC insurance may help to fill the gap.

In US, LTC private insurance policies issued in early years (1980 - 1990) suffered from being under-priced, due to underestimating claims trends, loose underwriting practices, and inaccurate mortality, lapse and interest rate assumptions. The LTC private insurance industry is undergoing a transformation and is responding to consumer concerns by developing products that are more affordable and flexible to meet the coverage needs of consumers. The newer products are also designed to be less risky for the insurers, e.g. with increasing premium structures, longer elimination periods and stricter triggers to become benefit-eligible. Traditional stand-alone policies are being offered with benefit coverage periods of one to three years or more, while newer short-term care insurance policies offer even shorter benefit coverage periods. Hybrid insurance policies link LTC insurance with an annuity or life insurance product using a long-term care or chronic illness rider[15].

The French market for private LTC insurance has been growing since the introduction of APA in 2002, with approximately 5.7 million policyholders in 2012. Most of this growth is in the group employer-sponsored market, which constitute 75% of the policies sold. On the individual side, the market grew by 40% from 2002 to 2012[16]. The private LTC insurance plans and schemes are typically pre-funded.

2. How is LTC Insurance Financed?

2.1. Pay-As-You-Go (PAYG) and Pre-funding

The Pay-As-You-Go (PAYG) approach to public financing of an LTC scheme is one that is based on a current disbursement method, where LTC benefits are paid for as the payment falls due, using general tax revenues

[13] https://www.service-public.fr/particuliers/vosdroits/F10009

[14] "*An Overview of the U.S. LTC Insurance Market (Past and Present): The Economic Need for LTC Insurance, the History of LTC Regulation & Taxation and the Development of LTC Product Design Features*", Society of Actuaries (2014)

[15] https://www.aarp.org/content/dam/aarp/ppi/2018/08/disrupting-the-marketplace-the-state-of-private-long-term-care-insurance.pdf

[16] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4462881/

(i.e. allocated from an overall tax budget) and other contributions (e.g. a specific payroll tax to fund a social scheme). In effect, such a PAYG LTC scheme will be primarily funded by the working population, with the retired population receiving most of the benefits.

The principal problem with a PAYG scheme is that, if the population is an ageing one, the ratio of the number of persons claiming for benefits to the number contributing to the financing of these benefits, rises over time. This problem is compounded by other costs of social security type benefits and services increasing materially with an ageing population, and also possibly by the shift from extended families, that are able or willing to self-support their elderly relatives, towards more dispersed families. This problem could also be further compounded by inflationary pressures on the cost of supplying long term care services by service providers. This demographic shift is prevalent in many developed countries and can clearly be seen in Singapore. As the overall population ages and lives longer, the contribution per working individual tends to rise, as a shrinking working population has to pay for increasing LTC insurance claims costs (arising from more elderly being covered, higher disability rates due to an ageing risk pool, and LTC cost inflation).

The burden on the persons supporting the scheme may then become onerous (Figure 2).

