Retiring in Comfort
An SGX and Oliver Wyman paper on retirement savings

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1. Executive Summary

Singaporeans face a retirement challenge – how to ensure a desirable lifestyle post retirement without overreliance on external sources. Historically, many retired Singaporeans have relied on their children as the main source of financial support. However, shifting demographics due to increases in life expectancy and low birth rates put limitations on the extent to which this model is sustainable. It is therefore paramount that Singaporeans can adequately plan, save and invest for retirement.

The CPF plays a central role in addressing this challenge and has established a mandatory retirement saving scheme for Singaporeans, bringing together employers and employees to contribute up to 36% of income into the scheme for retirement, housing and healthcare purposes.

According to the analysis used in this paper, the average Singaporean in full time employment today can expect an income replacement ratio (expected post retirement income vs. pre-retirement income) of around 68%. This is within the range recommended by the World Bank and comparable to those seen in OECD countries. However, some Singaporeans may aspire to a higher replacement ratio. This can be achieved through both increasing savings rates and/or targeting higher rates of return on these savings. This paper explores the latter.

Today, CPF members can use their Ordinary Account (OA) and/or Special Account (SA) savings for investments under the CPF Investment Scheme if they meet the minimum threshold balance of $20,000 in their OA, or $40,000 in their SA. Yet, over 70% (a total sum of ~S$15BN) of the total balances within the CPF Special Account (designated for retirement saving) that could be invested remain in the CPF accounts, earning the default interest rate. Building on the CPF’s existing foundation, we have set out to explore whether an alternative asset allocation strategy for the Special Account could achieve higher rates of expected return.

We start off by reviewing, for the average Singaporean, the effect of investing the Special Account balance above the minimum threshold in a higher risk-return strategy (namely Singaporean and international equities). We simulate a sensible investment strategy that minimizes the risk exposure in the final years of retirement savings. However the effect is small with expected retirement income only increasing by ~3%. Our research shows this is due to two reasons:

1. The expense fees on many investment products are too high for long term investment and can eat up to ~20% of expected returns through time. A high proportion of these fees are paying for the distribution of these investment products rather than actual investment management. We observe that in retirement saving schemes in some other countries they have found ways of bringing expense fees down for long term investment.

2. The average Singaporean reaches the minimum $40,000 threshold balance for investing their SA at around age 40 (and even later for individuals with lower incomes). This is a much later age to start investing in equities compared to retirement saving schemes in many other countries. When combined with a sensible de-risking of the invested savings in the final stages of retirement saving (e.g. during the 10 year period prior to retirement), this means there is a much reduced time window to actually be invested in higher risk-return assets. In order to lengthen this window, the minimum balance could be lifted whilst at the same time enforcing sensible de-risking as retirement approaches.
According to our simulation, changing both these aspects (lowering fees and allowing funds below the minimum balance to be invested in a sensible manner) would increase the expected annual retirement income by 16% against the status quo. Put another way, this increase will improve the income replacement ratio from 68% to 79% of pre-retirement income for the average Singaporean. One way to achieve this is a collective effort to create a set of lifecycle funds that Singaporeans can both easily and cheaply access within the CPF through simple choices. Lifecycle funds invest in higher risk-return assets during younger years of retirement saving and then automatically move into safer but lower return assets as retirement approaches. These funds would not replace the option for individuals to leave their balances in the CPF accounts but rather complement it. This has the following benefits:

1. It would make it easier for people to plan for their retirement and allow them to invest in higher risk-return asset classes without requiring deep investment expertise, whilst at the same time ensuring investments are made in a risk controlled manner that takes into account the time to retirement of each individual. These lifecycle funds could also be made available outside of the CPF to allow people to invest surplus savings to supplement their retirement income

2. A set of easily accessible lifecycle funds should benefit from economic scale and be simple to both distribute and administer. These scale benefits can be passed onto savers in the form of lower expense fees which are important to achieve higher net returns

3. These funds could in turn create new funding sources for investment by Singaporean companies and help deepen the domestic capital markets

To complement the introduction of lifecycle funds, the CPF minimum balance restriction for investing the Special Account savings can be relaxed to allow earlier investments in these funds.

However, it should be noted that there are some risks attached to investing in higher risk-return asset classes. In the event of extremely bad market performance over a prolonged period of time, expected post retirement annual income could drop by 12% versus the status quo (this corresponds to an extreme event such as a global depression or a war spanning over many years). Further, investing in higher risk-return asset classes requires a long term commitment and the expectation of periods of price volatility, further pointing towards the benefit of a lifecycle fund approach.

A higher risk-return retirement savings strategy may not be for everyone, but given the significant potential upside for Singaporeans’ retirement income, we encourage a broader discussion on how to rise to the challenge of enabling this choice.
2. Introduction

The purpose of this paper is to review how Singaporeans invest their retirement savings today and compare this with other countries in order to identify potential improvements. It is designed to set out the key challenges for Singaporeans (in needing to better plan for retirement), policy makers (in defining the structure of the retirement savings system) and the savings industry (in providing solutions) to address, rather than seek to prescribe a set of definite answers.

To do this we have simulated the expected retirement income for the average Singaporean based on current investment choices for retirement savings. We have then tested alternative asset allocation choices and analysed to what extent improvements can be achieved in expected retirement income.

The paper is structured as follow:

Section 2 on preparation for retirement through CPF provides an overview to the retirement savings system in Singapore. It highlights how most savings earn the default CPF interest rates and how the structure of the system requires people to build up a minimum balance before they can invest in higher risk-return asset classes.

