

**Singapore's Social Security Savings System:
A Review and Some Lessons for the United States**

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Abstract

Unlike the defined benefit system adopted by the United States, Singapore operates a defined contribution system administered by the Central Provident Fund (CPF). When originally conceived, CPF's main goal was to help citizens save for retirement. However, over the years, it has evolved into a comprehensive system with multi-faceted objectives: saving for retirement, home ownership, healthcare, financial protection, and asset enhancement. While regarded as generally successful, the CPF has been criticized recently for not achieving retirement adequacy. This chapter reviews the key features of Singapore's social security savings system and suggests some reforms to enhance retirement security for its members.

Keywords

Central Provident Fund, social security savings, defined contribution, defined benefit, retirement adequacy, home ownership, healthcare financing, financial protection, asset enhancement

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Singapore's Social Security Savings System: A Review and Some Lessons for the United States

Singapore is one of the world's fastest aging nations, due primarily to its low fertility rates and long life expectancy.^{1,2} In the next two decades, it may overtake every country except Japan in its elderly fraction of population. This demographic trend places a heavy burden on its pension system to be the main vehicle to prepare citizens for old age.

Singapore's social security savings system was set up with the primary goal of helping citizens prepare for retirement. Unlike the defined benefit Social Security system adopted by the United States and European nations, Singapore operates a defined contribution (DC) savings system administered by a government statutory board, the Central Provident Fund (CPF). The CPF was established even before Singapore became independent from the British Colonial Rule. Under this system, members have their own individual retirement accounts and assume sole responsibility for providing for their own retirement needs. When originally conceived, CPF's main focus was retirement adequacy. However, over the years, it has evolved into a system with multi-faceted objectives.

The CPF Board states that it aims to achieve five objectives, by helping its members accumulate sufficient savings to (1) finance retirement, (2) own a home, (3) pay for health care, (4) provide insurance protection for family, and (5) enhance asset for future consumption. The CPF calibrates its policies to only provide for basic needs. This means that individuals who wish to have a lavish retirement must rely on private savings to fund needs beyond the basic level. The income groups targeted by policymakers are the 10th to 80th percentile of the working population with the lowest income group receiving financial assistance from the government.

This chapter reviews the key features of Singapore's social security savings system and evaluates whether the five key objectives set by the CPF have been successfully achieved. We

show that Singapore's system is generally successful in meeting the needs of citizens for home ownership, healthcare, and protection but it requires reforms to secure retirement adequacy and asset enhancement for its members. The chapter ends with specific suggestions on the types of reforms that might be undertaken to improve retirement security.

In what follows, we first outline the structure of Singapore's social security savings system, focusing on the links between the Central Provident Fund's schemes and its five key objectives. Next, we show how the CPF system has been liberalized to cater to the changing needs of its members. Subsequently, we identify gaps in the current system and suggest reforms that can be made to improve it. We conclude by identifying some lessons the Singapore's pension system can provide for the United States.

The Central Provident Fund (CPF)

The Central Provident Fund was first established in 1955 as a mandatory retirement savings scheme. As at end of 2013, the scheme covered 3.51 million members, of whom 1.85 million were active (Table 15.1).³ The CPF's defined contribution plan is funded by mandatory contributions from members' monthly wages. Table 15.2 shows the contribution rates made by employees (age 35 and below) and employers to the CPF Board. At inception of the scheme, the contribution rate was 10 percent; it subsequently rose to a peak of 50 percent in 1984–1985. The contribution rate fluctuated between 35 percent and 40 percent during the 13-year period between 1986 and 1998, before declining to a low of 30 percent in 1999. It held steady at 36 percent over the period 2011 to 2014.

Insert Tables 15.1 and 15.2 here

The CPF Board initially channeled all contributions into a single account, but over the years this has expanded to four accounts: the Ordinary Account (OA), the Special Account (SA), the Medisave Account (MA), and the Retirement Account (RA) (Figure 15.1). Cash savings in these accounts earn interest on their balances. The savings in the Ordinary Account (OA) can be withdrawn to purchase homes, service mortgage payments, finance premiums for insurance protection, pay for children's tertiary education, and to invest in financial products to grow savings. The Special Account, introduced in 1977, holds savings primarily for retirement, which cannot be withdrawn before the age of 55. Members can deposit them with the CPF Board to earn interest, or they can invest in a smaller set of lower-risk financial products. The Medisave account, created in 1984, holds savings for members to pay inpatient hospital bills, selected outpatient treatments, and premiums for insurance against catastrophic illness and disabilities. All working adults have only three accounts until they turn 55 years old, when savings earmarked for retirement are deposited into the Retirement Account (RA). Since 2013, it is mandatory for all CPF members to invest their RA savings in life annuities (CPF life) to provide a stream of income from age 65 until their deaths.

Figure 15.1 here

The CPF contribution rates and allocation into the three accounts are not uniform but decline with age as shown in Table 15.3. In 2014, those age 35 and below had to contribute 20 percent of their monthly wages, and their employers 16 percent, to the CPF Board. Of the total 36 percent contribution, 23 percent is deposited into the Ordinary Account, 6 percent into the Special Account, and 7 percent into the Medisave Account. At the other end of age band, contributions from elderly workers over 65 and their employers decline sharply to 5 percent and 6.5 percent respectively; the allocations into Ordinary, Special and Medisave accounts are 1 percent, 1 percent

and 9.5 percent respectively. These contribution rates apply to wages up to an income ceiling of S\$5,000 per month.⁴ For workers earning more than S\$5,000 per month, both the employer and employee contributions are computed based on the income ceiling.⁵

Table 15.3 here

Members' contributions into their CPF accounts over time have resulted in substantial asset accumulation. Aggregate contributions to the OA, SA, and Medisave accounts in 2013 totaled S\$28.5 billion, and CPF balances stood at S\$253 billion (Table 15.1). Retirement savings of members have grown 67 percent over the last five years.

Currently, CPF savings in the Ordinary Account (OA) and Special Account (SA) are paid a government-set interest rate of 2.5 percent and 4 percent p.a. respectively. This interest rate is not fixed but rather can fluctuate over the years, as shown in Table 15.4. The highest interest rate paid was 6.5 percent during the 13-year period from 1974 to 1986. Since then, the OA rate has declined gradually to 2.5 percent, in line with the global interest cycle. The actual return paid on Ordinary Account balances is computed as the maximum of 2.5 percent or the average deposit rate paid on the 12-month fixed deposit and savings deposits by major local banks.⁶ This means that the CPF Board guarantees a minimum nominal return of 2.5 percent p.a. (stipulated by the CPF Act) and it provides members the opportunity to earn a higher return should bank deposit rates rise. The interest rate paid on balances in Special, Medisave, and Retirement Accounts is computed as the 12-month average yield of 10-year Singapore Government Securities plus 1 percent. However, the rate has a floor of 4 percent, set at 1.5 percent above the OA rate. There has been no change in the OA rate of 2.5 percent and SA rate of 4 percent since 1999. To help members grow their savings further, the CPF Board announced that it would pay an extra 1 percent on the first S\$60,000 of combined savings, including up to S\$20,000 in the Ordinary Account. As at end of 2013, CPF

members have S\$253 billion savings allocated 39 percent in the Ordinary Account, 24 percent in the Special Account, 26 percent in the Medisave Account and 11 percent in the Retirement Account.

Insert Table 15.4 here

Review of Singapore's Social Security Savings System

Currently, the CPF operates a comprehensive social security savings system providing funding for retirement, healthcare, home-ownership, family protection, and asset enhancement. These objectives were achieved through various schemes introduced from 1968 to 2009, as shown in Table 15.5. On the program's inception, all CPF savings were defaulted into a single account earning a prescribed interest rate for retirement. Over time, the CPF system has liberalized to permit savings to be used for other purposes. The Home Ownership Scheme (HOS) was introduced in 1968 to permit members to use CPF savings to purchase public housing apartments.⁷ Ten years later, in 1978, CPF liberalized further to allow members to purchase common shares in a listed company (Singapore Bus Service). In 1981 and 1986, CPF savings were permitted to be used for the purchase of private properties and commercial properties respectively. The Approved Investment Scheme (IS) was introduced in 1986 to allow members to use a restricted portion of their savings for investment in specified financial instruments. The scheme was further liberalized to allow members to invest 100 percent of OA and SA savings in 2001.⁸ Over the decades, the CPF Board has introduced many new schemes such as Home Protection, Medisave Account, Minimum Sum, Dependent's Protection, Education Financing, MediShield, Medifund, Eldershield, and the CPF life annuities to enhance the social security savings system.

Insert Table 15.5 here

In the following sections, we review the key measures taken by the CPF to achieve its goals of retirement adequacy, home ownership, healthcare adequacy, financial protection, and asset enhancement.

Home ownership. Singapore citizens are encouraged to own their homes, to ensure that they not only have roofs over their heads but are also rooted to their country. The CPF has introduced two schemes, the Public Housing Scheme and the Residential Properties Scheme, to promote home ownership.

The Public Housing Scheme was introduced in 1968 to help members purchase public housing apartments known as HDB flats. These flats ranged in size from 807 sq. feet (3-room) to 1453 sq. feet (5-room). The amount of withdrawals allowed from members' OA account is the minimum of either the purchase price or the market value of the flat. In addition, OA savings can be used to service the mortgage payments for the duration of the loan which can be as long as 30 years.

The Residential Properties Scheme was introduced in 1981 to help CPF members purchase homes sold by private developers. These homes cost substantially more than public housing apartments. Under the scheme, CPF members can withdraw more than 160 percent of the value of the purchased property from their Ordinary Account to pay for the purchase price as well as service mortgage payments. In recent years, the CPF has taken steps to reduce the excessive withdrawal of CPF savings for housing with the aim of reducing the limit gradually to 120 percent of the home's valuation.

Figure 15.2A shows a time series of home ownership rates in Singapore, which grew from 58.8 percent in 1980, to 90.5 percent in 2013. A comparison of the home ownership statistics across countries in Figure 15.2B indicates that Singapore has one of the highest home ownership

rates in the world. Home ownership is much higher in Singapore (90.5 percent) compared to those in developed countries such as the United States (66 percent) and United Kingdom (64 percent). This shows that the two housing schemes have been successful in promoting home ownership in Singapore.

Figure 15.2 here

Pursuing high home ownership does come at a cost of diminished retirement adequacy. Figure 15.3 shows that 44 percent of cumulative CPF contributions have been invested in housing leaving the remaining for retirement and other purposes. The decline in retirement adequacy is somewhat mitigated by the appreciation of home values over the last 4 decades. Figure 15.4 Chart A shows that private properties have appreciated 16 times since 1975 or 7.77 percent per annum for the last 38 years. Chart B shows that public housing apartments also registered 5 times appreciation since 1990, or 8.2 percent per annum over the last 23 years. The sharp appreciation in the value of home allows CPF members the option of cashing out of their properties or entering in a reverse mortgage contract to generate income to finance retirement.

Figures 15.3 and 15.4 here

Financial Protection for Families. A key financial risk faced by families is the loss of income due to death or permanent disability of the breadwinner. To hedge this risk, the CPF Board has introduced two insurance schemes (dependent's protection scheme and home protection scheme) to cover members and their dependents against death and permanent disability.⁹ The Dependents' Protection Scheme provides term insurance protection of S\$46,000 up to age 60 at an affordable premium. The policy provides financial assistance to families in the first few years of the insured's incapacity or death. CPF members who wish to have insurance coverage of more than S\$46,000 can utilize their OA savings to purchase private insurance. Table 15.6 shows that more than half

(between 55 percent and 57 percent) of CPF members purchase term insurance plans to protect their families.

Table 15.6 here

The Home Protection Scheme is a mortgage-reducing insurance scheme to prevent members from losing their homes in the event of death or permanent disability. This scheme is mandatory for members who use CPF savings to purchase public housing. When death or permanent disability occurs, the CPF Board will pay off the insured's outstanding housing loan. The scheme covers members until age 65 or for the full duration of the housing loan.

Healthcare financing. As citizens age, their health care expenditures are expected to rise significantly. Such increases result from escalation in health care costs, increasing usage of sophisticated medical technology for treatment, and longer life expectancy of individuals. The CPF supports healthcare financing for its members through the 3-M framework: Medisave, MediShield, and MediFund. The Medisave Scheme was set up in 1984 to help members save for future medical expenditures. Initially, these savings could only be used to pay inpatient hospitalization expenses incurred by members or their dependents. Over time, the scheme was expanded to permit selected outpatient treatments such as chemotherapy and radiotherapy, along with step-down care in community hospitals and hospices. Savings in the Medisave account can also be used to pay premiums for medical insurance schemes such as MediShield and ElderShield. Table 15.7 shows contribution rates as a share of salary that go into the Medisave Account for the various age groups. For a young person age 35 years and below, 7 percent of monthly income is credited to his Medisave Account in 2014, while the contribution rate is higher, at 9.5 percent, for those over age 50.

To ensure that there is sufficient savings for healthcare, members are encouraged to build up their Medisave account balances to \$43,500. Once they attain that amount, excess savings will be transferred to their Special Accounts (below age 55) or Retirement Accounts (above age 55). In addition, members must set aside the Medisave Required Amount of \$40,500 in the Medisave Account at age 55 to ensure there are sufficient savings to finance future medical expenditures during retirement.

To help members hit those targets, the CPF board has progressively increased contributions to Medisave accounts from 6 percent in 1984 to a range of 7–9.5 percent in 2014 for the various age groups (Table 15.7). Furthermore, since 1992, contribution rates for older age groups have increased more rapidly than those in the younger age groups.