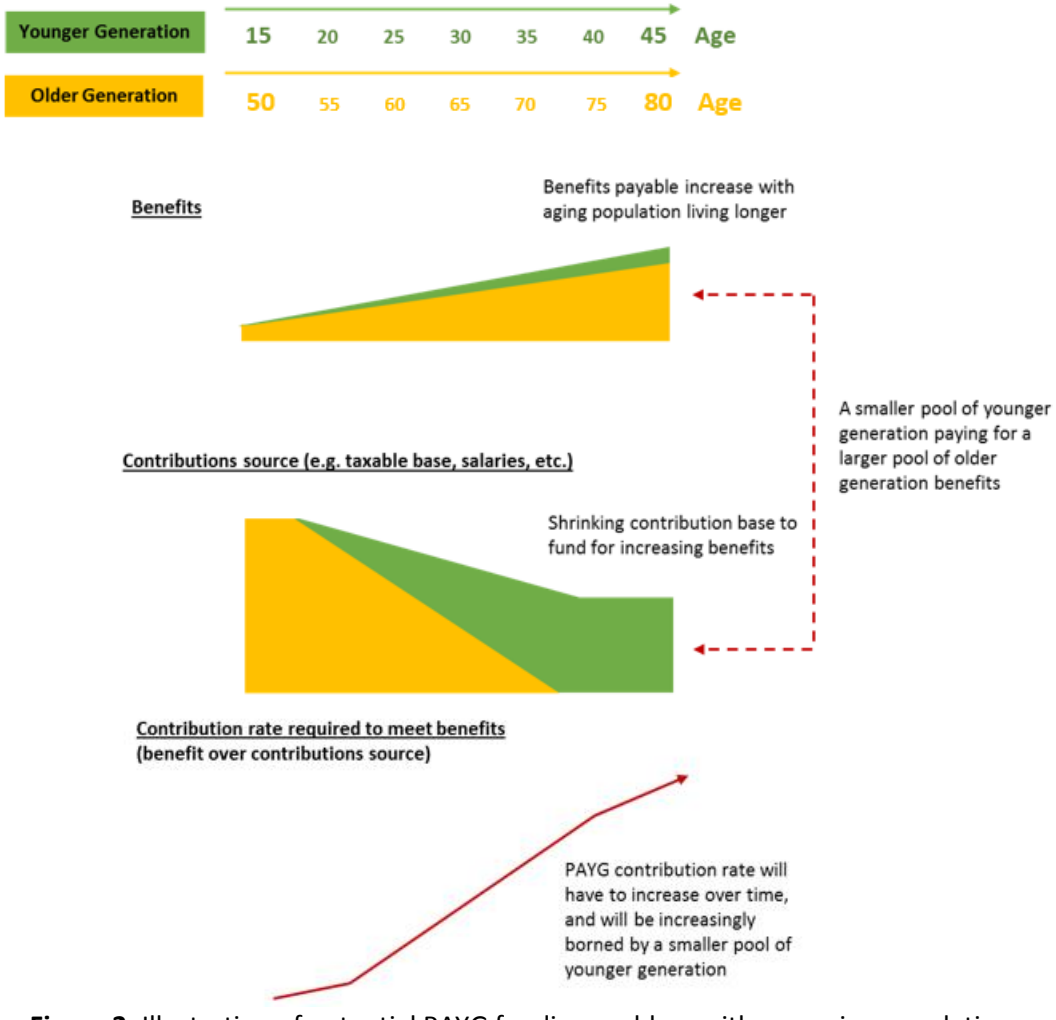

Figure 2: Illustration of potential PAYG funding problem with an ageing population

A pre-funding scheme generally refers to an insurance structure where premiums paid are accumulated to meet the scheme's future liabilities. Each insured individual pays premium throughout her lifetime or until a specific age, like 67 for CareShield Life. In effect, the contributions of a generation are accumulated to pay for the future LTC costs of the same generation.

If we take a **cohort** of such individuals, whose insurance is incepted within a certain period of time (e.g. when the cohort turns 30 years old), the premiums collected from them are likely to exceed the benefit payments they will claim during that year, and for a number of years thereafter. The excess of these premiums over the claim benefit and other expenses during these years, will be accumulated in a fund.

When this cohort ages, the claim benefit and other expenses they incur will begin to exceed the premiums collected from the same cohort from a certain age, upon which the accumulated fund will be drawn down to meet these excess expenses. If they reach the age where premium payment stops (e.g. age 67), the accumulated fund will be the only resource to meet their claim benefit and other expenses. It is possible to calculate a premium which remains unchanged until the limiting age, based on the expected claims experience of the cohort.

With a pre-funding scheme, each insured person 'pays forward' towards her own benefits, in that any premium paid not used to meet current claim benefits will be accumulated to meet future claim benefits. This concept is further developed in the next section. However, the pre-funding approach poses challenges for making adequate provision for residents in the higher aged groups, as they will have a shorter time for their premiums to accumulate to a sufficient size to meet benefit payouts after premium payment ceases. These challenges may have to be met by supplementing the premiums with some external source of funding.

2.2. Pre-funding – General Methodology for Pricing or Calculation of the Premium

A pre-funding LTC insurance scheme, just as for other long-term insurance products, like life insurance policies, are priced using cash flow modelling where each component of the cash flow such as future premium income and future claim and other expense outgo are projected for each future time period (e.g. each future year) of the duration of the insurance coverage. The projection is usually made for each cohort of the insured population, e.g. the insured persons born in the same year, until the projected death of the final member of the cohort.

One challenge of the modelling process is formulating a model which caters for the determination of how many of the insured (healthy) persons of an initial starting cohort will become disabled, die or remain healthy in each future time period.

Two methods commonly used are the multiple-state model or the inception and annuity model.

- The **Multiple-state Model** (Figure 3) allows for the probability that an insured person moves from a healthy state to different states of disability and back to the healthy state, and out again to a disability state, as illustrated by the diagram below. Of course, if the insured person moves to the death state, she remains in that state. This model reflects more accurately the actual underlying process of becoming disabled and enables a more detailed model to be constructed from which the time for which the insured person remains in each state can be estimated. However, in most countries, there is insufficient data to support the detailed assumptions required, in particular the transition rates, which are the rates at which persons in any state move into another state. The complexity of the model also makes it harder to check and maintain.

- The **Inception and Annuity Model** (Figure 4) is a simpler model that assumes that the insured person can only move from a healthy state to a disability state and, once in a disability state, cannot move back to a healthy state. If there are more than one disability state, the insured person can move from the lower disability state to the higher but not back again. This process is illustrated in the diagram below. Assumptions are also required for the duration the insured person stays in any disability state after she moves to it, with which the stream of benefits payable (the benefit annuity) can be calculated. The more modest complexity of this model means that it is often more practical to adopt this approach, in particular in countries where credible data on LTC experience is lacking.