Section 3 on potential uplift in returns on retirement savings establishes the expected retirement income for the average Singaporean under a set of status quo assumptions. It then shows the modelled results of adopting an alternative asset allocation under different system structures and how this impacts the expected retirement income under different outcome scenarios.

Section 4 on enablers for higher retirement income discusses the areas of change required to enable higher expected retirement incomes and how these could be achieved.
3. Preparation for retirement through the CPF

We have examined the retirement and pension landscape for Singaporeans using the Worldbank’s five pillar pension framework.

Figure 1: Pension Framework World Bank Definition

<table>
<thead>
<tr>
<th>Pillar</th>
<th>Description</th>
<th>Singapore system</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>A non-contributory pillar, intended to provide minimal protection for those members of the society with very low incomes and inability to build their own retirement income, mainly in the form of a social pension / other benefits.</td>
<td>Some structures within the CPF (e.g. Workfare programme) Public Assistance Scheme</td>
</tr>
<tr>
<td>I</td>
<td>A mandatory pillar with contributions linked to varying degrees to member earnings with the intention to accrue sufficient retirement savings to replace a certain portion of pre-retirement income. This pillar is intended to remove the risks of myopia and enforce a savings discipline.</td>
<td>CPF is a mandatory, employment-linked retirement savings scheme with defined contribution rates on earnings (not pay-as-you-go)</td>
</tr>
<tr>
<td>II</td>
<td>A mandatory pillar with typically individual savings accounts with options for members to exert control over their savings, mainly in the form of corporate defined contribution schemes.</td>
<td>CPF is also Pillar II for most individuals</td>
</tr>
<tr>
<td>III</td>
<td>Flexible and discretionary accounts that can take a wide range of shapes (e.g. individual savings account within a pensions / tax wrapper) within the full control and discretion of the individual.</td>
<td>Supplementary Retirement Scheme</td>
</tr>
<tr>
<td>IV</td>
<td>Access to informal support (e.g. family support), other social programs (e.g. health care, housing) as well as other financial and non-financial assets (e.g. reverse mortgages where available).</td>
<td>CPF schemes (Medical care, home ownership scheme, etc.)</td>
</tr>
</tbody>
</table>

The retirement savings system in Singapore is made up of the CPF, corporate pension schemes and the Supplementary Retirement Scheme (SRS). Among these, the CPF represents the vast majority of pension savings. Corporate pensions remain rare in Singapore and are only accessible to a minority. While the SRS is becoming increasingly popular, with the number of accounts having grown by >30% per annum from 2001 to 2011, the total balances in SRS accounts still represent less than 1% of the CPF balances. Therefore these balances are not considered in this study.

Beyond the pension framework, Singaporeans may choose to build private pension savings through, for example, insurance linked savings, bank deposits, stocks, unit trusts or property investments. Given that these savings are generally not fully earmarked for retirement, and in order to establish a like-for-like comparison to other countries, we have also excluded private pension savings in the scope of this study.

The rest of this paper hence focuses on CPF as the mandatory saving scheme for Singaporeans.
3.1. Central Provident Fund

Overview to CPF

The CPF plays a number of roles spanning social security/minimum protection, home ownership facilitation, retirement savings and medical savings. Within the CPF, each individual has four accounts dedicated to different purposes, each with specified contribution rates and investment restrictions. These are summarised in Figure 2 below. The interest rates shown are the current levels which can be expected to vary through time.

Figure 2: Overview of the CPF Accounts

<table>
<thead>
<tr>
<th>CPF balance asset allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The average asset allocation of CPF balances is heavily skewed towards deposits (funds which are invested ultimately in Special Singapore Government Securities, but referred to in this paper as deposits for comparison to other schemes) as shown in Figure 3. This phenomenon is driven by a combination of:</td>
</tr>
<tr>
<td>- Policy restrictions (minimum balances that must be reached in the Ordinary Account and Special Account before other types of investments can be made)</td>
</tr>
<tr>
<td>- Investment behaviour, as ~70% of the balances actually eligible for investment remain allocated to deposits</td>
</tr>
<tr>
<td>- High rates currently paid on deposits relative to commercial market rates</td>
</tr>
</tbody>
</table>

\[ Source: CPF \]
The CPF allocation (taking into account only OA and SA balances above the investible threshold) contrasts with a generally higher allocation to higher risk-return assets (especially equities) in other comparable pension schemes in countries such as the US, UK, Australia, Hong Kong and Malaysia, as highlighted in Figure 4. This view is also supported by the Mercer Melbourne Index 2012, which placed Singapore at the lowest end of the risk spectrum.
The differences in asset allocations across different pension schemes are driven by a multitude of factors including cultural, historical development, inflation expectations, etc.

While no system is directly analogous, we have used these observations to inform the development of an alternative asset allocation strategy for the retirement related CPF balances and tested the impact on expected retirement incomes.