Table 15.7 here

While CPF members can rely on their Medisave savings to pay small hospital bills and outpatient treatments, they do risk depleting these savings if they are struck with prolonged or catastrophic illnesses. To help members pay these large hospital bills, the MediShield Scheme was introduced in 1990 to provide insurance coverage for costly health care expenditures. Medishield uses risk pooling to keep the cost of insurance low and provide wider coverage for participants. The scheme covers members up to 92 years of age. Those who wish to have insurance coverage for treatment in private hospitals or better class wards in public hospitals can purchase upgraded insurance plans (Integrated Shield Plan) from private insurers. The Medishield is an opt-in plan with a high participation rate of 93 percent (in 2012; See Table 15.6).

The healthcare needs of average CPF members are adequately covered by the Medisave and MediShield schemes. Nevertheless, a minority of people are too poor to enroll in the MediShield plan or contribute to their Medisave accounts. The government has specifically created the

Medifund to help this group with their healthcare bills. Applicants are means-tested to ensure that only the financially needy can tap into this fund. The government's strong support for Medifund assures citizens that they will always have access to basic medical care.

Elderly CPF members are also strongly encouraged by the government to participate in ElderShield, a disability insurance scheme that provides coverage for long-term care. This insurance scheme pays a cash payout of S\$400 per month for 72 months if the insured is struck with disabilities. CPF members who reach 40 years old are automatically enrolled in the insurance plan and pay premium until they are 65 years old. The premium is fixed at the age of entry and will not increase with age. Although premium payment ends at age 65, the insurance coverage is for life.

Retirement adequacy. Singapore is experiencing seismic changes in the demographics of its population. By 2030, approximately 900,000 workers (a quarter of citizens) will leave the workforce and go into retirement. Furthermore, these cohorts are also expected to live longer. Singapore's life expectancy was estimated to be 82 in 2010, one of the highest in the world. While the early pioneers who settled in Singapore had large families with many children to depend on for financial support during old age, more recent retirees are unlikely to do so. This is because they had smaller families, a trend that is prevalent in developing countries experiencing rising affluence. It is therefore crucial that Singapore's social security savings system adequately prepare workers for old age. To this end, the CPF Board set up the Special Account Scheme in 1977 to help members accumulate savings for retirement. Every working adult is required to make contributions based on a percentage of his monthly wage to his Special Account. The SA savings are strictly designated for retirement and cannot be withdrawn until age 55.

In 1987, the CPF Board also established the Minimum Sum Scheme requiring members to retain a minimum level of savings for old age. From July 2013 onwards, members must set aside S\$148,000 in their Retirement Account upon reaching age 55, an amount deemed sufficient to support a subsistent level of living. The Minimum Sum was initially set at S\$90,000 in 2005 but it has risen steadily to S\$148,000 as of 2013 (Table 15.8). Such upward adjustments in the Minimum Sum were necessary to keep up with inflation, so that a consistent standard of living can be maintained throughout retirement.

Insert Table 15.8 here

To boost cash savings, the CPF Board had both raised SA contribution rates and paid higher interest on SA savings. The SA contribution at inception was 1 percent and it rose to a high of 6 percent in 2011 for those ages 35 and below. A government review committee had recommended that the total contribution rate be raised from the current level of 36 percent (for those below 35 years old) to 40 percent in the future, and most of the increase is to go into the Special Account for retirement purposes. Besides the general uptrend in SA rate, the share of total contribution into the Special Account will also increase as members age.

From 1977 to 1994, the interest rate paid on SA balances was identical to that of OA balances. Since 1999, an additional 1.5 percent was paid on SA balances above the OA rate. From 2008, the CPF Board has decided to pay an extra 1 percent interest on the first S\$60,000 of combined CPF balances with up to S\$20,000 from the Ordinary Account to boost retirement savings. This means that the first S\$20,000 in the Ordinary Account will earn 3.5 percent instead of the default 2.5 percent rate. The interest income earned in the Ordinary Account annually will be transferred to the Special Account. The remaining portion of S\$40,000 from the Special Account or Retirement account will be paid an interest of 5 percent instead of the default 4 percent rate. The CPF board

estimated that with the extra 1 percent interest rate payment, members will earn an extra \$1 billion in interest income in their retirement accounts in 2011.

Figure 15.5 shows that during the 34-year period from 1980 to 2014, interest rates on SA balances were generally higher than the inflation rate.¹⁰ This means that retirement savings were growing at positive real rates of return.

Insert Figure 15.5 here

An indicator of retirement adequacy is the percentage of CPF members that meet the Minimum Sum requirement at age 55. Another indicator is the income replacement rate (IRR) of retirees, or the ratio of retirement income to pre-retirement earnings. McGill et al (2005) and Scheiber (2004) suggested that IRR should be at least 70 percent.¹¹ An early estimate of Singapore's IRR by McCarthy et al. (2002) found that it was a low 28 percent. Hui (2012) estimated the IRR for three groups segmented by education level (secondary, post-secondary, and tertiary) and found that only the low-income secondary educated workers were able to achieve the target IRR of 66 percent. A recent report by Mercer (2012) found that the median income earner in Singapore achieved an IRR below 20 percent. OECD (2009) estimated that Singapore's IRR was a low 13 percent compared to the 72 percent average for 34 member countries. Nevertheless, critiques of Mercer's and OECD's IRR studies pointed to a lack of understanding of Singapore's social security savings system. For example, although both OA and SA savings can be used for retirement, these studies only used SA savings to estimate Singapore's IRR. Recently, Mercer (2013) has rectified this error and raised Singapore's IRR significantly. OECD (2009) estimated that if both OA and SA savings were used in the computation, Singapore's IRR would have been 82 percent. The latest study by Chia and Tsui (2012) found that a median male earner could achieve an IRR of 70 percent if he retires at 65, while a female earner has a slightly lower IRR of 64 percent.

They concluded that a young Singaporean joining the labor force would likely have sufficient savings for retirement.

Although members do manage to save for retirement, many have insufficient cash savings to hit the Minimum Sum of S\$148,000 (Table 15.9). Two groups of members are especially vulnerable to financial hardship during retirement. The first is the elderly who are above 60 and have average cash savings of only S\$52,000, an amount which would be sufficient to only pay for a few years of consumption. If they lack private savings or family support, they will be in dire straits during the last stage of their lives. The second vulnerable group is women above 55 who have substantially lower savings than their male counterparts. As women tend to live longer than men, they would need more financial resources for retirement.

Insert Table 15.9 here

Given the high mandatory saving rates (36 percent of gross monthly salary for those 35 years and below), it is puzzling why so many CPF members did not accumulate even the Minimum Sum. Figure 15.3 provides a clue to this liquidity problem. Almost half of members' cumulative CPF contributions (44 percent) have been withdrawn to purchase homes and to service mortgages, leaving only 29 percent of these contributions in Ordinary and Special Accounts for retirement. These huge withdrawals meant that very little cash savings remain in the CPF OA and SA accounts. The other reason is that the contribution rate for SA account in past years may have been too low. Only 6 percent of the total contribution of 36 percent (for workers 35 and younger) went into the SA for retirement. The bulk of the contributions of 23 percent went to the OA account and was withdrawn prior to retirement for other purposes.

In view of increasing life expectancy, retirees face the prospect of outliving their savings during old age. To hedge such longevity risk, the government in 2009 introduced CPF Life, a life

annuity for retirees. Initially launched as a voluntary scheme, it is now mandatory for members to purchase CPF Life using their Minimum Sums when they reach age 55. This life annuity will pay a monthly income from the drawdown age of 65. For members who do not have sufficient savings to enroll in the annuity scheme (less than S\$40,000), they have the option to rejoin it if they accumulate S\$60,000 by the drawdown age of 65. The CPF board currently offers two plans for members: the Life Standard Plan and the Life Basic Plan. The Life Standard plan offers members a higher monthly payout of S\$1,100–1,210 but a lower bequest (S\$38,869 to S\$177,061) to their beneficiaries.¹² The Life Basic Plan offers a lower monthly payout of S\$1,008–1,112 but a higher bequest (S\$67,622 to S\$212,925). By purchasing CPF Life, members are assured of a subsistence level of income for the rest of their lives.

Asset enhancement. The CPF Investment Scheme was introduced in 1986 to allow members to invest their savings in a wide variety of financial instruments to grow their pension assets.¹³ CPF Members can avail themselves to many investment products that could potentially earn a higher yield than the interest rate paid by the CPF Board. Currently, the CPF operates the CPFIS-OA and CPFIS-SA investment schemes which cover savings in the Ordinary Account (OA) and Special Account (SA) respectively.

Under the CPFIS-OA scheme, members can invest their OA savings in bank fixed deposits, government bills and bonds, corporate bonds, property funds, equities traded on the Singapore stock exchange, annuities and endowment insurance policies, investment-linked insurance products, unit trusts, exchange traded funds, fund management accounts, and gold. For instruments deemed as more risky, the CPF board place limits on the maximum allowable investments. For example, a member can invest only up to 10 percent of his OA savings in gold, and up to 35 percent in shares, property funds/REITs, and corporate bonds. Such restriction ensures that members'

portfolios are well diversified and take no concentrated risk in any particular asset. For the CPFIS-SA scheme, a narrower set of financial products is permitted for investment, as members are discouraged from taking high risk when investing savings meant for retirement. Members can invest in all the financial instruments in the CPFIS-OA scheme except fund management accounts, shares, property funds, REITS, corporate bonds, gold, investment-linked insurance products, unit trusts, and higher risk exchange traded funds.

Low Participation in CPF Investment Scheme (CPFIS). Prior research showed that only 12 percent of OA savings were utilized by members for investment (Koh et al. 2008) and the situation is similar for the SA account where members invested only 20 percent of their SA savings. In other words, the participation rate in CPF Investment Scheme has been low. Possible reasons accounting for members' preference to leave their savings in the Special Account are the relatively high government-paid interest rate of 4 percent p.a. and the unwillingness of members to assume risk for savings meant for retirement. Nevertheless, these reasons do not adequately explain the reluctance of members to invest their OA savings, since the interest rate paid is a meagre 2.5 percent p.a.

Insert Figure 15.6 here

Of the OA savings committed to investment, 63 percent went into insurance products, 25 percent into shares, 11 percent into unit trusts and a negligible amount (0.64 percent) into other instruments such as bank deposits, bonds, Exchange Traded Funds (ETFs), gold, property funds, and fund management accounts (Koh et al. 2008). For the CPFIS-SA scheme, 86 percent were invested in insurance products and 14 percent in unit trusts. These findings suggest that although CPF Board offers a comprehensive menu of investment options, members are not utilizing the scheme fully. The asset allocation patterns of OA and SA savings showed that members were

prepared to take more risk with their OA funds than SA funds. They seemed to put SA savings in a separate ‘mental account’ targeted for retirement and preferred not to take risk to actively manage it. We observed two distinct investment behaviors of a high preference for insurance products and a low preference for professionally managed funds. The low yield on whole life and endowment policies of 2–4 percent cannot explain the preference for insurance products. A comparison of the relative investment performance of Investment-linked Insurance Product versus unit trusts sheds light on the high investment in insurance products. There is no empirical evidence to suggest that ILPs outperform unit trusts. As the industry parlance goes, insurance policies are sold rather than bought. With a large sales force and aggressive sales strategies, insurance companies have been successful in persuading many CPF members to buy insurance products. Other possible reasons for the low interest in professionally-managed unit trusts include poor investment performance, high fees and transaction costs charged by funds, and people’s lack of financial literacy to select funds. CPF members who lack financial knowledge may not know how to begin to assess the 400 funds on offer. Furthermore, selecting the best fund to invest means having to evaluate the return and risk characteristics of 400 funds, a task too onerous even for many financially savvy members.

Performance of Professionally-managed Funds. Koh, Mitchell, and Fong (2010) studied the performance of CPFIS unit trusts over two 10-year periods, from 1991–2001 and 1997–2007.¹⁴ These two periods were chosen to coincide with the bear and bull phases of Singapore’s stock market. The question was whether CPF-included unit trusts were successful in helping investors grow their retirement savings. The authors found that the average return of CPFIS unit trusts ranged from 7.96–10.27 percent p.a., higher than the risk-free and the CPF default interest rates (Panel A of Table 15.10). This means that CPF members were able to grow their savings faster through investing in unit trusts than leaving them in CPF default accounts.¹⁵

Insert Table 15.10 here

While unit trusts' average returns were relatively high, the funds were unable to outperform their style-specific benchmarks. A common statistic to gauge the stock selection skill of fund manager is a positive Jensen alpha.¹⁶ Panel B showed that few funds reported alphas statistically larger than zero at the 5 percent significance level. Only 14–22.5 percent of equity fund managers exhibited superior stock selection skills. The results for balanced funds were more extreme, ranging from 0 to 100 percent (the latter figure must be interpreted with care as there is only one balanced fund with a 10-year historical series ending 2001). The empirical results imply that unit trusts managers in Singapore generally did not exhibit superior stock selection skills, so CPF members at the time could not expect them to outperform the stock market.

Fund managers who do have market timing skill will report positive gamma.¹⁷ Panel B showed that the average gamma of equity and balanced funds was zero, and only 27.5–50 percent of funds reported gammas larger than zero at the 5 percent significance level. This implies that fund managers generally did not exhibit market timing skills and they cannot be relied upon to earn superior returns.