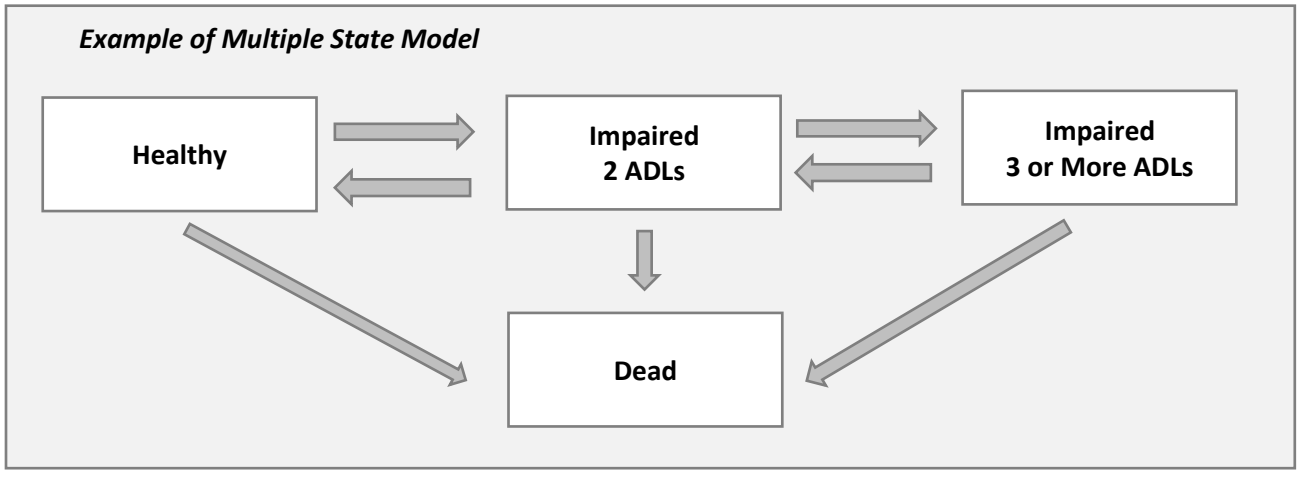

Figure 3: Example of Multiple State Model

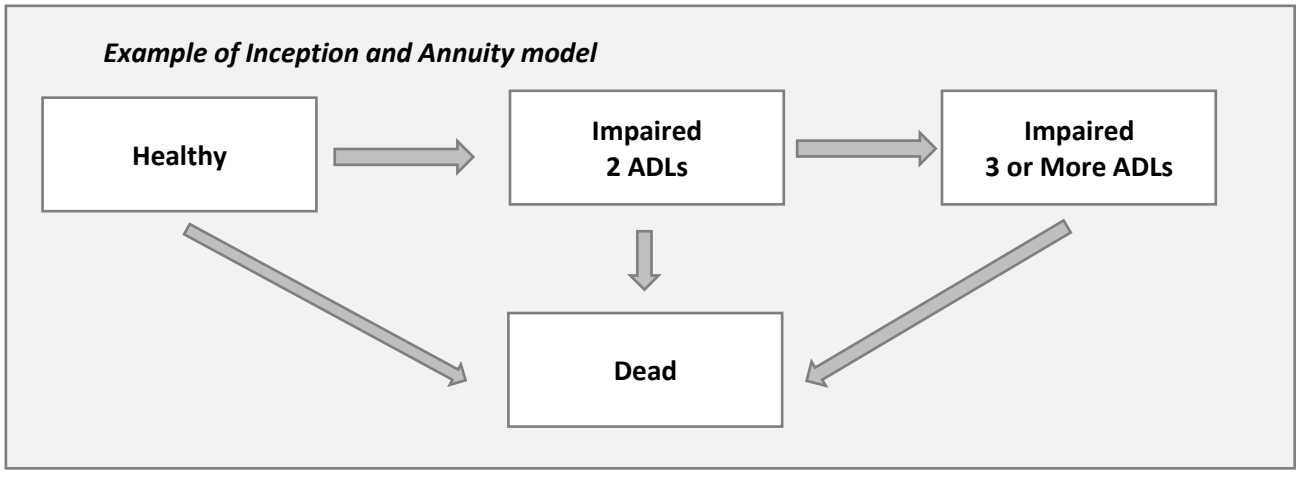

Figure 4: Example of Inception and Annuity Model

2.3. Key Pricing Assumptions and Pricing Risks

If an LTC insurance scheme is pre-funded for each cohort, premiums paid by the insured persons in that cohort, in excess of the claim benefits and expenses incurred in the early years, help to fund the cost of benefits and expenses projected to be incurred in the future by surviving members of that cohort, as explained earlier and illustrated by the diagram below (Figure 5). Usually, the premium payable is calculated to be level, or constant, throughout the working lives of the insured persons, although the premium may be adjusted from time to time if the actual experience of the scheme deviates from the assumptions made to project the experience. The premiums are paid into a fund, which shall be called the LTC fund, out of which claim benefits and expenses are paid. The fund will be invested and earn a rate of return on the investment.