**Alternative asset allocation profile**

Based on guidance from Mercer, we have created a lifecycle asset allocation approach. This approach allocates a higher weighting to equities and bonds during the early and middle years of retirement saving and then de-risks towards deposits in the later years of retirement saving. The objective of this is to benefit from the higher long term returns expected from equities whilst ensuring minimal exposure to market price movements at the point of retirement. In creating this allocation approach we have taken into account the specific constraints of the CPF system. We note that lifecycle asset allocation is becoming a more common approach in pension systems across many countries, although there is no fully agreed answer on what constitutes the ideal asset allocation.
Figure 5: Alternative asset allocation profile for CPF retirement related balances (based on average allocation of observed systems with imposed gradual de-risking towards retirement age)

In order to model the impact on retirement saving returns, this alternative asset allocation profile has been applied to the average CPF balance eligible for investment within the Special Account at each stage of the lifecycle. The alternative asset allocation profile was not applied to balances in the Ordinary Account.

As a consequence, the effective total asset allocation remains heavily weighted towards low risk-return asset classes when compared to other countries. Figure 6 illustrates this by showing the effective, aggregate asset allocation over time across the relevant CPF accounts (i.e. Ordinary Account, Special Account and Retirement Account) if we apply the alternative allocation profile to only the balances in the Special Account.

Notes:
- Based on average starting allocation profiles from US, UK, Australia, Hong Kong, Malaysia
- It should be noted that although bonds are shown as separate asset class, given the relatively high rates offered for deposits by the CPF, investing in bonds (net of costs) may result in lower returns; The shown balance therefore represents the theoretical desired allocation, which is however adjusted to ensure the right trade-off between deposits and bonds
- Only applicable to the investible balance of Special Account

1 The alternative asset allocation profile was applied to the SA balances above the minimum balance threshold for investment ($40,000), as well as to the remaining SA balances (above $40,000) after a portion of the SA balances has been transferred to the Retirement Account at age 55 has taken place.
From the above it is clear that it takes significant time for individuals to reach the stage where they can build investments in higher risk-return assets given the minimum balance restrictions. The scenario also captures an assumed property purchase at age 30 and subsequent mortgage payments being made from the Ordinary Account. As such there is little investment from the Ordinary Account to higher risk-return assets under the current status-quo allocations. So even under the alternative asset allocation scenario applied to the Special Account, only from around age 40 to age 55 is the average Singaporean able to have any meaningful exposure to higher risk-return assets.

It needs to be noted that under this scenario, no allocation to bonds takes place as the simulation model automatically optimises the investment allocation. Given the relatively high CPF deposit rates versus current expected bond returns net of costs, bond allocation only takes place when the average return on the deposits falls below the expected net return of bonds (this only occurs when large balances are accumulated in deposits and the effective average return decreases).
4. Potential uplift in returns on retirement savings

4.1. Modelling approach

The simulation model which is used to test the impact of alternative asset allocation strategies works through a six-step approach, as depicted in Figure 7. We note that there is no clear data available on how Singaporeans save specifically for retirement vs. saving for other purposes throughout their lifetime. As such, parts of the simulation model have been built using best estimates and assumptions based on available data and expert opinions.

Figure 7: Modelling overview

1. Income projection
   - Models the lifetime income for an average Singaporean, who is assumed to enter the workforce at age 24 and retire at age 65

2. Contribution into CPF accounts
   - Sizes the contributions into the respective CPF accounts, following the CPF-prescribed contribution rates for the Ordinary Account, Special Account and Medisave Account

3. Fund transfers and withdrawals
   - Models the general practices on fund transfers and withdrawals
   - Withdrawal of funds from the Ordinary Account funds for property purchase
   - Transfer of the Minimum Sum to the Retirement Account at age 55
   - Transfer of contributions when the Medisave Contribution Ceiling (MCC) is met

4. Investment allocation
   - Allocates CPF balance into three broad asset classes: equities (higher investment risk), bonds (lower investment risks) and CPF deposits (lowest investment risk)
   - Considers the minimum balance thresholds for the Ordinary and Special Accounts
   - Considers the restrictions on investment classes and maximum exposures

5. Investment returns
   - Applies corresponding investment returns on the amount allocated by asset classes
   - Equities and bonds: Based on Mercer’s forward-looking simulations
   - CPF deposits: Based on CPF prevailing interest rates, including the bonus 1% on the relevant portions
   - Adjusts returns for investment costs

6. Retirement income
   - Sizes the total retirement income based on the accumulated balance at age 65
   - Expresses results as monthly retirement income, implied return, income replacement rate
   - Tests the impact of different levers on retirement income

Again it should be noted that any scenario analyses and changes from the status quo are only applied to the Special Account, whereas the Ordinary Account remains as it is.

Further explanation of the detailed methodologies used can be found in the Appendix.
4.2. Results and scenario analysis

The simulation model demonstrates that the average Singaporean (with a 50\textsuperscript{th} percentile income) can expect to achieve a monthly retirement income of S$2,079 (in current terms) from the CPF under the status quo asset allocation and current contribution rates. The current expected average return on retirement savings made in the CPF is ~3.7\% per annum, given current CPF interest rates and expected rates of return on different asset classes based on Mercer’s research\textsuperscript{2}. The range of expected returns for different Singaporeans will differ quite considerably around this figure. Some people will have a 100\% allocation to deposits and hence have a lower expected average return (given that rates fall as balances increase). Others will have a higher allocation away from deposits and hence have a higher expected average return. Experience from other systems suggests that those on lower incomes are less likely to invest in higher risk-return asset classes and hence have lower expected returns than those on higher incomes.

Moving to the alternative asset allocation profile with a higher allocation to higher risk-return asset classes increases the expected retirement income by ~3\% versus the status quo, holding everything else equal. To account for the potential variation in results, the simulation also considered a 1 in 10 chance downside case (i.e. what happens if equities perform poorly over the savings lifecycle relative to expectations) and a 1 in 10 chance upside case (i.e. if equities performance better relative to expectations) as depicted in Figure 8.