High Fees and Charges for CPFIS Options. The range of fees charged by CPFIS unit trusts can be bewildering to naïve investors, as it includes sales charges, transaction fees, realization charges, switching fees, annual operations fees, performance fees, and redemption charges. The sales charge (front-end load) for unit trusts can be hefty, as high as 5 percent of the amount invested. Some unit trusts do not impose a sale charge but instead levy a realization charge (back-end load) upon divestment by investors. When selling out of a fund within 90 days of purchasing it, an investor may also have to pay a redemption fee. An additional switching fee is imposed when investors switch between funds.

In addition to these charges, unit trusts also pay a wide range of fees such as management, trustee, administration, custodian, registrar, audit, accounting, and valuation.¹⁸ Although these fees are borne by unit trusts directly, they are eventually passed on to investors through lower dividends. To help investors gauge the cost associated with investment in unit trusts, fund managers are asked to declare their *total expense ratio* which capture all their operating cost as a proportion of the fund's average NAV.¹⁹ Table 15.11 shows that the sales load of CPFIS-included unit trusts ranged from 0.1–5 percent of NAV, expense ratios from 0.7–2.1 percent, and annual management fees from 0.5–1.4 percent. As observed by Mitchell (1998), the fees levied in Singapore appear to be far more diverse and complex than those of the U.S. institutional market.

Insert Table 15.11 here

To evaluate how investment cost can impact the return of retirement savings of a CPF member who had invested in unit trusts, Koh et al. (2008) computed the rate of return an investor would require in order to 'cost-recover' the expenses over one-year (short term), five-year (medium term), and 10–20 year (long-term) periods. In the simulation, they assumed that the prices of unit trusts remain unchanged so the change in fund value reflects solely the cost levied by the unit trust. They also assumed that management fees and other annual operating costs were fixed at the prevailing average rates for equity, balanced, income, and money market funds.²⁰

Table 15.12 shows how much \$1 investment would be eroded by annual operating costs, assuming no change in the value of component securities in the unit trust. It computes the annual rate of return required for an investor to 'cost-recover' by each fund type. The values are large for short horizons. For example, transaction costs of an equity fund eroded 6.9 percent of its value in one year and 3 percent p.a. over a five-year holding period. The high transaction costs associated with unit trusts may explain low participation rates of CPF members in CPF Investment Scheme.

Insert Table 15.12 here

Given the numerous instruments available for investments, we would have expected CPF members to exploit them to grow their savings over the long term. Yet, Table 15.13 paints a rather disappointing picture of their investment performance: almost half of CPFIS-OA investors (47 percent) incurred losses from investing, while 35 percent realized profits equal to or less than the default OA rate of 2.5 percent. Only 18 percent of the investors made net realized profits in excess of the OA interest rate. Allowing a free rein for CPF members to invest their savings may not help those lacking investment skills. Rather, what they need might be professional advice and default portfolios such as indexed portfolios or life cycle funds, which are attractive in the U.S. to those lacking financial knowledge.

Table 15.13 here

Reforming Singapore's Social Security Savings System

Our review of Singapore's Social Security Savings system in the preceding sections showed that it is generally successful in helping CPF members own their homes, pay for healthcare costs, and provide financial protection for their families. However, there are three areas that require reforms, namely, retirement adequacy, asset enhancement, and healthcare financing. The relatively low cash savings accumulated in the CPF OA and SA accounts point to low retirement adequacy faced by CPF members. In the following sections, we provide specific suggestions on the reforms that could be undertaken to improve retirement security.

Monetization of home equity. Although many Singaporeans are proud owners of their homes, they tend to lack sufficient retirement savings in the CPF accounts. This is termed the 'asset rich and cash poor' syndrome by McCarthy et al. (2002). As explained previously, this situation arose

because of excessive pre-retirement withdrawals of CPF savings to acquire homes. Figure 15.6 shows that 59 percent of accumulated CPF OA savings have been channeled into property purchases. With an inelastic supply of land for housing and a rising population, home prices have been appreciating over the past few decades.^{21, 22} Furthermore, unlike the 70s and 80s where property was regarded as a home, many people today regard properties as a financial asset for wealth accumulation. Due to the high cost of housing and the long duration of mortgage servicing, Singaporeans found themselves diverting the bulk of their lifetime incomes to home ownership instead of preparing for retirement. This has resulted in a lack of liquidity during old age, and it suggests an urgent need to introduce mechanisms for households to unlock home equity to generate cash flow for retirement. Currently, the four ways of monetizing home equity in Singapore are reverse mortgage, subletting of home, downsizing to a smaller home, and lease and buyback. We review these mechanisms in the following sections and suggest further refinements that would make them more robust and effective.

Reverse mortgage. A reverse mortgage is a scheme whereby a home owner receives a stream of income from a financial institution for a specified period in return for progressively giving up equity ownership of his home. Upon the owner's death, the home is sold by the financial institution to recover the loan and cumulative interest due. The key appeal of a reverse mortgage is that the owner gets to stay in his own home while receiving a regular income for daily expenditures. A disadvantage is that the owner may lose ownership of his home should its market value fall abruptly below the allowable limit; this is more likely to happen during a property market crash. In recent years, commercial lenders have been encouraged to offer reverse mortgage schemes to help members unlock their home equity, though their response has been lukewarm with very few transactions done. With the bulk of housing stock in public housing apartments, financial

institutions find it difficult to offer reverse mortgages on homes with short leases.²³ The asset values are likely to depreciate as the leases approach their expiration dates.

Given the profit motive and risk aversion of financial institutions, it is unlikely that the private reverse mortgage market will thrive in Singapore in the future. If the reverse mortgage market for public housing units is to take off, HDB, the public housing board, must step in as the market maker to offer these contracts. To make the scheme attractive to owners, the lending rate should be the current HDB's loan rate which is currently pegged at 2.6 percent (0.1 percent above the OA rate). This is reasonable since that HDB is currently offering new housing loans to first-time home buyers at this rate. The risk to HDB is that the value of flats may drop to a level that is insufficient to recover the loan. This tail risk can be hedged by buying insurance against that outcome.

Subletting. Owners of public housing flats may sublet part of their homes to earn rental income. This option is appealing to older owners, as they get to stay in their homes which they can then bequeath to their children. An impediment to widespread subletting in Singapore is the concern about personal safety and privacy. Aged owners worry about their personal safety when subletting a part of their homes to strangers. A strong preference for privacy also means that owners are unlikely to accept intrusion into their family's daily routines. A recent survey carried out by the government found that 54 percent of home owners would not sublet due to concerns about privacy and 20 percent due to security concerns. The long-term solution to these two problems is to design dual-key apartments with two separate entrances. When the owner has decided to sublet his home, he can erect a wall to divide the apartment thereby creating two smaller living units with separate entrances. This allows the owner to live in a separate area of the apartment from his tenant. Existing public housing apartment without the dual-key entrances can be renovated to have this feature.

Downsizing. Public housing units of different sizes ranging from 2- to 4-bedroom apartments are currently sold to citizens, and owners of larger apartments can downsize to smaller apartments to extract home equity. To encourage downsizing, the government has provided an S\$20,000 cash incentive to owners. The extracted home equity can then be invested in a life annuity to provide a lifetime income. Yet, some elderly members may find it difficult to adjust to new living environments after downsizing, as their new homes may be in different neighborhoods from their former homes. Furthermore, they may lose their social network of friends and relatives when moving to new localities. The public housing board may wish to consider building mixed housing types in the same neighborhood to allow owners to downsize to new apartments located within a couple of blocks from their old homes.

Lease and buyback. In a lease and buyback scheme, the homeowner sells away the lease period remaining beyond 30 years to the public housing authority to generate a lump sum payment. This scheme is currently applicable to owners age 65 or older. The advantage of this scheme is that the owner gets to live in his flat for another 30 years, in addition to getting a cash payout. The key risk of the scheme is that the owner may need to vacate his home if he outlives the 30-year lease period. Due to this uncertainty, few people have taken up this scheme, as the elderly dislike taking longevity risk during old age. To make the scheme more attractive, the public housing board might assume the tail risk of an owner outliving the 30-year lease period. Given current mortality tables, it is relatively easy to estimate the likelihood of this occurring and the number of owners involved. If need be, this risk could be hedged through insurance.

Limiting withdrawal of CPF for housing. Excessive pre-retirement withdrawals to acquire housing were a contributing factor leading to a lack of liquidity in retirement. Although most households will have a fully-paid home at retirement, they may have insufficient cash flows for

daily living. And while owners can monetize their homes, the amount of home equity they can extract is subject to market risk. For example, Singapore's property market plunged 45 percent from 1996 to 1998, and 25 percent during the 2008 global financial crisis. In a depressed real estate market, retirees may be forced to sell out at fire-sale prices. An asset-based retirement strategy is therefore clearly risky. One long-term solution to the 'asset rich, cash poor' syndrome is to restrain the amount of pension savings that can be diverted into property purchases, so that CPF participants can earmark sufficient savings for retirement. When the housing schemes were first launched, CPF members could withdraw up to 160 percent of home valuation, 150 percent in 2002, and to 120 percent in 2007. The CPF Board may wish to consider reducing the maximum withdrawal amount to not exceed 100 percent of home valuation.

Raising contribution rates of older age groups. Table 15.3 showed that the contribution rates decline rapidly by age from 36 percent for workers below age 50 to 11.5 percent for those above age 65. The rationale for reducing contribution rates for older workers is to enhance their employability. Besides lowering employer's contributions, employees' contribution rates also fall with age. Yet, low contribution rates for aged workers can adversely affect their ability to achieve old age retirement adequacy. To boost adequacy, contribution rates for the older age groups could be raised progressively until they are at parity with the younger workers.

Hedging against inflation risk. The life annuity offered by the CPF Board has been estimated to be quite valuable (Fong et al. 2012). This is primarily due to low administrative charges and little adverse selection. In addition, due to the non-profit status of the CPF Board in managing the annuity scheme, profits typically earned by private insurers who offer similar life annuities are returned to members by the CPF. While the mandatory life annuity is useful in hedging longevity risk, its current features have some deficiencies that may benefit from refinement. First, the

payouts are not pre-determined at the point of purchase at age 55; the CPF Board instead only provides an indicative estimate of future payouts which are not guaranteed. The payouts are determined by prevailing interest rates as well as population mortality changes, so there is some uncertainty as to whether the annuity payouts will be sufficient to provide a subsistence level of living. Furthermore, the scheme is not hedged against inflation, which means that the payouts will have decreasing purchasing power as retirees age. Moving forward, the annuity scheme could be enhanced to provide an inflation-indexed payout. Nevertheless, this could substantially reduce early benefit payout levels.

CPF contribution rates used as a macro-economic counter-cyclical tool. Although the primary goal of CPF is to prepare members for retirement, it has been used occasionally as a cost-cutting tool to combat recession. For instance, in 1986, the Singapore government took the unprecedented action of slashing employers' contributions by 15 percent, from 25 to 10 percent. The second time a similarly drastic reduction in employer's contribution rate occurred was during the 1999 Asian Financial Crisis, when the contribution rate was reduced by 10 percent, from 20 to 10 percent. Both cuts effectively reduced the retirement savings of individuals by 15 percent and 10 percent respectively. The purpose of these cuts was to reduce business costs for employers and increase their cost competitiveness so that they could recover quickly from the recession or crisis. Yet, these cuts significantly reduced workers' retirement savings, as when their SA contribution rate fell to 0 percent in 1986 and 1999. This rate reduction rate was only partially restored in 1994. Similarly, the 10 percent reduction in employers' contribution rate was partially restored by 2 percent in 2000, another 4 percent in 2001 bringing the rate to its current level of 16 percent (previously 20 percent). In sum, the contribution rate for employers has declined by 9 percent from its peak of 25 percent in 1986.

The key policy issue to address is whether a country's pension system should be used as a counter-cyclical cost-cutting tool to help firms recover during economic recession. While it may help corporations cut costs, years in which contribution rates are low will adversely affect members' retirement adequacy. Ideally, the government should utilize other monetary, fiscal, or administrative measures outside the retirement system to resuscitate an ailing economy.

Extending the retirement age. Another measure to boost retirement adequacy would be to extend workers' official retirement age. Currently, the statutory minimum retirement age in Singapore is 62, though under the recently introduced Retirement and Reemployment Act, employers are required to offer re-employment to eligible employees age 62–65 and the government is mulling over extending this further to age 67. For workers who are healthy and able, they should be allowed to continue working. Employers are strongly encouraged by the government to engage older workers as long as they are healthy and able to perform in their jobs. By working longer, workers keep themselves mentally alert and have a means to support themselves financially during old age.

Healthcare Financing

The current MediShield Scheme provides insurance cover for members to pay large inpatient bills, yet our review of the scheme revealed several limitations. For example, the scheme does not cover pre-existing medical conditions and members older than 92 years of age. This means that the elderly above 92 are completely exposed to huge healthcare bills without insurance. With life expectancy rising, more health insurance protection will be needed. This can be achieved if the MediShield scheme were enhanced to allow for universal and lifetime coverage. With these refinements, members would be covered throughout their lives, no matter how old they are; pre-existing illnesses could be covered as well. With better benefits, healthcare costs will rise, but this

may be diversified by pooling those with pre-existing medical conditions with those that are healthy. The Singapore government is currently considering whether such a modified scheme (MediShield Life) would be feasible and affordable if introduced. Other refinements being considered include raising the maximum claimable limit above the current level of S\$300,000, increasing the daily claim limit by 55 percent, or lowering the co-insurance payment by policy participants. With these changes, it is anticipated that the majority of Singaporeans could pay less than S\$3,000 out of pocket cost for large inpatient bills, as the bulk would be paid by insurance. While a universal, lifetime medical insurance scheme ensures that healthcare is affordable and accessible, the premium paid can escalate rapidly if there is rampant over-utilization of health care services. Measures should be put in place to discourage unnecessary consumption of healthcare services and to contain the rising healthcare cost. This will ensure that the MediShield Life insurance scheme will be sustainable over the long run.