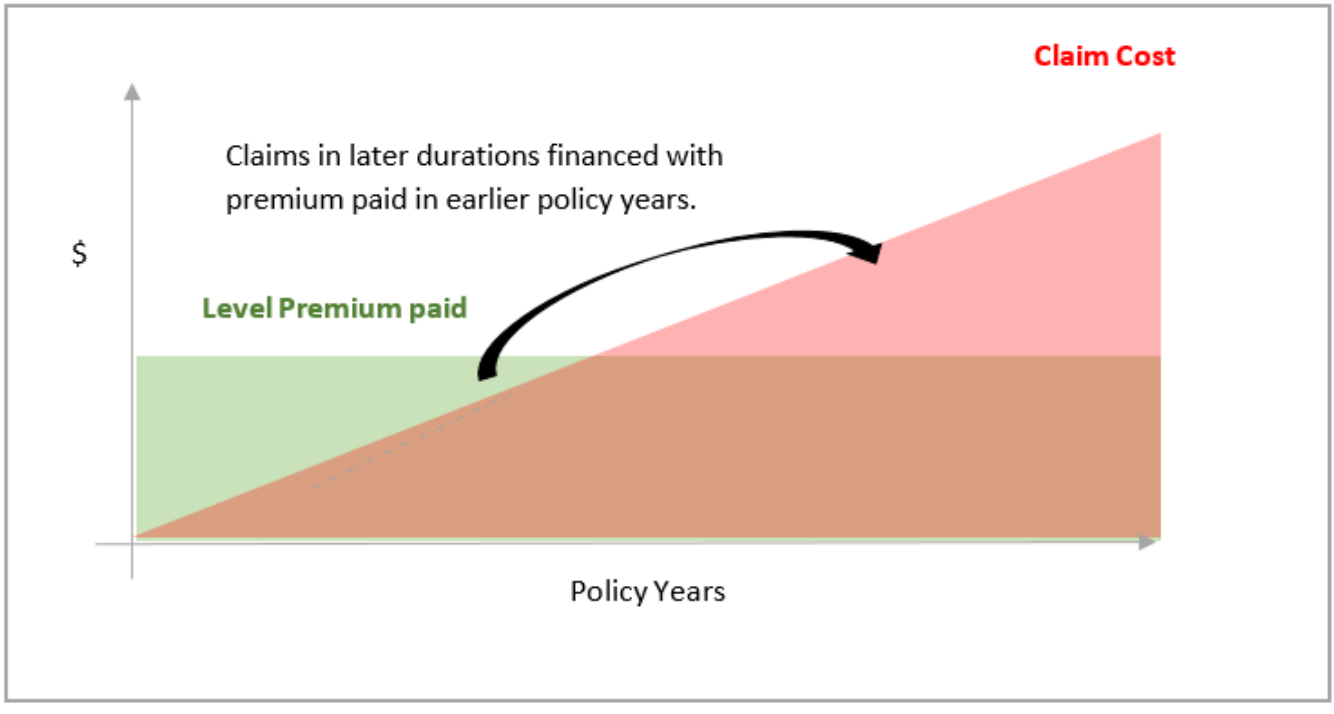

Figure 5: Pre-funding mechanism with level premium

In order to determine the premiums for an LTC insurance private plan or public scheme, several assumptions have to be made to project the future experience of the scheme. The table below provides a summary of the key assumptions and of the risks to the insurer of the scheme if the actual experience deviates from that projected by these assumptions. How these risks affect the viability of the plan or scheme is explained after the table.

Assumptions Relevant to Long Term Care Insurance Pricing		
Assumption	**Explanation**	**Risk to Insurer**
Mortality	Rates of death at each year of age, either before the receipt of LTC insurance benefits (the healthy state) or during the receipt of such benefits (the disabled state) - if before, these are the rates of transition from the healthy state to the death state directly - if after, these are the rates of transition from each disability state to the death state	Mortality is lower than expected, i.e. insured persons are living longer than expected. This leads to higher claim rates arising from: - higher than expected number of disabled insured persons making a claim; or - longer than expected durations of disabled insured persons receiving benefits.
Morbidity / Incidence	Rate of transition of insured persons from the healthy state to one or more states of disability at each year of age	Morbidity is higher than expected.
Recovery rate	Rates of recovery at each year of age of insured persons who are in a state of disability	Recovery rate is lower than expected leading to more claims.
Voluntary Lapse	Rates of voluntarily termination of insurance by insured persons in each year of insurance after inception: *the inverse is the persistency assumption*	Lapse rates are lower than expected, i.e. more insured persons remain insured at the end of each year of insurance than expected.

	– the proportion of the insured persons at inception still remaining insured at the end of each year of insurance	During the premium payment period, higher than expected lapses can also deplete the LTC fund, and might even worsen experience, if insured persons who lapse are predominantly healthy (this is referred to anti-selective lapsation). Lapse rates may not be applicable to mandatory public schemes.
Interest Rate	The rate of investment return earned on the accumulated LTC insurance fund	Investment return is lower than expected, resulting in insufficient accumulation to fund all future claims outgo in excess of premium income.
Expense	Expense incurred from commissions paid to distributors, administrative expense related to inception and maintenance of insurance, and claim expenses mostly related to claim assessment and processing	Expense cost is higher than expected.
Inflation	Inflation of claims and expense cost, especially where claim benefits are reimbursement in nature or are linked to inflation	Inflation is higher than expected leading to higher than expected claims and expense cost.

2.3.1. Mortality

The key risk faced by many LTC insurers is that of people living longer than expected. With improvements in mortality, there will be more insured persons surviving to make LTC claims and living longer while on claim than expected.

While there are uncertainties in the projection of long-term mortality improvement, life insurers often assume that improvements in mortality will persist beyond 10 years to arrive at their best estimates of mortality rates. It is worth noting that the underlying causes of population mortality improvement may be related to those that will drive changes to the morbidity experience as well.

As life expectancy improves, it is also expected that the number of years lived in ill health or disability will also rise. According to the Burden of Disease in Singapore 1990-2017 Report[17], Singaporeans born in 2017 are expected to spend 10 years in poor health over their lifetimes, compared to 9 years for those born in 1990. However, it is worth noting that by 2017, Singaporeans' life expectancy at birth had risen to 84.8 years from 76.1 years in 1990. Hence, the increase in the number of years lived in ill health or disability is relatively slower than the improvement in the life expectancy. The life expectancy of residents of nursing homes is less than 3 years (2.2 years (95% confidence interval [CI]: 1.9 - 2.4).[18]For the reasons above, mortality and morbidity assumptions are often developed in parallel.

The impact of the increase in claims costs due to falling mortality is lower for schemes where premiums are payable for life as compared to schemes where premiums are payable only until a certain age (e.g. age 67), as

[17] http://www.healthdata.org/sites/default/files/files/policy_report/2019/GBD_2017_Singapore_Report.pdf

[18] https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0203480&type=printable

insured persons who live longer than expected continue to pay premium. The additional premium income partly offsets the increase in claims costs.

2.3.2. Morbidity

Morbidity risk refers to the risk of healthy insured persons becoming disabled. The morbidity assumptions made in pricing depends on a wide spectrum of criteria including age at inception of insurance, duration elapsed since inception, gender, the definition of disability (the 'benefit triggers'), amount of benefit insured, maximum duration of benefit payment, and deferment period (whereby, upon disability, the insured must remain disabled for a period (e.g. 90 days) before the first disability benefit will be paid).