Figure 8: Retirement savings available under status quo (comparing the status quo versus an alternative, higher risk-return allocation profile)

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure8}
\caption{Implied nominal returns for the retirement savings of an average Singaporean, \% p.a.}
\end{figure}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure8}
\caption{Monthly payout for an average Singaporean, S$ in today’s currency}
\end{figure}

\textsuperscript{2} Mercer assumes long-term, through the cycle average annual gross returns of ~8\% for equities (as a blend of Singaporean and international equities) for which long-term mean-reversion is assumed. This compares to for example the S&P long-term returns of approximately 9\% average annual return when measured over the period 1950 to 2013.
While increasing retirement income, this expected uplift is only small at +3%. This is mainly due to two factors:

1) **Relatively high investment costs that erode the additional returns**

For unit trusts eligible for inclusion in CPF, we observe total expense ratios (TERs) of between 1.0% to 1.95% p.a. depending on the product and asset class. These levels are similar to unit trust TERs for unit trusts outside the pension system both in Singapore and in other comparable countries. CPF retirement savers who wish to invest in a unit trust or other investment products typically buy and administer these investments through one of the qualifying Singaporean banks. Much of the fee expenses are used up to pay for the advice, sales, compliance and administration costs incurred in this process. We observe that in some other countries, systems have been created to offer a simplified, narrower set of investment products for retirement savers. Savers are guided into a particular fund depending on their age together with the use of centralised or similar scalable administration systems. This creates significant cost savings and typically brings expense ratios down to between 0.3 to 1.0% p.a. Some of these systems are state-run, like the UK NEST or Swedish AP7 systems, whilst others are sponsored either by corporates, like the US 401k system, by unions, such as in the Netherlands, or by asset managers, like i-Shares lifestyle exchange trade fund products listed in the US.

If investment costs in the Singaporean system could be reduced closer to this range, this would increase the uplift in expected retirement incomes from 3% to 6%.

2) **Combing both a minimum balance and de-risking in the later years of retirement savings, results in only a short period of significant investment in equities**

The CPF rules stipulate that individuals need to accumulate a balance of $40k in their Special Account, prior to being able to make any allocation to other investments. The principle behind this minimum balance is meant to ensure individuals first accumulate a “safety buffer” prior to taking more risk. However it also prevents the average Singaporean from investing their CPF retirement savings in higher risk-return asset classes until beyond age 40, which is halfway through the normal working life. If Singaporeans can invest earlier in their lifecycle, the accumulation period of higher returns will be extended and the risk of market volatility should be diminished due to longer holding horizons.

Instead of having a minimum balance requirement in the Special Account, there is an option to replace it with enforced de-risking, that gradually limits exposure to higher risk-return asset classes as individuals come closer to retirement. This is different to the status quo where individuals can be heavily invested in equities over and beyond the minium balance right up until their retirement and thus carry significant risk to their retirement income due to unexpected market volatility. Ensuring that individuals do not carry too much risk as they approach retirement, is a lesson that pension systems in other countries have now learned post the global financial crisis.

Lifting the minimum balance restrictions has a significant impact and would further increase the expected monthly retirement income to a total uplift of 16% (as per the above, assuming lower investment costs and alternative allocation). The below summarises the expected results as well as the 1-in-10 downside and upside cases.

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3 Assuming the average expense ratio for equities is lowered from 1.85% to 0.8% and for bonds from 0.9% to 0.6%.
However it should be noted that in a worst-case downside scenario (where equity markets perform badly over a very long period of time such as through a global depression or war), this alternative approach could see expected retirement income drop by up to 12% versus the status quo (with expected returns of 2.2% vs. 2.9% respectively)\(^4\). Investing in higher risk-return asset classes requires a long term commitment. Hence we should be clear is that there is no ‘free lunch’ and that a higher risk-return retirement savings strategy may not be for everyone.

In particular it is not a suitable strategy for those balances that may need to be unexpectedly withdrawn in the future. The timing of such withdrawals could come about at a bad point in the market cycle, leading to investment losses. That is why we have only applied the alternative asset allocation to the Special Account (where withdrawals are not expected) and left the average Ordinary Account allocation as is (where unexpected withdrawals may be required).

\(^4\) This refers to a simulated worst-outcome which reflects a significantly poorer outcome than the 1 in 10 downside case displayed above
4.3. Implications to post-retirement lifestyle

Most retirees can expect to face changes in their lifestyle upon entering retirement due to decreased disposable income – putting the above findings into this context illustrates how Singaporeans could improve their post retirement income.

The latest Household Expenditure Survey in 2007/2008 provides some indications into the expenditure break-down of an average household with the main income earner in the age group 60 to 64 (as a proxy for the pre-retirement stage).

Figure 10: Expenditure composition at retirement

We have categorised 54% of the expenditure as “basic” (i.e. housing, food & beverage, clothing, health, transport, communication and others which includes personal care, 3rd party insurance, etc.), and 46% of the expenditure as “additional” (i.e. food servicing, recreation & culture, private transport, education and savings).