Asset Enhancement

Lowering transaction costs of CPFIS scheme. As noted above, professionally-managed funds in Singapore charge high sales loads of 4.4 percent, management fees of 1.3 percent and expense ratios of 1.9 percent (Table 15.11). To lower transaction costs, the CPF Board announced a few policy changes in 2007 and 2008 to make it more affordable for members to invest in CPFIS-included funds. These include the capping of front-load charges of all CPF-included funds at 3 percent (as of 7/1/07) and expense ratios at the median of existing funds from the same risk category (from 1/1/08).²⁴ The revised 3 percent front-end load is significantly lower than the 5 percent front-end load previously charged by professionally-managed funds. The expense ratio of equity funds will now be capped at 1.95 percent of the fund's Net Asset Value (NAV), balanced

funds at 1.75 percent, fixed income fund at 1.15 percent, and money market funds at 0.65 percent.²⁵ A review of the U.S. market found that the average expense ratio for equity funds was 1.13 percent and that of bond funds was 0.9 percent (ICI 2006). Compared to the U.S. then, transaction costs of investing in CPFIS funds are still high. For a start, the CPF Board might want to omit small funds with inefficient cost structure from the CPF Investment Scheme, replacing them with larger global funds with low transaction costs.

With the myriad of fees charged by funds, investors need to comb through prospectuses carefully to estimate all the component costs. Yet, it is onerous for a naïve investor to sieve through each of the 400 CPFIS-included unit trust prospectuses to decipher their cost structure and compute overall costs before deciding whether to invest in them. To help CPF members make investment decisions painlessly, the CPF Board can consider developing a real-time online calculator to combine all the myriad charges and fees in a single overall cost measure. This statistic would allow the investor to know the true cost of investment and thereafter decide if the unit trust is worth investing after adjusting for all associated costs.

Offering Low-cost Passive Default Portfolios.

There are more than 400 funds on offer in Singapore at present, and some CPF members are overwhelmed by the number of funds they need to evaluate. Although new funds are admitted into CPFIS after clearing a set of stringent admission criteria, there are fewer rigors in screening out existing poor performers from the scheme. It would be useful to streamline the investment menu regularly, so that only high-performing funds remain in the scheme on offer to CPF members.

In studying the asset allocation decisions of CPF investors, Koh et al. (2008) found that men were more proactive in investing their savings compared to women. They tended to invest more

in shares and unit trusts than women who chose to put the bulk of savings in insurance products. This finding is similar to the U.S., where higher income men sought riskier investments and traded more in their accounts (Mitchell et al. 2005). Contrary to conventional wisdom that investment in risky products should decrease with age, the more mature CPF members (56+ age groups) invested a higher proportion of their savings in individual stocks and less in insurance products, as compared to those in the younger age groups. In addition, the younger working adults were more likely to delegate their investments to professional fund managers while the mature group tended to invest in shares on their own. These investment behaviors confirmed findings by Mitchell et al. (2006) for the US, that higher income, older men were more likely to hold riskier portfolios compared to their female and younger counterparts. Koh et al. (2008) also found that lower income earners were less likely to hold risky investments, with at least 70 percent of their investments committed to insurance products. As salary levels rose, so did the fraction invested in risky instruments.

These research findings have identified three vulnerable groups of investors needing special attention: women, the aged, and the low-income. Women and low-income members may need more guidance to select the right financial products to grow their retirement savings. For the older members, they need advice on portfolio rebalancing so that as they age, they reduce exposure to risky financial instruments to preserve their savings.

Of the numerous funds on offer in the CPF Investment Scheme, very few are low-cost passively-managed index-linked funds or ETFs, and there are no target maturity date life-cycle funds and inflation-protected instruments.²⁶ Life cycle funds may appeal to financially less-savvy members as these funds automatically rebalance the portfolio based on investor age. One possible reason for the low investment in unit trusts is that CPF members do not know how to evaluate and

select funds for investments. Without guidance from the CPF Board, these members simply default their savings in the OA or SA accounts. If they could access default portfolios which have low transaction costs and are well-diversified, CPF members would stand a better chance of growing their savings substantially over the long-term. Of the 400 funds, few can exploit economies of scale, and their higher cost of operations will be passed on to retail investors. One reform that the CPF Board could consider would be to invite a few large low-cost privately-managed life cycle funds to participate in the CPF Investment Scheme. The CPF board could then pool all members together to enjoy lower institutional transaction costs.

As an example, Chile is a country that has adopted life cycle funds as the default portfolios in its pension system. Private pension managers there offer up to five funds, ranging from ‘Fund A’ which invests 80 percent of the portfolio in equities, to ‘Fund E’ which invests 100 percent in fixed income securities. Funds B to D hold intermediate weightage in equities. Chileans may select up to two funds at a time offered by a single money manager; the fund manager then automatically rebalances participants’ portfolios to a more conservative one as members age (Arenas de Mesa et al. 2008). The introduction of diversified low-cost life cycle funds could appeal to many less sophisticated members and help increase participation in Singapore’s CPF Investment Scheme as well.

Lessons for the United States

The pension system adopted by the United States is a multi-pillar retirement system entailing a universal social security, an employment-based pension, and voluntary savings. Increasingly, the U.S. Social Security System faces a mounting sustainability problem of financing Baby Boomers’ retirement in the future. This is due to the dwindling population of young tax payers and longer

life expectancy of post-war retirees. The pay-as-you-go pension system is expected to experience significant stress from the impending fiscal imbalance. Compounding this problem is the low U.S. households' savings rate, which portends inadequate private savings for old age. The private pension system is predominantly employment-based and offers either a traditional defined benefit plan (DB) or an increasingly popular defined contribution (DC) plan. For DB pension plans, employers assume the responsibility of providing pension to employees during their retirement. For DC pension plans, employers make regular contributions to employees' retirement accounts but are not responsible for providing income to retired employees. Instead, the burden of retirement adequacy is transferred to employees.

Increasing pension coverage. One of the criteria of a successful pension system is the extent of pension coverage for employees. Ideally, a good pension system should cover all employees. As U.S. employers-sponsored 401(k) pension plans are offered to employees on a voluntary basis, this has resulted in relatively low participation rates by companies. Additionally, the decision on who are covered and how much employers should contribute in 401(k) plans vary across companies. For companies that offer such plans, many employees do not contribute the maximum or take full advantage of matching contributions by employers. Consequently, the median balance of these plans stands at a relatively low US\$77,000.²⁷ It is estimated that currently only one out of two workers in the U.S. has a pension (Forman 2006; Moore 2011). In contrast, the Singapore's CPF system is able to achieve full coverage for all working adults by making participation mandatory. Under current U.S. political environment, it is not feasible to enact laws to compel employers to offer pension plans and employees to enroll in these plans. A more viable alternative is for the U.S. government to require all employers to offer either a 401 (k) plan or an IRA. In addition, by setting the default to automatic enrolment for both 401(k) and IRA, the participation

level from employees can be raised and the level of savings can be increased (OECD Pension Outlook 2012; Thaler and Bernartzi 2007).

Expanding the scope of 401(k) plans. Unlike the U.S. pension systems which focused solely on financing of retirement, Singapore's comprehensive CPF system helps members to own homes, finance healthcare in addition to preparing them for retirement. The success and sustainability of Singapore's social security savings system over the last 59 years suggests that such a comprehensive pension system can be viable for the U.S. and other countries. Some plan participants may prefer to use pension savings to finance housing or repay education loans in the early years of their working life. The U.S. pension system currently does not support these uses as pension savings can only be withdrawn for retirement purpose.²⁸ Using pension savings to acquire a home has several advantages such as saving on rental payments during retirement, having the option to monetize a valuable housing asset when liquidity is required and avoiding the need to pay high interest on mortgage loans. Singapore's CPF System currently allows members to make pre-retirement withdrawals to purchase homes, service mortgage payments and finance tertiary education. The interest rate charged on housing loans is the default interest paid on the CPF account plus 0.1 percent. With this home financing scheme, most CPF members are able to fully own their own homes prior to retirement. For education loan, the interest levied is the default CPF interest rate of 2.5 percent. At such low interest cost, children can comfortably repay education loans that were financed by parents' CPF savings. In contrast, the educational loans taken by U.S. college entrants are pegged to commercial loans' rate thereby making loans costly and repayment burdensome. A key worry about making pension system more flexible is the adverse effect on retirement adequacy. If pre-retirement withdrawals are generous and lax, pension plan participants may end up with insufficient retirement savings. Singapore's CPF system mitigates this risk by

requiring recipients of education loans to repay the loan principal with interest into their parent's CPF account upon graduation. By enlarging the scope to accommodate housing and education financing, 401 (k) plans can be made more attractive for members and their participation in such plans can be expected to rise.

Enhancing the portability of pension account. Currently, all 401(k) plans are sponsored and administered by employers, and this rigid linkage between a worker and his employer can limit labor mobility. U.S. employees stand to lose their pension benefits if they change their employers prior to the vesting period. Portability can be greatly enhanced if the U.S. follows Singapore's system of requiring all employees to set up employees' pension accounts with an independent pension administrator (CPF Board).²⁹ Using a central body in pension management allows workers to retain the same pension accounts even when they change employers. With a centralized system, employers' role is dramatically simplified to being a conduit of employees' pension contributions. Portability of pension account can be further enhanced if the contributions made by employers and employees are standardized across all companies.

Hedging longevity risk through annuitization. 401(k) plans are currently not required to offer annuities and few do. Furthermore, for plans that offer life annuities, the take-up rate is low.³⁰ Upon retirement, most plan participants withdraw their pension savings as a lump sum, thereby exposing them to longevity risk if they outlive their savings. By contrast, Singapore mandates annuitization of retirement savings, requiring that the Minimum Sum of \$148,000 be invested in a life annuity. The income from life annuities provides approximately S\$1,200 per month for a retiree to maintain a subsistence level of living. As income will be paid throughout an annuitant's life, longevity risk faced by retirees is hedged. With a partial annuitization of the Minimum Sum, the CPF member can still withdraw his remaining savings in lump sum. The unique features of

Singapore's life annuity scheme are that it is mandatory and the government is its underwriter. This results in significant benefits to annuitants such as economies of scale, pooling of longevity risk, low adverse selection cost, and affordable premiums. While it is unlikely that the United States can mandate annuitization of pension assets, it can increase purchase of annuities by requiring all employers to offer life annuities in 401(k) plans and making them the default option on drawdown at retirement. This will help plan participants overcome their inertia in dealing with longevity risk.

Enhancing risk diversification through pension design. In 401 (k) plans, the onus is on plan participants to grow their pension assets through judicious investments. Given the low level of financial literacy worldwide, it would be challenging for plan participants to make informed investment decisions. Some may be overly conservative in investing while others may be overly aggressive by taking excessive risk. Singapore's CPF Investment Scheme has been carefully designed to encourage risk diversification. For example, while members can assume more investment risk when investing their OA saving, they cannot do so with their SA savings. With OA savings, members can avail themselves of the complete menu of investment instruments. However, the range of investment instruments is drastically reduced when investing SA savings that are meant for retirement. In addition, when investing OA savings, there is a 10 percent cap on investments in Gold and a 35 percent cap on investments in individual common shares, REITs, and corporate bonds. With such built-in limits on investments in specific asset classes, members are more likely to end up with a broadly diversified portfolio. Like CPF Investment Scheme, the U. S. 401(k) plans can enhance risk diversification by placing caps on how much pension assets can be invested in each asset class.

Inter-generational transfers to enhance retirement adequacy. Singapore's CPF board provides substantial flexibility for inter-generational transfers to enhance retirement adequacy in households. For example, a member can top-up the CPF accounts of his grandparents, parents, spouse and siblings. Such transfers are tax exempt and can enhance the retirement adequacy of household members who currently do not have sufficient pension savings. 401(k) plans currently do not accept contributions from anyone other than the employee or his employer. To enhance retirement adequacy, the rules on contributions into the 401(k) plan can be relaxed to allow for external cash injection into a worker's account. Government tax incentives can also be used to promote top-ups made to an employee's account whose balance is below a threshold level.

Conclusions

Since 1955, Singapore's social security savings system has helped citizens save for retirement. This chapter has explored its various schemes introduced through the years to help citizens own homes, gain healthcare coverage, attain financial protection for families, save for retirement, and grow pension assets. The CPF Board has been successful in achieving its first three objectives, of home ownership, health care coverage, and financial protection. More remains to be done for retirement adequacy and asset enhancement, since many CPF members have insufficient cash savings for retirement. Due to high transaction costs, lack of financial literacy, and inertia, many have not taken advantage of the large menu of investment instruments on offer to grow their retirement savings. Instead, they left them in their CPF OA and SA accounts earning low interest. Singapore's system could enhance the retirement security of its members by developing financial markets to facilitate monetizing home equity, limiting the withdrawal of retirement savings for home purchase, raising contributions of older workers, refining the CPF life scheme to offer

inflation-indexed payouts, avoiding using CPF contribution rates as counter-cyclical tools and extending the retirement age of workers. While the MediShield Scheme has been effective in helping members pay off large hospital bills, it can also be enhanced to provide universal and lifetime coverage for members. Retirement will more secure if CPF members can grow their savings through investments in high-yield portfolios. To this end, the CPF investment scheme can be enhanced by systematically reducing the transaction costs of funds on offer. Offering low-cost passive default portfolios such as index-funds, ETFs, and life cycle funds will make investment a hassle free experience for the financially illiterate. The CPF savings system has several attractive features that can be modified and adapted in the U.S. to increase participation rate in 401(k) plans. Specifically, 401(k) plans can be expanded to permit financing for housing and college education, maximize portability by centralizing pension administration, reduce longevity risk through annuitization, promote risk diversification through setting of investment limits and encourage inter-generational transfers to boost the retirement adequacy of households.