Across many countries, there has been a shift in the predominant causes of LTC dependency. With fewer people dying from cardiovascular diseases such as heart attack or stroke, there is an increasing number of elderly people who become dependent on care because of cognitive impairments such as Alzheimer's Disease or other types of dementia, or neurological disorders such as Parkinson's Disease. This has led to a large increase in the length of time patients remain in care, compared to the relatively shorter time during which patients who suffer a heart attack or cancer. This lengthening of the duration on claim leads to an increase in the overall costs.

Benefit Triggers

A key driver of the morbidity assumption is the definitions of the benefit triggers - the criteria used to decide whether a claim for LTC insurance benefit is admitted or not. The most commonly used benefit trigger is the failure to perform a specified number of basic **Activities of Daily Living (ADLs) without the aid of another person**. A typical set of ADLs includes washing, dressing, feeding, toileting, mobility and transferring, each of which is defined as precisely as possible to avoid ambiguity. In addition to failure to perform ADLs, benefit triggers may include cognitive impairments. Other common benefit triggers include failure to perform a different set of ADLs classified as Instrumental ADLs (IADLs) or admission to care facilities like nursing homes, or are based on the amount of care required.

There is a risk that any benefit trigger, to some extent, is outside the control of the insurer, due to the subjective elements in the assessment of the ADLs, or in the assessment of care required, or in the admission to a care facility. Consistency between different assessors is hard to achieve.

There are benefit triggers that are linked to actual care provision being consumed, such as being admitted to a long-term care community or facility. For such a benefit trigger, the expected cost of claims payout may not be as high if the care provision is in short supply, as there may be a significant delay between people needing care and being able to obtain it. There is also a potential secondary impact on the survival rate of someone moving into a home care facility later than she or he should have.

Actuarial Basis for Gender Distinct Rates

US LTC insurers have not traditionally used gender as a parameter for setting premium rates, despite the fact that females experience significantly higher morbidity rates than males do. This could be due to limitations set by some states that require gender neutral insurance premiums. This practice changed in 2012 when some of the big insurance companies in US introduced the first gender-specific LTC insurance premium rates. It was followed shortly by other private LTC insurance providers.

According to an article published by Milliman Consulting[19] in April 2014, if the sex distinct claims cost were fully priced in, female LTC insurance premiums could be as much as 15 or 30 percent higher than premiums developed using unisex assumptions.

[19] "The Actuarial Argument for Gender-Distinct LTC Rates", Dawn Helwig, Milliman Consulting (2014)

The key contribution to the premium differential between the sexes is driven by the longer life expectancy of females. According to The Burden of Disease in Singapore 1990-2017 report, the life expectancy at birth of a female Singaporean is 5.6 years more than a male Singaporean[20]. Charging unisex rates requires the insurer to make assumptions about the proportions of male and female lives within each cohort paying premiums or receiving benefits in any period of time. If the insurer has a higher proportion of female insured persons than originally assumed in pricing, it will not collect enough premiums to pay the anticipated benefits for all insured persons, male and female. Premium rates will eventually have to increase. Though, for a mandatory national scheme, the risk of gender skewing of the population is much lower (or at the very least, it can be priced for with less uncertainty).

Challenge in setting the "right level" of morbidity assumptions

One of the key challenges in setting morbidity assumptions is the low frequency of LTC insurance claims and the delay in onset of claims payments. Private insurers often need to supplement their own claims experience with industry experience to improve the reliability of their assumptions. In some countries, such as Singapore, where the population is relatively small and ageing relatively quickly, there is insufficient LTC experience, and assumptions may need to be drawn up by analysing experience in other LTC insurance markets such as the US and France.

This challenge is further exacerbated by the fact that there is usually a large gap between the average age at inception and the average age at first claim. Deviation of the claim experience from that projected by the pricing morbidity assumptions may not become apparent for many years, until a significant number of cohorts have reached the ages at which claims become relatively frequent. In the US, the country with the longest history of LTC insurance and claims, the morbidity curve (the graph of morbidity rate against age) has steepened over time[21]. This steepening reflects actual claims costs which have been decreasing at lower ages but increasing at higher ages, relative to past experience or assumptions as reflected in older versions of the morbidity curve. As a result, LTC insurance providers in the US have had to increase premiums on several occasions as the higher-than-expected claim experience at the higher ages unfolded.

Further, the experience in the early years of any LTC insurance plan or scheme, regardless of the age of the insured person at inception, reflects underwriting selection, if insured persons are only offered insurance after being underwritten (or selected) by the insurer to ensure they are in good health. This early experience may not be a good guide to the ultimate (long-term) morbidity level. The industry average morbidity selection discount for selected US LTC insurance providers may be as high as 50% (i.e. 50% lower morbidity rate than a hypothetical non-underwritten insured life, all other risk factors such as age or gender being the same) in the first year of insurance and this effect can persist for up to 7 years[22].

The constant evolution of medical practice presents another challenge to confidence in pricing. With new medical discoveries, the interpretations of the definitions of disability can evolve, leading to changes in the eligibility of insured persons to benefits, for better or for worse, from the insurer's perspective. This evolution has been witnessed with critical illness insurance, which led to changes in the definitions of the eligible illnesses. Improved medical treatment and therapies may lead to increasing longevity in disability, thereby increasing the claims cost, or to improvements in rehabilitation rates, thereby reducing the claims cost. This uncertainty is very difficult to quantify and requires the insurer to constantly monitor not only its claims experience but the healthcare environment which impacts it.