Under the status quo scenario, the average Singaporean retirement income generated from CPF saving is expected to be 68% of pre-retirement income (the income replacement ratio). With the changes described in Section 4.2, the expected income replacement ratio increases to 79%.
5. **Enablers for higher returns**

We now encourage a broad discussion by all parties involved to rise to the challenge of enabling better retirement savings returns. This requires finding solutions to:

1. **Enabling the alternative asset allocation:** make it easier for people to invest in higher risk-return asset classes without requiring deep investment expertise

2. **Enabling reduced investment costs:** find ways to reduce the costs incurred in long term investing in higher risk-return asset classes

3. **Enabling the safe removal of the CPF minimum balance for the Special Account:** find alternative risk safeguards to make sure that retirement savers invest in a sensible way given their time horizon until retirement

We discuss several aspects below that can help address the above and there is a range of possible solutions. One of these solutions is a collective effort to create a set of lifecycle funds that Singaporeans could both easily and cheaply access through a simple set of choices. These funds would not replace the deposit option but rather complement it.

### 5.1. Enabling the alternative asset allocation

Part of the challenge here is that many Singaporean retirement savers do not feel well enough informed to invest in higher risk-return asset classes.

We note that whilst the CPF Board offers several online tools and websites (e.g. “Retirement ready” and IMsavvy), education on investing is largely done today on a “pull fashion”, i.e. individuals need to seek out the information they need and educate themselves. Individuals who do this are likely to be better educated and already actively interested in investment topics.

Recent research\(^5\) on Singaporean investment behaviour shows ~60% of individuals have never been directly involved in investing into equities, bonds or other direct products. Some of the main reasons quoted are “don’t know how to enter the market” (~50%) and “difficult to get information / research” (~18%). This could be addressed through better education which can potentially come from a variety of different sources be it state-led, embedded into the education curriculum or sponsored by employers or unions. Improved access to tools that allow people to look at the expected outcomes and potential risks of different asset allocations would be useful.

In parallel to education initiatives and increased responsibility for retirement planning from Singaporeans, the availability of simple to choose, lifecycle funds can provide retirement savers with an easy and risk controlled route to investment. The use of default fund options has proven successful in other countries. In Australia, for example, ~45% of individuals remain within their default plan without making any adjustments to their pension arrangements. In the Swedish public scheme, a significant majority of retirement savers take the default option of a lifecycle fund designed for each generation cohort.

We note that lifecycle funds are already available within the CPF but we believe that awareness and ease of access could both be improved.

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\(^5\) Research for SGX on behaviour of retail investors, 2012
5.2. Enabling reduced investment costs

The CPF does today impose some expense ratio caps to control investment charges. However these caps are still at a much higher level than the expense ratio levels that we have identified are needed to improve expected retirement incomes. Further the experience from other countries is that a more aggressive stance on caps will probably lead to distributors pulling away from providing retirement advice. Instead we see a wider range of options that should be considered including:

1. Alternative fee structures for investment products that encourage and reward long term investment rather than short term speculation. Examples include shifting more of the fees onto investment entry and/or exit points and reducing recurring fees. The UK NEST system is an interesting example where savers will pay a 1.8% one-off fee on new contributions but then only 0.3% recurring annual expenses on balances.

2. Simplifying the investment product sales, advisory and administration processes to reduce costs and pass these savings onto retirement savers.

A set of easily accessible low-cost lifecycle funds could achieve these objectives and add competitive choice to the existing market of CPF eligible investment products. A good example of this is the Swedish AP system where individuals are given the choice of taking either the default fund option (a state run fund with low expense costs) or funds from other commercially run investment managers.

5.3. Adjust risk safeguards and relax the minimum balance

Removing the minimum balance would require new investment risk safeguards. We think that there are two parts to this. Firstly there probably needs to be improved portfolio diversification rules or even measures restraining investment up to a minimum level to only well diversified investment products. Secondly there is a need for stricter de-risking rules for individuals as they approach retirement. A simple way to achieve this without running into complex administrative challenges could be to exempt holdings in pre-approved lifecycle funds from the minimum balance rules.

In summary we believe there is a most valuable opportunity to give Singaporeans the option to achieve higher expected returns on their retirement savings in a way that is easy for them to understand and act on. We hope that this paper helps to draw attention to that opportunity and to begin an in-depth discussion between policy-makers, the savings industry and Singaporeans themselves about the best way to achieve that.
## Glossary