References

- Arenas de Mesa, A., D. Bravo, J. Behrman, O. S. Mitchell, and P. Todd (2008). 'The Chilean Pension Reform Turns 25: Lessons from the Social Protection Survey,' in S. J. Kay and T. Sinha, eds., *Lessons from Pension Reform in the Americas*. Oxford, UK: Oxford University Press: 23–58.
- Asher, M. (2004). 'Retirement Financing Dilemmas: Experience of Singapore,' *Economic and Political Weekly*, 39(21): 2114–2120.
- Asher, M., and A. Nandy (2006). 'Mandatory Savings for Asset Enhancement: The Case of Singapore,' *Social Development Issues*, 23(2): 57–70.
- Asher, M., and A. Nandy (2011). 'Singapore: Pension System Overview and Reform Directions,' in D. Park, ed., *Pension System and Old Age Income Support in East and Southeast Asia*. Abingdon, UK: Routledge, pp. 152–175.
- Brown, J., O. S. Mitchell, and J. Poterba (2000). 'The Role of Real Annuities and Indexed Bonds in an Individual Accounts Retirement Program,' in J. Y. Campbell and M. Feldstein, eds., *Risk Aspects of Investment-Based Social Security Reform*. Chicago, IL: Univ. of Chicago Press: 321–360.
- Chia, N. C. (2010). 'Social Protection in Singapore: Targeted Welfare and Asset-based Social Security', in M.G. Asher, S. Oum, and F. Parulian, eds., *Social Protection in East Asia – Current State and Challenges*. ERIA Research Project Report 2009-9. Jakarta: ERIA: pp.90–123.
- Chia, N. C. and A. K. C. Tsui (2003). 'Life Annuities of Compulsory Savings and Income Adequacy of the Elderly in Singapore,' *Journal of Pension Economics and Finance*, 2(1): 41–65.

- Chia, N. C. and A. K. C. Tsui (2009). 'Monetizing Housing Equity to Generate Retirement Incomes,' SCAPE Working Paper No. 2009/01. Singapore: National University of Singapore.
- Chia, N. C. and A. K. C. Tsui (2012). 'Adequacy of Singapore's Central Provident Fund Payouts: Income Replacement Rates of Entrant Workers,' SCAPE Working Paper No. 2013/02. Singapore: National University of Singapore.
- Doyle, S., O. S. Mitchell, and J. Piggott (2004). 'Annuity Values in Defined Contribution Retirement Systems: Australia and Singapore Compared,' *Australian Economic Review*, 37(4): 402–416.
- Fong, H.Y., O. S. Mitchell, and B. S. K. Koh (2011). 'Longevity Risk Management in Singapore's National Pension System,' *Journal of Risk and Insurance*, 78(4): 961–982.
- Forman, J. B. (2006). *Making America Work*, Washington, DC: Urban Institute Press.
- Hui, W. T. (2012). 'Macroeconomic Trends and Labour Welfare: A Focus on Retirement Adequacy,' in Kang, S. H. and C. H. Leong, *Singapore Perspectives 2012: Singapore Inclusive: Bridging Divides*. Singapore: National University of Singapore, Institute of Policy Studies, pp.37–58.
- Koh, B. S. K., O. S. Mitchell, T. Tanuwidjaja, and J. Fong (2008). 'Investment patterns in Singapore's Central Provident Fund System,' *Journal of Pension Economics and Finance*, 7(1): 37–65.
- Koh, B. S. K., O. S. Mitchell, and J. H. Y. Fong (2008). 'Cost Structures in Defined Contribution Systems: The Case of Singapore's Central Provident Fund,' *Pensions: An International Journal*, 13(1-2): 7–14.
- Koh, B. S. K. and O. S. Mitchell (2010). 'What's on the Menu? Included versus Excluded Funds

- for Singapore's Central Provident Fund Investors,' *Pensions: An International Journal*, 15(4): 276–286.
- Koh, B. S. K., O. S. Mitchell and J. H. Y. Fong (2010). 'Collective Investments for Pension Savings: Lessons from Singapore's Central Provident Fund Scheme,' *Pensions: An International Journal*, 15(2): 100–110.
- Investment Company Institute (ICI) (2006). *Investment Company Factbook 2006*. Washington, DC: ICI. <http://www.icifactbook.org/2006/index.html>.
- Investment Management Authority of Singapore (IMAS) (2005). *Guidelines for the Disclosure of Expense Ratios*. Singapore: IMAS.
http://www.imas.org.sg/uploads/media/2012/10/25/19_200505_-_IMAS_Revised_Guidelines_on_Expense_Ratio.pdf
- Low, L. and T.C. Aw (1997). *Housing a Healthy, Educated, and Wealthy Nation through the CPF*, Singapore: Times Academic Press.
- Low, L. and T.C. Aw (2004). *Social Insecurity in the New Millennium: The Central Provident Fund*, Singapore: Times Academic Press.
- Lusardi, A. and O. S. Mitchell (2007). 'Financial Literacy and Retirement Preparedness: Evidence and Implications for Financial Education Programs,' PRC Working Paper No. 2007-04. Philadelphia, PA: Pension Research Council.
- McCarthy, D., O. S. Mitchell, and J. Piggott (2002). 'Asset Rich and Cash Poor in Singapore? Retirement Provision in a National Defined Contribution Pension Fund,' *Journal of Pension Finance and Economics*, 1(3):197–222.
- McGill, D. M., K. N. Brown, J. J. Haley, and S. J. Schieber (2005). 'Total Retirement Income: Setting Goals and Meeting Them,' in *Fundamentals of Private Pensions*, 8th ed. New York, NY: Oxford University Press, pp. 401–443

- Mercer (2012). *2012 Melbourne Mercer Global Pension Index*. Melbourne, Australia: Australian Centre for Financial Studies. <http://www.globalpensionindex.com/pdf/melbourne-mercerglobal-pension-index-2012-report.pdf>
- Mercer (2013). *2013 Melbourne Mercer Global Pension Index*. Melbourne, Australia: Australian Centre for Financial Studies. <http://globalpensionindex.com/2013/melbourne-mercerglobal-pension-index-2013-report.pdf>.
- Mitchell, O. S., (1998). 'Administrative Costs of Public and Private Pension Plans,' in M. Feldstein, ed., *Privatizing Social Security*. Chicago, IL: University of Chicago Press, pp. 403–456.
- Mitchell, O. S., G. Mottola, S. Utkus, and T. Yamaguchi (2006). 'The Inattentive Participant: Trading Behavior in 401(k) Plans,' PRC Working Paper No. 2006-05. Philadelphia, PA: Pension Research Council.
- Mitchell, O. S., G. Mottola, S. Utkus, and T. Yamaguchi (2006). 'Winners and Losers: 401(k) Trading and Portfolio Performance,' PRC Working Paper No. 2006-26. Philadelphia, PA: Pension Research Council.
- Moore, K. L. (2011). 'An Overview of the U.S. Retirement Income Security System and the Principles and Values It Reflects,' *Comparative Labor Law & Policy Journal*, 33(1): 5–48.
- Oakley, D., and K. Kenneally (2013). *Pensions and Retirement Security 2013: A Roadmap for Policy Makers*. Washington, DC: National Institute on Retirement Security.
- OECD (2009). *Pensions in Asia/Pacific: Ageing Asia Must Face Its Pension Problems*. Paris: OECD. <http://www.oecd.org/els/socialpoliciesanddata/41941763.pdf>
- OECD (2011). *Pensions at a Glance 2011: Retirement Income Systems in OECD and G20 Countries*. Paris: OECD Publishing. http://dx.doi.org/10.1787/pension_glance-2011-50-en
- OECD (2012). *Pensions at a Glance Asia/Pacific 2011*. Paris: OECD Publishing.

<http://dx.doi.org/10.1787/9789264107007-en>

OECD (2012). *OECD Pensions Outlook 2012*. Paris: OECD Publishing.

<http://dx.doi.org/10.1787.9789264169401-en>

Scheiber, S. J. (2004). 'Retirement Income Adequacy: Good News or Bad?' *Benefits Quarterly*, 20(4): 27–39.

Singapore Department of Statistics (2013). *Key Demographic Indicators, 1970–2013*.

<[www.singstat.gov.sg/statistics/browse_by_theme/population/time_series/keyind
population2013.xls](http://www.singstat.gov.sg/statistics/browse_by_theme/population/time_series/keyind_population2013.xls)>

Thaler, R. H. and S. Bernartzi (2007). 'The Behavioral Economics of Retirement Savings Behavior,' AARP Public Policy Institute Research Report No. 2007-02. Washington, DC: AARP.

Wray, D. L., (2008). *Testimony before the ERISA Advisory Council Working Group on Spend Down of Defined Contribution Assets at Retirement*. Washington, DC: ERISA Advisory Council, US Department of Labor.

Yakoboki, P., (2010). 'Retirees, Annuitization, and Defined Contribution Plans,' *Trends and Issues, April 2010*. New York, NY: TIAA-CREF Institute.

Endnotes

¹ The Singapore fertility rate in 2011 was reported as 1.2 by the World Bank. (<http://data.worldbank.org/indicator/SP.DYN.TFRT.IN>www.census.gov).

² Singapore's Department of Statistics reported the life expectancy of males and females to be 79.9 years and 84.5 years, respectively. See http://www.singstat.gov.sg/statistics/visualising_data/chart/Life_Expectancy_At_Birth.html.

³ Active CPF members are individuals with at least one contribution in the current or preceding three months.

⁴ The income ceiling for CPF contributions has varied over the years from a low of S\$500 in 1955 to a high of S\$6,000 during the 1985 to 2003 period. Since September 2001, it has stabilized at S\$5,000. The exchange rate as of June 2014 was S\$1.25=US\$1.

⁵ The income ceiling relevant for CPF contributions is set to not exceed the 80th percentile income level.

⁶ See <http://mycpf.cpf.gov.sg/Members/Gen-Info/Int-Rates/Int-Rates.htm>.

⁷ See McCarthy et al. (2002) and Low and Aw (1997) for further discussion of the housing loan arrangements.

⁸ For details see <http://mycpf.cpf.gov.sg/Members/Gen-Info/FAQ/investment/CPF-Invscheme.htm>.

⁹ Dependents are immediate family members such as spouse, children, parents or grandparents.

¹⁰ The only exceptions were 1980, 1981, 1994, 2008, 2011 and 2012.

¹¹ The World Bank recommends that countries should aim for an IRR of 53 percent of net final year wage or 78 percent of net average lifetime wage.

¹² The monthly payout and bequest are estimated for a retiree who reached age 55 in 2014 with a minimum sum of S\$148,000.

¹³ When introduced in 1986, the CPF Investment Scheme was known as the Approved Investment Scheme. It was subsequently renamed in 1994 to offer a wider range of financial instruments for investments by CPF members.

¹⁴ Unit trusts are similar to mutual funds except that they are created under a trust deed with an external trustee monitoring the portfolio manager on behalf of unit investors.

¹⁵ These returns do not include transaction costs.

¹⁶ A positive Jensen Alpha α_j from the regression $R_{jt} - R_{ft} = \alpha_j + \beta_j (R_{mt} - R_{ft}) + \epsilon_j$ indicates that the manager was able to select stocks to earn superior returns.

¹⁷ A positive gamma γ_j from the quadratic regression $R_{jt} - R_{ft} = \alpha_j + \beta_j (R_{mt} - R_{ft}) + \gamma_j (R_{mt} - R_{ft})^2 + \epsilon_j$ indicates that the manager was able to time the market to earn superior returns.

¹⁸ Other fees include service fee, asset allocation fee, legal fee, printing fee and distribution fee.

¹⁹ The NAV of a unit trust is the value of the unit trust fund's assets less its liabilities.

²⁰ Different unit trusts may have different investment objectives, different styles of management and different levels of equity risk depending on their portfolio allocation. This is recognized by Mercer Investment Consulting, CPF Board's consultant, which has developed a risk classification system for the CPFIS that assigns various risk levels to permitted investments. The unit trust or ILP with a greater proportion of its assets invested in the more volatile stock market will have a higher equity risk. Based on its level of equity risk, a unit trust or Investment Linked Product is assigned one of the four risk categories.

²¹ Singapore is an island nation with a small land area of 716.1 sq km. Although it tries to increase the land area through reclamation of shoreline, the increase is a marginal 1 sq km from 2012 to 2013.

²² Singapore's population grew rapidly from 3 million in 1990 to 5.3 million in 2012.

²³ Public housing apartments are sold on 99 year leases. A 65 year old member who bought his home at the age of 30 will have a lease with remaining life of 64 years.

²⁴ Announcement of 12/28/06; see mycpf.cpf.gov.sg/CPF/News/News-Release/N_28December2006.htm

²⁵ mycpf.cpf.gov.sg/CPF/News/News-Release/N_29Dec2005.htm

²⁶ It would also be of interest to offer inflation-indexed bonds, as these make good sense for the retirement decumulation phase (Brown et al. 2000).