[20] "The Burden of Disease in Singapore, 1990-2017", Ministry of Health Singapore (2019)
[21] "Mechanics and Basics of Long-Term Care Increases", Long-Term Care News (Issue 36), Society of Actuaries (2014)
[22] "Long Term Care Insurance: The SOA Pricing Project", Society of Actuaries (2016)

2.3.3. Lapse or (Conversely) Persistency[23]

Lapse rates refer to the likelihood that policyholders will voluntarily terminate their insurance contracts. In the pricing of LTC insurance, cashflows are projected over a period of 50 years or longer and, hence, lapse or persistency assumptions are crucial. Setting this assumption incorrectly can have a significant impact on the viability of the insurance, if the size of the insured population eligible to make claims at the later durations (when the insured persons are older and more likely to claim) is larger than had been projected. As with morbidity, the deviation of actual experience from that projected by the assumptions may not be apparent for many years. If the actual lapse rates are lower than assumed (higher persistency), even though the insurer may benefit from collecting more premiums, this could be more than offset by paying more claim benefits on a larger persisting pool of lives.

There is also the anti-selection effect if insured persons have the option to continue their insurance or not. Insured persons who consider themselves in ill health are more likely to claim for LTC insurance benefits, and are more inclined to keep their insurance in force than those who consider themselves in good health and unlikely to claim. As such, under-estimating persistency can be particularly costly in the later years.

Under-estimating persistency also means that the excess premiums accumulated in earlier years may not be sufficient to cover the larger than projected claim benefits in later years, especially if these benefits cannot be partially offset by collecting more premiums, if premium payment ceases at a specified age. In the US, the ultimate lapse rate assumption dropped from 2.8% in 2000 to 0.7% in 2014. This increase in the persistency assumption (and reduction in the rate of investment return assumption – see below) contributed to a two-fold increase in LTC insurance premiums market-wide between 2000 and 2014.[24]

2.3.4. Interest Rate

If an LTC insurance plan or scheme is pre-funded, investment income earned on the LTC fund is crucial to the growth of assets in the fund, which will be drawn upon to support the claim benefit payments as the insured persons age. As a result, investment income assumptions (e.g. bond interest rates) are critical to the financial health of the LTC insurance plan or scheme.

After the 2007 economic recession, the long-term rate of investment return assumptions used for pricing recent cohorts of insured persons were much lower than the rates used for prior cohorts. Lower rates of return meant that LTC insurers need to collect more premiums from recent cohorts to support the same level of benefits than from older cohorts. However, even with the older cohorts, insurers have to reinvest the fund accumulated from their premiums at interest rates lower than originally assumed. This has also led to premium rate increases for older LTC insurance contracts in the US to offset the fall in investment income.

2.3.5. Inflation

In many countries, there is a shortage of professional caregivers for persons requiring long-term care. This has had the effect of driving up the cost of the provision of long-term care. This supply-side inflation has a direct impact on the claims cost of LTC insurance plans or schemes which reimburse the actual cost of care. However, it can also have an indirect impact on plans or schemes which pay fixed monetary benefits, in that there will be pressure to raise the level of the benefit amounts to make keep them relevant and adequate.

3. CareShield Life

CareShield Life, a new government-run long-term care insurance scheme which is expected to be launched in 2020, will replace the existing ElderShield insurance scheme. Persons insured under the ElderShield scheme will

[23] Note: may not be applicable for a mandatory public LTC scheme; more applicable for private insurance
[24] "Long Term Care Insurance: The SOA Pricing Project", Society of Actuaries (2016)

be given the option to transfer to the CareShield scheme. The decision to introduce a new scheme came about after the Ministry of Health convened the ElderShield Review Committee to review the ElderShield scheme with the purpose of helping Singaporeans better prepare for the needs of old age.

In the ElderShield Review Committee Report[25], it was noted that that "1 in 2 healthy Singaporeans aged 65 could become severely disabled in their lifetime". This can be illustrated as shown below (Figure 6):