<table>
<thead>
<tr>
<th>No</th>
<th>Term</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alternative asset allocation</td>
<td>Asset allocation profile based on the average allocation of US, UK, Australia, Hong Kong, and Malaysia with gradual de-risking throughout life stage</td>
</tr>
<tr>
<td>2</td>
<td>Base case asset allocation</td>
<td>Current asset allocation profile in Singapore</td>
</tr>
<tr>
<td>3</td>
<td>CPF</td>
<td>Central Provident Fund</td>
</tr>
<tr>
<td>4</td>
<td>Expected return</td>
<td>50th percentile return from Mercer simulation</td>
</tr>
<tr>
<td>5</td>
<td>IRR</td>
<td>Income Replacement Rate: Post-retirement income / pre-retirement income</td>
</tr>
<tr>
<td>6</td>
<td>MA</td>
<td>Medisave Account: Savings for medical expenses such as hospitalization and medical insurance payments</td>
</tr>
<tr>
<td>7</td>
<td>MCC</td>
<td>Medisave Contribution Ceiling: When cumulative amount in the Medisave Account exceeds the MCC (S$ 43,000 in 2013), contribution for the Medisave account rolls over to the Special Account (if less than age 55), Ordinary Account (if the amount in the Retirement Account exceeds the Minimum Sum for a person aged 55 and above), or the Retirement Account (if the amount in the Retirement Account is less than the Minimum Sum.)</td>
</tr>
<tr>
<td>8</td>
<td>Mercer return simulation</td>
<td>Return for various asset classes simulated from a stochastic model, assuming that yields (both bond and equity) and economic variables are mean reverting and serially correlated, taking into account both initial yields and Mercer's expectations for long term 'normal' yields</td>
</tr>
<tr>
<td>9</td>
<td>Minimum Sum</td>
<td>The minimum amount transferred from the Special Account and the Ordinary Account to the Retirement Account at age 55 ($148,000 in 2013)</td>
</tr>
<tr>
<td>10</td>
<td>OA</td>
<td>Ordinary Account: Savings for housing purchase and CPF insurance payment</td>
</tr>
<tr>
<td>11</td>
<td>Payout</td>
<td>Monthly payout received post retirement</td>
</tr>
<tr>
<td>12</td>
<td>RA</td>
<td>Retirement Account: Accrued from Ordinary Account and Special Account contributions to meet basic needs after age 55</td>
</tr>
<tr>
<td>13</td>
<td>SA</td>
<td>Special Account: Savings for contingency purposes and investment in retirement-related financial products</td>
</tr>
<tr>
<td>14</td>
<td>SRS</td>
<td>Supplementary Retirement Scheme</td>
</tr>
<tr>
<td>15</td>
<td>Status quo</td>
<td>Assuming base case allocation profile, current investment cost level and the minimum balances for the Ordinary Account and Special Account imposed</td>
</tr>
<tr>
<td>16</td>
<td>1 in 10 downside case</td>
<td>10th percentile return from Mercer simulation</td>
</tr>
<tr>
<td>17</td>
<td>1 in 10 upside case</td>
<td>90th percentile return from Mercer simulation</td>
</tr>
<tr>
<td>18</td>
<td>1 in 2000 worst case</td>
<td>0th percentile return from Mercer simulation</td>
</tr>
</tbody>
</table>
Appendix A: Modelling methodology

Following the overview to the modelling methodology from Section 4.1, this section of the appendix provides detailed assumptions and methodologies used for modelling.

**Income projection**

All analysis is based on an average Singaporean with a 50th percentile income who enters the workforce at age 24\(^6\). The projected lifetime income path up to retirement, at age 65, is based on wage growth and unemployment assumptions. This projected lifetime income is the source for all contributions into the CPF accounts.

**Figure 11: Income projection**

**Income projection for an average Singaporean with a 50th percentile income**

![Income projection](chart.png)

**Notes:**
1. Based on Ministry of Manpower, CPF administrative data assumptions, consistent with the assumptions used by the Department of Economics of NUS in its paper entitled ‘Adequacy of Singapore’s CPF payout’, published in Nov 2012
2. As per OECD assumptions
3. Assume unemployment periods being spread out evenly over the working lifetime, following the methods used by the Department of Economics of NUS in its paper entitled ‘Adequacy of Singapore’s CPF payout’, published in Nov 2012

**Contribution into CPF accounts**

The amount to be contributed into the CPF account follows the CPF-prescribed contribution rates. The CPF contribution table specifies the amount of contribution for each CPF account, i.e. the split into the Ordinary Account, Special Account and Medisave Account and changes depending on age.

Figure 12 is the CPF contribution table for individuals with income > S$1,500, equivalent to income level above the 30th percentile.

\(^6\) Based on the average age of entry into workforce for a male worker at age 25 and a female worker at age 23
We have modelled transfers and withdrawals between the CPF accounts, including:

1. Withdrawal of funds from the Ordinary Account funds for property purchase
2. Transfer of the Minimum Sum to the Retirement Account at age 55
3. Transfer of the Medisave Account contributions into other CPF accounts when the Medisave Contribution Ceiling (MCC) is met

For the purchase of property using funds from the Ordinary Account, we assumed that an average Singaporean will draw down all balances at age 30 to buy a property and take up a 25-year loan to fully repay the mortgage. A portion of subsequent contributions into the Ordinary Account up to age 55 will be used for mortgage payment, with the remaining being accrued for retirement.

For transfer of funds at age 55, we assumed funds from the Ordinary and Special Accounts (first from Special then Ordinary) up to the Minimum Sum get transferred into the Retirement Account, which will then be used to buy a CPF Life which pays out annuity from the age of 65 to death. The rate of return from the CPF LIFE is assumed to be 4%, as per the average CPF quoted rates between 3.75% and 4.25%. While the monthly pay-out may be adjusted year to year based on factors such as the CPF interest rate and mortality experience, we have assumed a constant pay-out rate in this model. After setting aside the minimum sum, the CPF savings may be withdrawn, but we have assumed accrual of all residual amounts in the Ordinary and Special Accounts for retirement as per the prevailing conditions.

For the transfer of Medisave Account contributions, any contributions into the Medisave Account in excess of the Medisave Contribution Ceiling will be transferred to the Special Account for members below age 55. For members 55 or older and who do not meet the CPF Minimum Sum, the excess Medisave amount will be transferred to their Retirement Account. For those who have

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Note:
All figures are in percent of wage. Figures above are for monthly wages of $1,500 and above.

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SGX The Asian Gateway
set aside the full CPF Minimum Sum, the excess Medisave amount will be transferred to the Ordinary Account.