²⁷ Fidelity reported that the average 401(k) balance as at end of 2012 is US\$77,300.

²⁸ Although employees can take loans from their retirement account, they are substantially penalized. Currently, withdrawals prior to age 59.5 are subject to 10 percent tax on distributions.

²⁹ Oakley and Kenneally (2013) reported in a recent survey that most Americans prefer a pension system that provides portability from job to job.

³⁰ Paul Yakoboki (2010) found that only 19 percent of retirees annuitized a portion of their retirement savings and David L. Wray (2008) noted that about 20 percent of defined contribution plans offer annuities but savings are hardly ever annuitized.

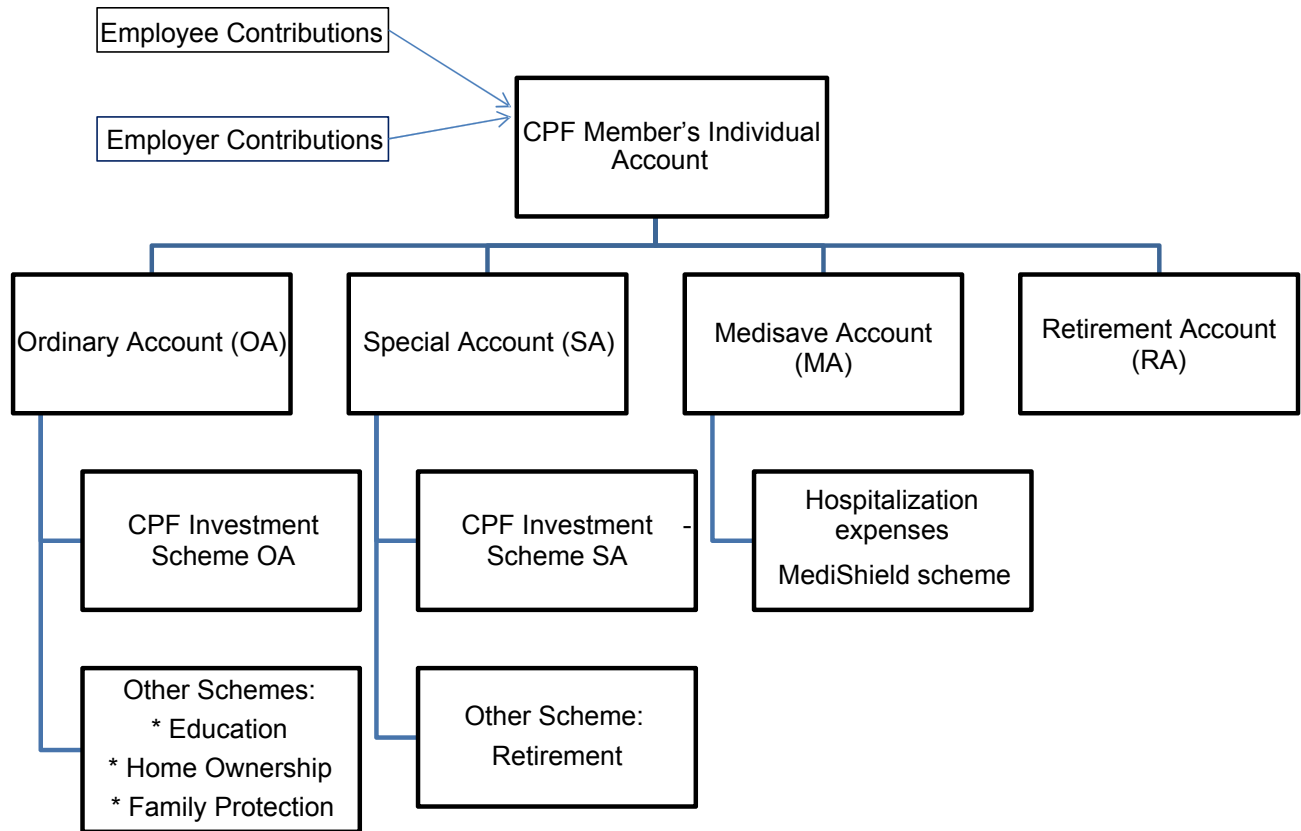
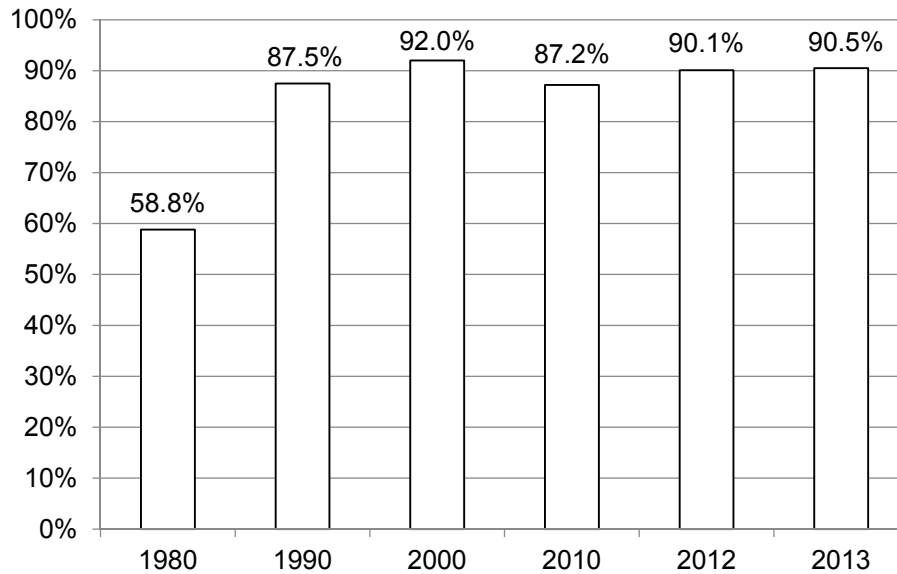
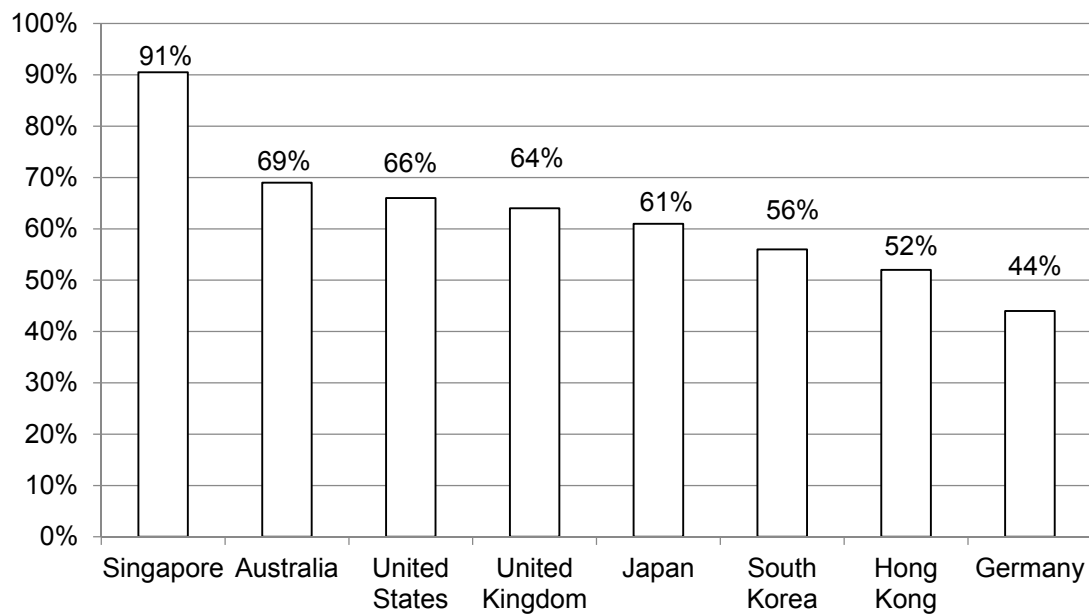


Figure 15.1. Central Provident Fund (CPF) overview
Source: Singapore Central Provident Fund



Panel A. Percentage of home ownership in Singapore over time.
Source : Singapore Department of Statistics (2013).



Panel B. Percentage of home ownership across countries.
Source: Singapore's Ministry of National Development

Figure 15.2. Comparative home ownership statistics.