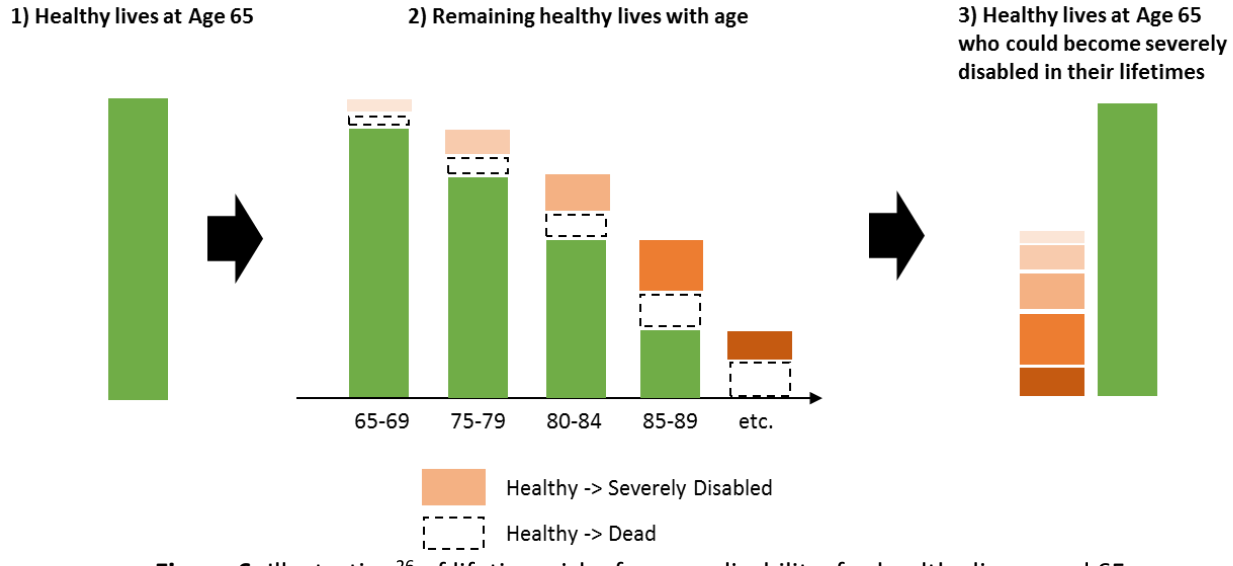

Figure 6: Illustration[26] of lifetime risk of severe disability, for healthy lives aged 65

After considering inputs from Singaporeans through focus group discussions and studying the experience of other countries, the ElderShield Review Committee identified a few key areas necessary to further strengthen Singapore social safety nets[27]:

1. **Expand coverage for greater inclusivity:** provision of long-term care protection for all Singaporeans including those with pre-existing disabilities.
2. **Enhance benefits for better protection:** increase in the starting level of payouts from $400 to $600 per month, and provision of payouts that will continue for life as long as the insured is severely disabled and that will be adjusted for inflation. Currently, payouts for ElderShield are limited to a maximum of 5 or 6 years and remain level throughout the payout period. However, inflation of benefits ceases once payouts commence or when the insured attains age 67 which, if the disability is prolonged, can erode the real value of the benefit payouts significantly.

As any enhancement comes with greater claim expense, the Committee recognized the need to moderate these enhancements so as to keep premiums affordable while also ensuring sustainability of the scheme. These considerations are notable in CareShield Life's design and pricing, as discussed below.

3.1. Mandatory National Long-Term Care Insurance Scheme

The new CareShield Life scheme is mandatory for future cohorts (born in 1980 and later) of Singapore citizens and permanent residents, starting from the age of 30, whereas insurance under the ElderShield scheme is voluntary (albeit on an opt-out basis) and starts at age 40. This will help keep premiums affordable by spreading the premiums over a longer duration and, by starting premium payment at a lower age, a higher proportion of the premium can be accumulated to pay claims at the higher ages.

[25] "*ElderShield Review Committee Report*", pg. 6, ElderShield Review Committee (2018)
[26] High level illustration only to demonstrate the conceptual logic behind the "1 in 2…" number. Actual death and severe disability statistics would be needed to provide a more accurate and to-scale illustration.
[27] https://www.moh.gov.sg/docs/librariesprovider6/resources/eldershield-review-committee-report-executive-summary.pdf

3.2. Pre-funding, not Pay-as-You-Go (PAYG)

CareShield Life is set up as a pre-funding long-term care insurance scheme, and not as a PAYG scheme.

In view of Singapore's rapidly ageing population[28], LTC cover sustainability can be a major problem under a PAYG approach which will rely on a shrinking working population to fund for increasing claims costs incurred by an expanding pool of retired residents.

Under a pre-funding approach which both CareShield Life will adopt and the existing ElderShield adopted, a significant portion of the premiums are set aside in the early years and invested to pre-fund future claim benefits when the insured population reaches the higher ages.

When such a pre-funding LTC scheme is at its early stage and the insured persons are relatively young, low annual loss-ratios are common. This has been observed in ElderShield[29], where $3.5 billion in premiums were collected with $153 million paid out as claims in its first 18 years of operations.

However, such initial excess of premiums over claims will reverse as the cohorts age, and as premium payment eventually stops and the claims cost continue to escalate due to increasing morbidity with age. Eventually, at the higher ages, once premium payment has ceased, the scheme would need to tap into the fund accumulated from the excess of premiums over claims and expenses at the lower ages to pay for the claims and expenses at these higher ages.

Therefore, over the long term, for each cohort, we may expect the lifetime premiums collected to cover the lifetime claims. Accordingly, for such a pre-funding scheme, it would be more appropriate to look at a life-time cumulative loss ratio, rather than any single period (e.g. annual) paid loss ratio (Figure 7).