Besides the three main withdrawals as mentioned above, there are other withdrawal schemes including the Home Protection Scheme, Dependants’ Protection Scheme, Education Scheme, Special Discounted Shares Scheme, etc. Due to the small scale of these (~1.5% of total net withdrawals, as per 31 Dec 2012), we have excluded them from the scope of our analysis.

Also, we have not modelled any transfer from the Ordinary Account into the Special Account given the transfer is irreversible, assuming that people want to have the flexibility to utilise the Ordinary Account balance for property purchase, assessing investment options that are not applicable for the Special Account and for other forms of withdrawals.

Income contributions as per the above and adjusted for transfers / withdrawals accumulate to the total available balance within the various CPF accounts on a yearly basis.

**Investment allocation**

Of the total balance within the CPF account as per the above, the funds within the Ordinary Account and the Special Account can be invested into a range of asset classes, which for the purpose of this simulation have been categorised as equities (higher risk), bonds (lower risk) and deposits (lowest risk).

However, the CPF has specified minimum balances of S$20k and S$40k for the Ordinary and Special Accounts respectively, which can only be saved as deposits within the CPF account. Any balance beyond these thresholds can be invested in other assets.

The base case allocation assumes the current allocation profile, which is highly skewed towards deposits, while the alternative allocation profile assumes higher allocation of riskier assets but with gradual de-risking overtime.

Under the alternative allocation profile, we have constructed the derisking based on the migration path across different risk profiles overtime. Figure 13 shows the three risk profile scenarios that have been created by Mercer for illustrative purposes in the context of this analysis. While we believe that these models are practical and implementable, they are not direct recommendations for the Singaporean context but representative scenarios that could be used as risk profile options.

**Figure 13: Mercer asset allocation scenarios**

Source: Mercer
We also acknowledge the investment restrictions as specified by CPF, e.g. the 35% investible amount threshold of the Ordinary Account that can be invested in direct holding of shares, corporate bonds and REITs, and selected unit trusts to which investible amounts from the Special Account can be invested. In reality, however, people can still achieve the desired level of exposure via indirect investments or investing more into available funds.

Under the status quo assumptions, the model assumes that the investible amounts within the Ordinary and Special Accounts are invested according to the base case allocation profile. For a scenario testing to assess the impact of increased investments in higher risk-return assets, the model assumes that the investible amount within the Special Account gets invested according to the alternative allocation profile, while the investible balance within the Ordinary Account remains with the base case allocation split.

The balance from the Medisave Account can only be invested in the CPF deposits and thus has been excluded from alternative asset allocations. The transfer of Minimum Sum into the Retirement Account is used to purchase a CPF Life product at age 55 and therefore has been excluded as well.

**Investment returns**

All balances in CPF deposits (which include i) all non investible amounts, ii) allocated investible amount and iii) the Medisave Account) are accrued at the prevailing CPF interest rate. The current interest rates are 2.5% for the Ordinary Account and 4% for the Special Account, with a bonus 1% for the first S$60k for all CPF accounts combined, with up to S$20k from the Ordinary Account. The Retirement Account, which is invested in the premium for CPF Life, is accrued at the expected return ~4%.

The expected returns for bonds and equities were generated by Mercer’s 2,000 forward-looking simulations of 40-year returns for blended Singapore and international government bonds and equities. Rather than applying a long-run 40 year annualised return (which would smooth returns and reduce volatility), annual returns have been computed for each holding period and are applied accordingly to the funds invested within each year of the simulation.

In addition to the expected returns, the distribution of returns allows an assessment of volatility and therefore has been considered in the results, e.g. 1-in-10 downside case (10th percentile), expected return (50th percentile), 1-in-10 upside case (90th percentile) to reflect the range of possible returns.

These levels of returns assume a long term investment horizon, from the time of investment till retirement. This is consistent with the cash flows modelled in the model, especially for the investible balance within the Special Account, where the investments can be held till age 55, when transfers into the Retirement Account take place.

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9 The expected returns are from 3.75% to 4.25% (do not represent the maximum or minimum). They are variable, depending on mortality, interest rates, etc.
Figure 14 shows the return assumptions that have been used in the model.

**Figure 14: Annualised return for bonds (left) and equities (right) by holding period**

Using blended assumptions of domestic and international returns reflects the available investments both in Singapore and abroad and also reduces the volatility of domestic returns.

All return assumptions do not include investment costs, which need to be accounted for separately to allow a like for like comparison to the returns available from deposits. Figure 15 shows the expense ratio benchmark from other countries, which has been used to derive the cost assumptions used in the model.
The actual expense ratios assumed in the model are shown in Figure 16.
Figure 16: Expense ratios assumptions

Assumptions for the investment expense ratios used for analysis, %

Notes:
1. Base case current expense ratio: Equity = Average for Singapore high risks and medium to high risk, Bonds = Based on benchmark from various Singapore bond funds under CPFIS
2. Lower expense ratio: Based on benchmark from the various countries

Retirement income

The total cumulated amount from the Ordinary, Savings and Retirement Accounts at age 65 is the total pot\textsuperscript{10} available for retirement. The Medisave Account is excluded from this sum as it can only be used for medical expenses.

The results have been expressed in various metrics, e.g. total sum for retirement, monthly pay out\textsuperscript{11}, implied return of contributions and income replacement rate.