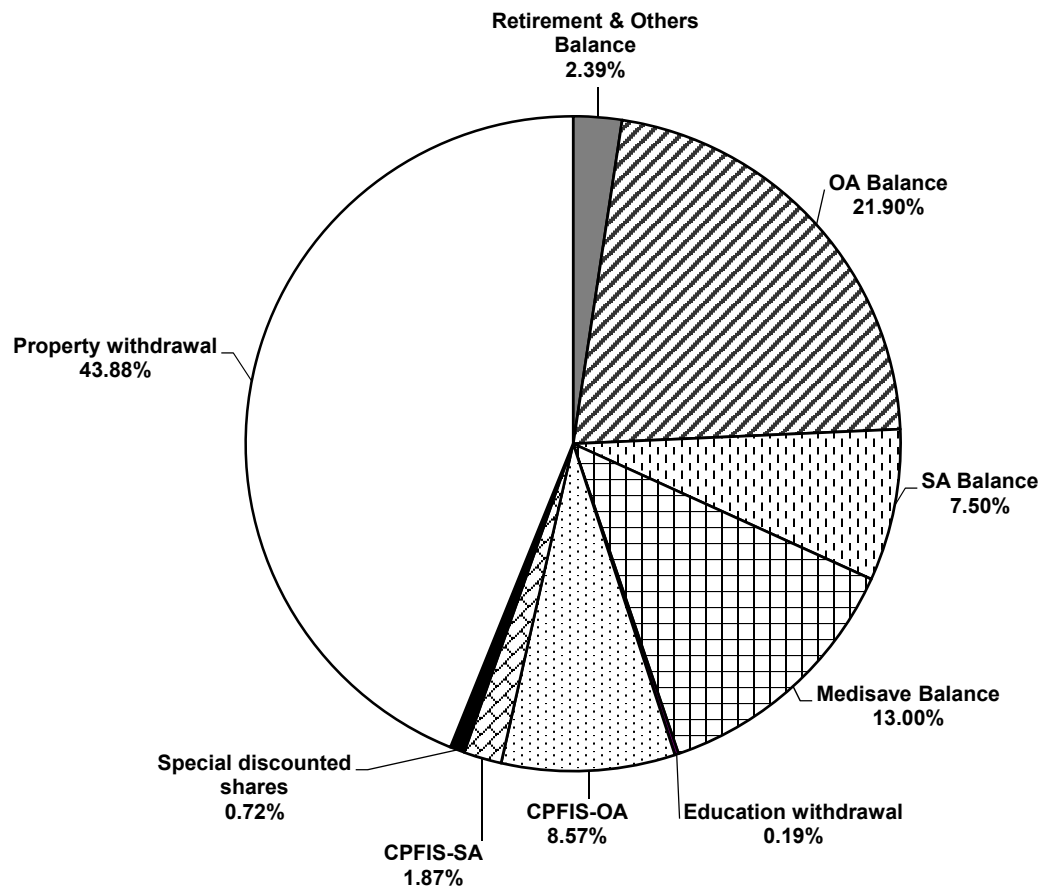
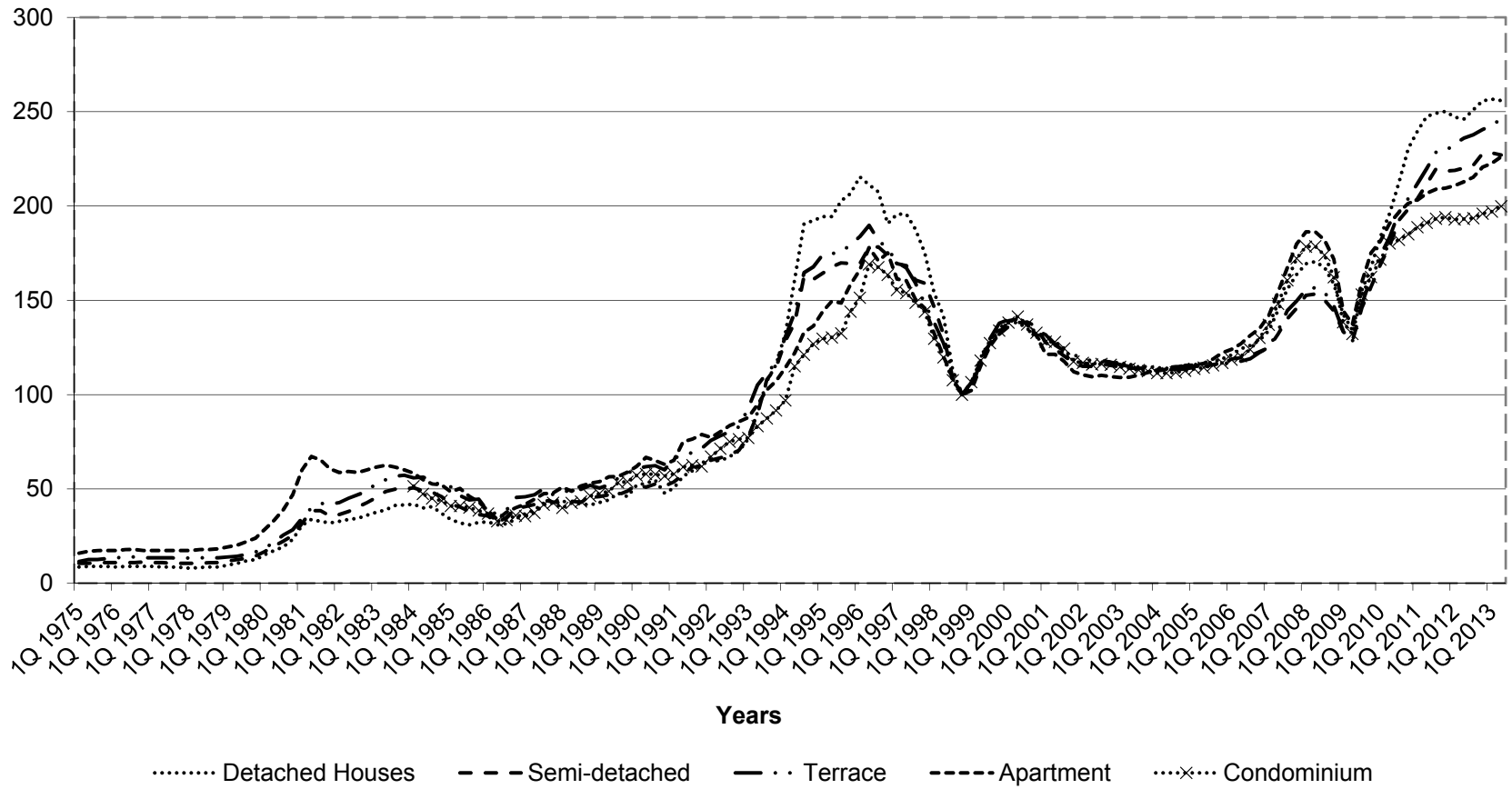
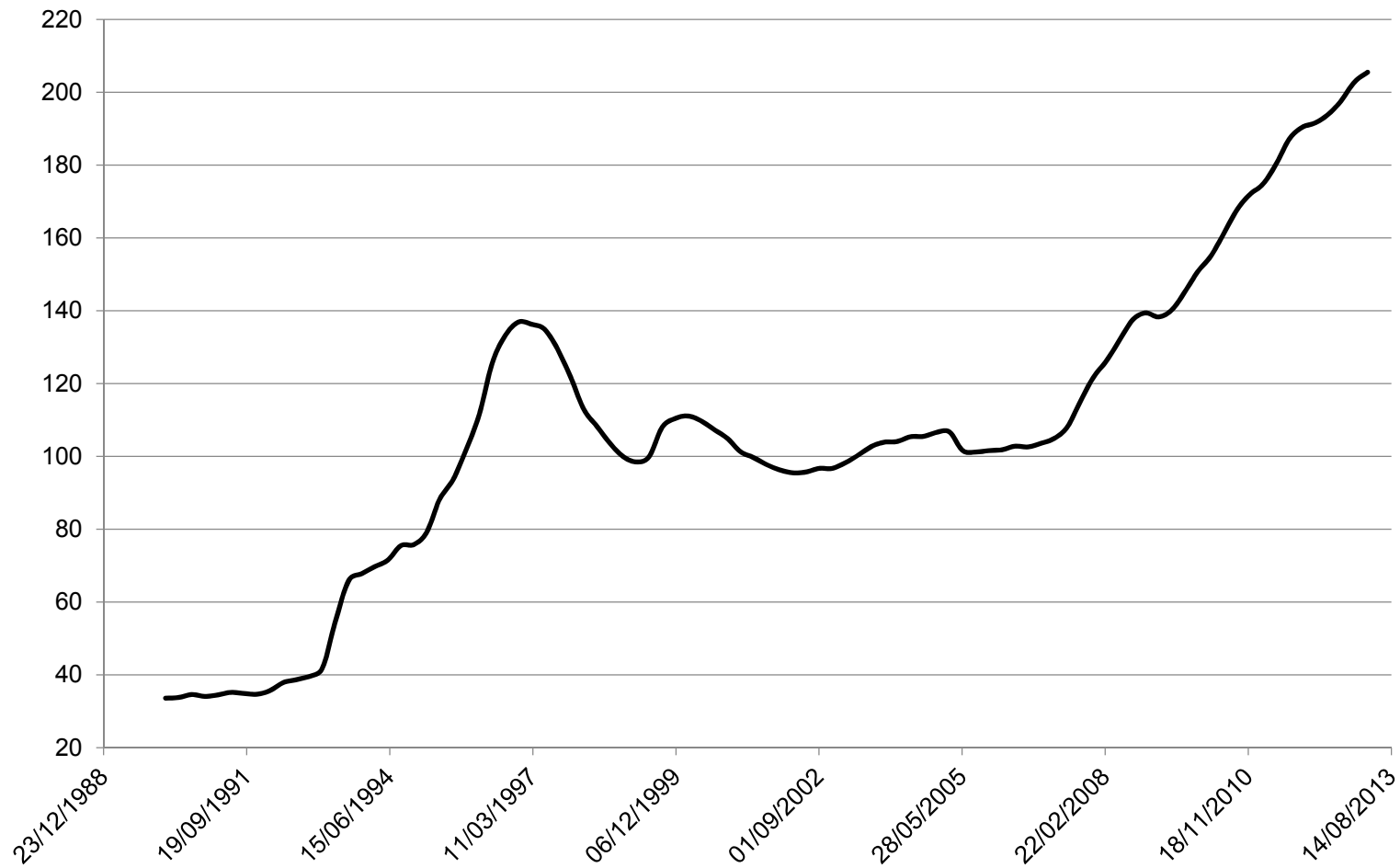


Figure 15.3. Cumulative use of CPF funds (OA and SA combined)

Source: Koh et al. (2008), Figure 5



Panel A. Private Property Price Index
Source: Urban Redevelopment Authority



Panel B: Public Housing Price Index
Source: Singapore's Housing Development Board

Figure 15.4. Property prices in Singapore

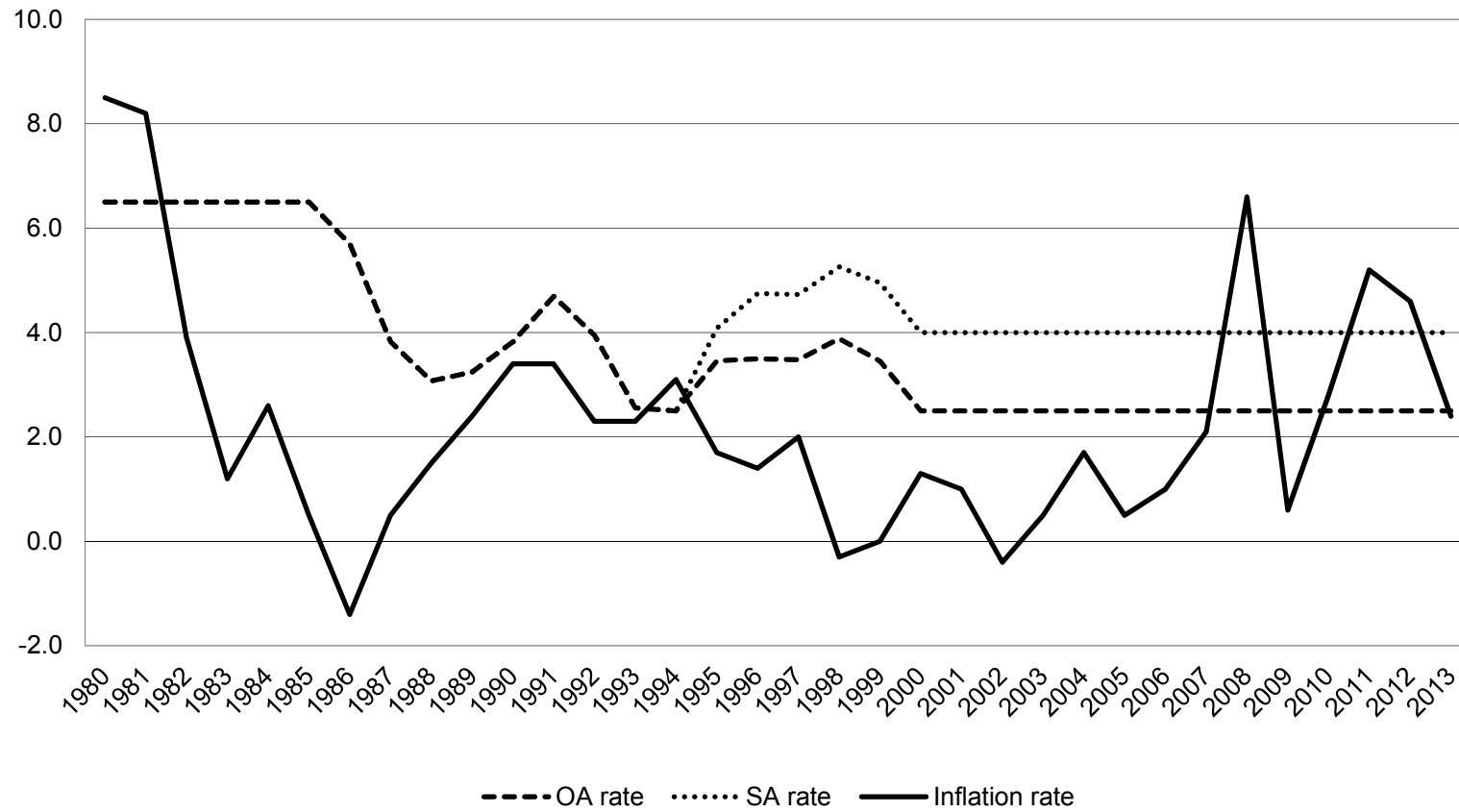
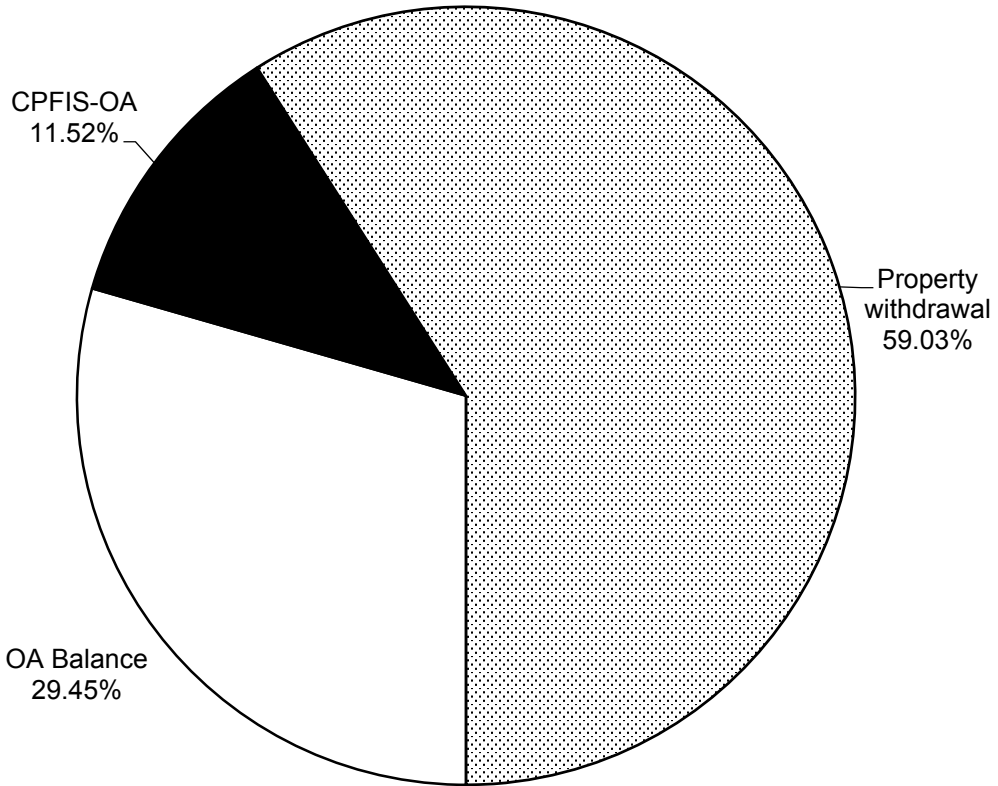
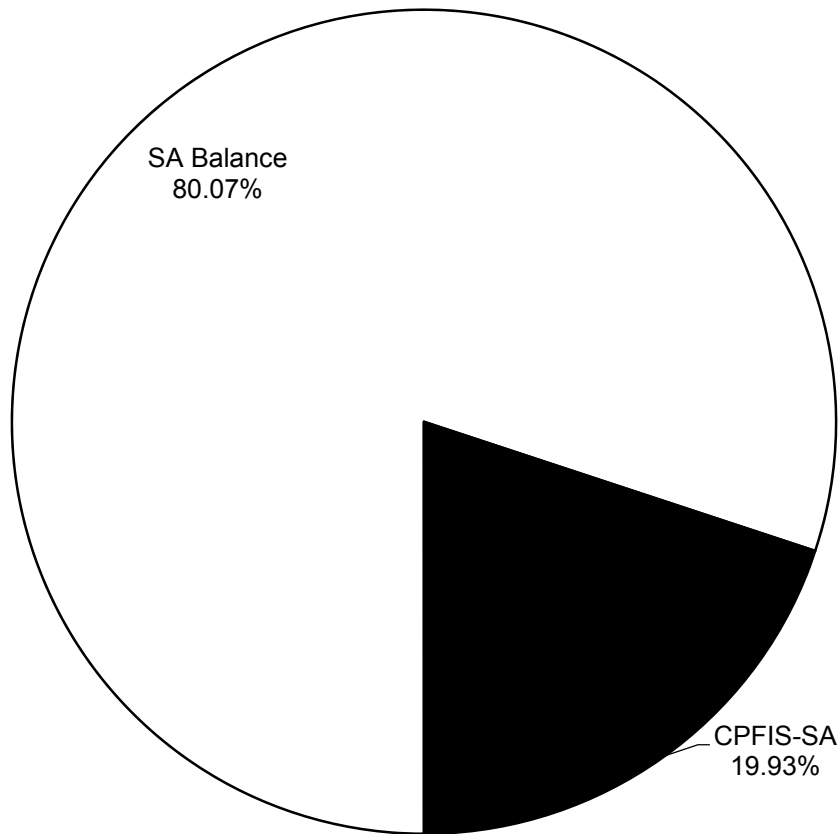


Figure 15.5. CPF interest rate and Singapore's inflation rate over time

Source: Singapore's CPF and Department of Statistics



Panel A. Portion of Balance Remaining in OA Account vs Portion Used for Investment



Panel B. Portion of Balance Remaining in SA Account vs Portion Used for Investment

Figure 15.6. Portion Invested and Balance Remaining in CPF Ordinary and Special Accounts
Source: Koh et al. (2008), Figure 6

Table 15.1. Contributions and balances in the CPF system.