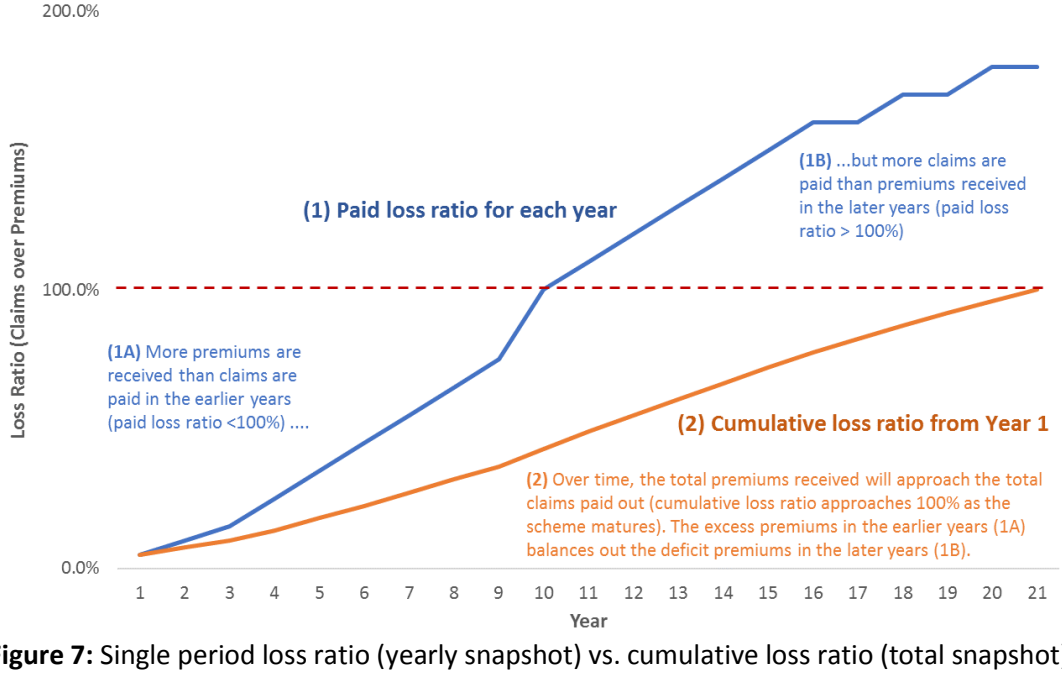

Figure 7: Single period loss ratio (yearly snapshot) vs. cumulative loss ratio (total snapshot)

Also, under a pre-funding insurance approach, without inter-generational risk sharing, the premiums payable by the insured persons belonging to any particular cohort are designed to be stable over time. Given the pre-funding premium financing structure, the insureds in each cohort can be reasonably certain as to how much

[28] Based on population trend statistics prepared by the Department of Statistics, Singapore resident population has grown older with more elderly and fewer younger people in the last decade. (Source: Department of Statistics Singapore)

[29] https://www.straitstimes.com/forum/letters-in-print/current-eldershield-insurers-should-return-surplus-premiums-to-moh, https://www.moh.gov.sg/news-highlights/details/eldershield-premiums-collected-meant-to-support-future-claims

they will have to pay in premiums for their own cohort's LTC insurance benefit payouts. By design, there should be no future additional and uncertain obligations arising from having to fund the benefit payouts of other cohorts. Pre-funding without inter-generational risk sharing provides each insured person greater certainty as to her financial obligation than under a PAYG system, where the cost she has to bear in the future can be considerably more uncertain.

3.3. Premiums

Under CareShield Life scheme[30], new cohorts (i.e. those that turn 30 that year) of Singapore residents[31] and Singapore citizens residing overseas will start paying premiums from age 30 up to age 67, with annual premiums starting at $206 for men and $253 for women. In 2020, to cover residents who have yet to be eligible for insurance under the Eldershield scheme, residents aged 31 to 40 will also be automatically covered with premiums increasing with age at commencement of the scheme. The rate of premium and pay-out increases will be reviewed regularly and may be adjusted depending on actual and projected experience. For the first five years, however, both premium and pay-out will increase by a fixed 2 percent annually.

The rationale for gender-differentiated premium has been presented. Men and women pay premiums over the same duration under CareShield Life, but past experience has shown that women tend to live longer than men and run a higher risk of disability. Since benefit payouts are fixed and paid for life, women are more likely to suffer from disabilities for a longer duration and thus it may be deemed equitable for women to pay higher premiums than men.

Moreover, with the limited amount of local data and experience (ElderShield has been in force for only 17 years, meaning that the original cohort aged 40 is now aged only 57, which is still below the ages at which significant LTC insurance claims are made), there is considerable uncertainty in the assumptions underlying the cash-flow modelling for pricing the scheme. Hence, it is critical that the claims experience is monitored closely, and adjustments are made to premiums as and when necessary to ensure that the scheme remains viable and sustainable.

As inter-generational or inter-cohort subsidies are kept to a minimum, consideration had to be given to helping the older cohorts accumulate funds of sizes which can adequately meet their insurance claim needs, with subsidies from other sources. This is a subject which is outside the scope of this paper.

3.4. Other Considerations

Other enhancements were considered by the Committee, such as, lowering the threshold for claiming inability to perform one or two ADLs. However, in view of the additional cost, the Committee decided not to introduce these enhancements, which may be provided under optional supplementary coverage which private insurers can offer. Private insurers can play this important role, as they have done by providing supplements to the ElderShield or MediShield Life schemes.

Uncertainties in the estimation of future claims cost arising from environmental factors like the evolving medical field or climate change are very difficult to quantify. It is incumbent on the insurer to monitor the environment and make adjustments as new facts come to light.

[30] https://www.moh.gov.sg/careshieldlife/resources

[31] Singapore residents refer to Singapore Citizens and Permanent Residents

4. Concluding Remarks

Demand for long-term care in Singapore is forecast to rise rapidly over the next few decades as a result of the baby boomer generation (population cohort born between 1946 and 1964) reaching the ages necessitating long-term care services. With the higher proportion of elderly dependents in the working population, a suitable financing method has to be developed to deliver a sustainable long-term care system. This was considered in the development of the CareShield Life scheme, and features of the scheme were designed to ensure premium affordability and scheme sustainability.

Our report identifies the difficulty in estimating long-term care costs due to the complex processes of ageing, which involves the gradual progression of varying states of disability that are sometimes reversible. This makes the process difficult to model as well as to specify claim criteria and, hence, there is a significant element of uncertainty in pricing long-term care contracts. However, the provision of such enhancements and the funding approach adopted is consistent with other long-term care schemes overseas, such as the aforementioned France's APA and the Medicare and Medicaid scheme in the US.