\textsuperscript{10} Can be expressed in terms of future or today currency. Modelling has been done in nominal terms with inflation considerations, but all results have been discounted for communication

\textsuperscript{11} Assuming total savings to be fully paid out in the next 20 years
Appendix B: Supporting modelling results

This section provides supporting modelling results that have not been included in the main body. Figure 17 shows the contribution, withdrawal and transfer of funds across accounts under the status quo\textsuperscript{12} assumption.

Figure 17 - Overview of simulated cash-flows across CPF accounts

\textit{S$ in nominal terms, in thousands, under status quo assumptions}

<table>
<thead>
<tr>
<th>Ordinary account</th>
<th>Special account</th>
<th>Medisave account</th>
<th>Retirement account</th>
</tr>
</thead>
<tbody>
<tr>
<td>Withdrawal for property purchase, with partial future contributions into the ordinary account used for mortgage repayment, up to age 55</td>
<td>Contributions for the Medisave account to go into the Ordinary account until age 55*</td>
<td>Contributions for Medisave account to go into the Ordinary account after age 55*</td>
<td>OA and SA savings transferred to RA (up to minimum sum) to purchaseCPF Life Annuity</td>
</tr>
<tr>
<td>Exceed minimum balance at ~age 38</td>
<td>Exceed minimum balance at ~age 40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contributions for Medisave account to go into the Ordinary account after age 55*</td>
<td>Transfer of Minimum Sum into the Retirement Account</td>
<td>Medisave Contribution Ceiling (MCC) is reached, no further contribution required</td>
<td></td>
</tr>
<tr>
<td>* If members have met the Medisave contribution ceiling and the minimum sum</td>
<td>** If members have met their Medisave contribution ceiling</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{12} For an average Singaporean with 50\textsuperscript{th} percentile income, assuming base case allocation profile, 50\textsuperscript{th} percentile return, current expense ratio, minimum balance in place
Figure 18: Implied split of total CPF balance

Base case allocation profile  
Based on Singapore current allocation

Alternative allocation profile  
Based on average allocation of other countries with gradual de-risking towards retirement age

Notes:
1. Based on contribution from an average Singaporean with 50th percentile income, assuming current expense ratio, and minimum balance in place
2. Includes investible and non-investible amounts
3. Bonds not shown as an allocation to bonds would result in lower returns vs. deposits under the shown scenarios

Figure 19 is similar to Figure 18, but expressed as dollar value, in nominal terms.
Figure 19: Cumulative total CPF balance

Cumulative amount of CPF balance, S$ ‘000 in nominal terms
Base case allocation profile

Cumulative amount of CPF balance, S$ ‘000 in nominal terms
Alternative allocation profile

Notes:
1. Based on contribution from an average Singaporean with 50th percentile income, assuming current expense ratio, and minimum balance in place
2. Includes investible and non-investible amounts
3. Bonds not shown as an allocation to bonds would result in lower returns vs. deposits under the shown scenarios

Figure 20 summarises the monthly income available post retirement as well as the implied return for the lifetime contribution towards retirement for an average Singaporean with 50th percentile income. The chart shows status quo results and compares the results to other scenarios, i.e. i) adopting alternative allocation profile, ii) lowering expense ratio and iii) removing the minimum balance. All results are expressed under a range of return assumptions (e.g. 1 in 2000 worst case, 1 in 10 downside case, expected return, and 1 in 10 upside case).
Figure 20: Monthly pay-out and implied returns of the retirement savings for an average Singaporean with 50p income

We have also conducted similar analysis for a lower income earner, with 30th percentile income, with results presented in Figure 21.

Figure 21: Monthly pay-out and implied returns of the retirement savings for an average Singaporean with 30p income
Figure 22 shows the results for a high income earner, with 70th percentile income.

**Figure 22: Monthly pay-out and implied returns of the retirement savings for an average Singaporean with 70p income**

- **Implied nominal returns for the retirement savings of an average Singaporean, % p.a.**
  - **Monthly payout for an average Singaporean, S$ in today's currency**
    - 2,310
    - 2,586
    - 2,764
    - 3,106
  - -11%
  - -4%
  - +5%
  - +27%
  - 2.8%
  - 3.4%
  - 3.7%
  - 4.3%
  - 2.1%
  - 3.1%
  - 3.9%
  - 5.4%

- **Increase from status quo**
  - -11% -4% +5% +27%
  - 2.8% 3.4% 3.7% 4.3%
  - -4% -2% +10% +39%
  - 2.0% 3.3% 4.5% 6.7%
  - +5% +27% +87%
  - 2.8% 3.4% 3.7% 4.3%

- **1 in 2000 worst case**
  - 2.8% 3.4% 3.7% 4.3%
  - -13% -1% +18% +67%
  - 1 in 10 downside case
  - 2.8% 3.4% 3.7% 4.3%
  - Expected return
  - 2.8% 3.4% 3.7% 4.3%
  - 1 in 10 upside case
  - 2.8% 3.4% 3.7% 4.3%

- **Status quo assumptions**
  - 2,310
  - 2,586
  - 2,764
  - 3,106

- **Scenario testing with alternative allocation profile**
  - 2,310
  - 2,586
  - 2,764
  - 3,106

- **Scenario testing with alternative allocation profile and Reducing investment costs**
  - 2,310
  - 2,586
  - 2,764
  - 3,106

- **Reducing investment costs and removing the minimum balance**
  - 2,310
  - 2,586
  - 2,764
  - 3,106
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