	2008	2009	2010	2011	2012	2013
Total number of CPF members (mil)	3.23	3.29	3.34	3.38	3.42	3.51
Total Number of Active CPF Members (mil)	1.61	1.64	1.7	1.74	1.79	1.85
Total Contributions (S\$m)	20,294	20,125	21,993	24,628	26,048	28,530
Ordinary Account (OA) Balance (S\$m)	65,341.10	70,593.80	77,939.50	85,084.80	91,862.00	98,336.20
Special Account (SA) Balance (S\$m)	30,547.30	35,389.20	40,392.70	46,533.70	53,191.90	60,142.60
Medisave Account (MA)Balance (S\$m)	42,928.20	46,238.00	50,671.20	55,329.30	60,024.40	65,576.00
Retirement Account Balance and Others (RA) (S\$m)	12,490.50	14,583.00	16,884.60	20,597.70	25,079.30	28,913.80
Total Members' Balance (S\$m)	51,307.10	66,804.00	185,880.00	207,545.50	230,157.70	252,968.60

Source: CPF website

Table 15.2. Contribution rates of employer and employees age 35 and below (% of monthly wage)

Year	Contribution rate (for monthly wages \geq \$750)			Credited to			Income ceiling for CPF contributions (S\$)
	Contribution by employer (% of wage)	Contribution by employee (% of wage)	Total contribution (% of wage)	Ordinary account (% of wage)	Special account (% of wage)	Medisave account (% of wage)	
1955 to 1967	5	5	10				500
1970	8	8	16				1,875
1975	15	15	30				2,000
1984	25	25	50	40	4	6	5,000
1986	10	25	35	29	0	6	6,000
1990	16.5	23	39.5	30	3.5	6	6,000
1995	20	20	40	30	4	6	6,000
1999	10	20	30	24	0	6	6,000
2000	12	20	32	24	2	6	6,000
2005	13	20	33	22	5	6	5,000
2010	15	20	35	23	5	7	4,500
2014	16	20	36	23	6	7	5,000

Source: CPF Annual Report 2014

Table 15.3. 2014 Contribution rates for various age groups (% of monthly wage)

Employee Age (Years)	Contribution Rate (for monthly wages \geq \$750)			Credited to		
	Contribution by Employer (% of Wage)	Contribution by Employee (% of Wage)	Total Contribution (% of Wage)	Ordinary Account (% of Wage)	Special Account (% of Wage)	Medisave Account (% of Wage)
35 & below	16	20	36	23	6	7
Above 35–45	16	20	36	21	7	8
Above 45–50	16	20	36	19	8	9
Above 50–55	14	18.5	32.5	13.5	9.5	9.5
Above 55–60	10.5	13	23.5	12	2	9.5
Above 60–65	7	7.5	14.5	3.5	1.5	9.5
Above 65	6.5	5	11.5	1	1	9.5

Source: CPF website.

Table 15.4. CPF interest rates paid over time.

A. Interest Rate Paid on All CPF Accounts: 1955–1995	
Year	CPF Interest Rate Per Annum (%)
1955–1962	2.5
1963	5
1964–1966	5.25
1967–1969	5.5
1970–1973	5.75
1974–Feb. 1986	6.5
Mar.–Jun 1986	5.78
Jul.–Dec. 1986	5.38
Jan.–Jun. 1987	4.34
Jul. 1987–Dec. 1987	3.31
Jan.–Jun. 1988	3.19
Jul.–Dec. 1988	2.96
Jan.–Jun. 1989	3.1
Jul.–Dec. 1989	3.39
Jan.–Jun. 1990	3.77
Jul.–Dec. 1990	3.88
Jan.–Jun. 1991	4.85
Jul.–Dec. 1991	4.54
Jan.–Jun. 1992	4.59
Jul.–Dec. 1992	3.31
Jan.–Jun. 1993	2.62
Jul. 1993–Dec. 1994	2.5
Jan.–Jun. 1995	3.1

B. Higher Interest Rates Were Paid from Mid-1995 on Special, Retirement, and Medisave Accounts

Year	Interest Rate Per Annum (%)	
<u>From 1 July 1995</u>		
	Ordinary and Medisave Accounts	Special and Retirement Accounts
Jul-Dec 1995	3.82	5.07
Jan-Jun 1996	3.52	4.77
Jul 1996 – Jun 1998	3.48	4.73
Jul-Dec 1998	4.29	5.79
Jan-Jun 1999	4.41	5.91
Jul 1999 – Sep 2001	2.5	4
<u>From 1 October 2001</u>		
	Ordinary Account	Medisave, Special and Retirement Accounts
Oct 2001 – Dec 2006	2.5	4

Notes:

- a) The Special Account, Medisave Account and Retirement Account were introduced in July 1977, April 1984, and January 1987 respectively.
- b) From 1955 to 1976, CPF interests were credited and compounded annually.
- c) From 1977 to 1985, CPF interests were credited quarterly and compounded annually.
- d) From 1986 to present, CPF interests are computed monthly and compounded and credited annually.
- e) From 1 July 1999, CPF interests are reviewed quarterly.

Source: CPF website.

Table 15.5. CPF schemes

	Goal	Scheme	Year introduced
1)	Home Ownership	Public Housing Scheme	1968
		Residential Properties Scheme	1981
2)	Protection for family	Home Protection Scheme	1981
		Dependent's Protection Scheme	1989
3)	Healthcare Financing	Medisave Account	1984
		MediShield Scheme	1990
		Medifund	19993
		Eldershield	2002
4)	Retirement Adequacy	Minimum Sum Scheme	1987
		CPF Top-up Scheme	1995
		CPF Life Annuity	2009
5)	Asset Enhancement	CPF Investment Scheme	1986
		Non-residential Properties Scheme	1986
6)	Others	Tertiary Education financing for children	1989

Note: When introduced in 1986, the CPF Investment Scheme was known as Approved Investment Scheme (IS).

Source: CPF website.

Table 15.6. Dependent's protection and MediShield Schemes

Dependants' Protection Scheme (DPS)	2005	2006	2007	2008	2009	2010	2011	2012
No. of persons covered by DPS	1,676,038	1,725,661	1,776,604	1,829,835	1,871,599	1,893,488	1,923,090	1,947,326
Percentage of enrollment	55%	56%	56%	57%	57%	57%	57%	57%
MediShield Scheme	2005	2006	2007	2008	2009	2010	2011	2012
No. of persons	1,955,392	2,763,673	2,870,631	3,075,994	3,298,682	3,389,815	3,496,523	3,542,898
Percentage of insured persons	56%	78%	78%	84%	88%	90%	92%	93%

Source: CPF website.

Table 15.7. Contributions to MediSave Account by age groups (% of monthly wage)

Year	<35	35–44	45–49	50–54	55–59	60–64	> 65
1984	6	6	6	6	6	6	6
1990	6	6	6	6	6	6	6
1995	6	7	8	8	8	8	8
2000	6	7	8	8	8	8	7.5
2005	6	7	8	8	8	8.5	8.5
2010	7	8	9	9	9	9.5	9.5
2014	7	8	9	9.5	9.5	9.5	9.5

Source: CPF Annual Report 2012.

Table 15.8. CPF Minimum Sum Scheme (MSS)

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Required MSS Amount (S\$)	90,000	94,600	99,600	106,000	117,000	123,000	131,000	139,000	148,000
% of persons meeting MSS at age 55	37.5%	36.4%	36.3%	33.8%	37.5%	40.7%	45.0%	48.7%	

Note: S\$1.25 is roughly equivalent to US\$1

Source: CPF website

Table 15.9. Average balances of CPF members by age and sex

Age group	Average balance for males (S\$)	Average balance for females (S\$)
< 20	852	1,196
20–25	6,386	12,003
25–30	33,242	40,893
30–35	59,886	61,365
35–40	85,353	85,587
40–45	105,009	93,789
45–50	100,360	88,570
50–55	109,538	92,260
55–60	100,905	81,077
60 +	51,642	33,759
Unspecified	1,888	2,205
All groups	72,421	62,264

Note: S\$1.25 is roughly equivalent to US\$1.

Source: CPF Annual Report 2012 (as of December 2012).

Table 15.10. Performance statistics of CPFIS-included unit trusts

A: Summary Statistics of CPFIS Unit Trusts				
Summary Statistics	<u>10-year Period Ending Dec. 2001</u>		<u>10-year period ending Dec. 2007</u>	
	Average Annual Return (%)	7.96		10.27
CPF OA (average) annual rate (%)	3.23		2.77	
T-notes/bond Yield annual rate (%)	3.73		3.02	

B: R-square, Alphas, and Gammas of CPFIS Unit Trusts				
Average	<u>Period ending Dec. 2001</u>		<u>Period ending Dec. 2007</u>	
	Equity	Balanced	Equity	Balanced
Average Alpha (%)	0.35	0.62	0.32	0.07
% where Alpha > 0	14	100*	22.5	0
Average Gamma (%)	0	0	0	0
% where Gamma > 0	29%	0%	27.50%	50%

Note: There is only one balanced fund in the sample.

Source: Koh et al. (2009), Tables 2 and 4

Table 15.11. Summary data on costs associated with unit trust investment

	Number of funds sampled	Average sales loads (%)	Average management fee (%)	Average expense ratio (%)
Equity Funds	167	4.9	1.4	2.1
active	164	5	1.4	2.1
passive	3	2.1	0.7	1
Balanced Funds	26	4.8	1.3	1.9
active	22	5	1.3	2.1
passive	4	3.5	1	1.3
Income Funds	39	2.1	0.9	1.1
Cash Funds	3	0.1	0.5	0.7
Sample mean		4.4	1.3	1.9

Notes:

- a) The sales load comprises both front-end and back-end sales charges. Annual operating costs comprise fees for management, custodian, trustee, administration, and other major fees paid by the unit trust out of the fund's net asset value, and is estimated using the total expense ratio publicly reported by Investment Management Association of Singapore (IMAS) under its Fund Information Service website (<http://www.fundsingapore.com>).
- b) There is one partially passive fund under the income funds category. However, its costs are not presented separately since one single fund is not a representative sample for analysis.

Source: Koh, Mitchell, and Fong (2008), Table 4.

Table 15.12. Simulation study showing the percentage of \$1 investment eroded by expenses assuming zero investment return, by fund type and holding period (%)

Type of Fund	1 year	5 years	10 years	20 years
Equity	-6.90	-3.00	-2.60	-2.30
Balanced	-6.60	-2.90	-2.40	-2.20
Income	-3.20	-1.50	-1.30	-1.20
Money market	-0.80	-0.70	-0.70	-0.70

Notes: This simulation study assumes that the prices of unit trusts remain unchanged so the change in the fund position solely reflects cost impacts on a \$1 investment over 1 year, 5 years, 10 years, and 20 years. Costs include the one-off sales load and the annual operating costs for each of the four fund types as presented in Table 15.10. The sales load comprises both front-end and back-end sales charges. Annual operating costs comprise fees for management, custodian, trustee, administration, and other major fees paid by the unit trust out of the fund's net asset value, and is estimated using the total expense ratio publicly reported by Investment Management Association of Singapore (IMAS) under its Fund Information Service website (www.fundsingapore.com). The performance fee is excluded from the total expense ratio.

Source: Koh et al. (2008), Table 11.

Table 15.13. Realized profits/losses for investments held under the CPF investment scheme ordinary account (CPFIS-OA): FY04–13.

	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	10-year avg.
Members who made net realized profits <i>in excess of</i> the OA interest rate of 2.5%	127,518	147,387	179,987	239,137	173,987	112,642	134,841	152,063	143,956	138,436	
% of members	17%	19%	23%	28%	20%	13%	14%	17%	16%	15%	18%
Members who made realized profits, but <i>equal to or less than</i> OA rate	240,010	250,237	257,191	244,841	278,758	314,901	332,399	344,299	362,598	385,493	
% of members	33%	33%	32%	29%	31%	35%	37%	38%	41%	43%	35%
Members who made realized losses	369,591	363,124	362,129	368,054	440,063	465,724	437,101	399,717	389,399	374,699	
% of members	50%	48%	45%	43%	49%	52%	49%	45%	43%	42%	47%

Source: Author's computations using the CPFIS profits/losses reports.