Intentional Bequest Motives and the Choice of Annuity

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Abstract

This paper identifies the intentional bequest motive by exploiting the choices between two compulsory partial annuity plans in Singapore, the default Standard Plan with a higher monthly payout but a lower bequest, and the Basic Plan with a lower monthly payout but a higher bequest. Because actively choosing the Basic plan increases committed bequests but not precautionary savings, individuals choose the Basic plan only if they want to leave bequests intentionally. Using our own household survey data, we find that about 20 percent of people choose the Basic Plan, which provides direct evidence for the existence of the intentional bequest motive. Better educated individuals, and individuals with children are more likely to intentionally leave bequests. Consistent with the altruism motive hypothesis, individuals with poorly educated or financially insecure children are more likely to leave bequests. Contradicting to the reciprocity hypothesis, the frequency of children's visit has no impact on the probability of leaving bequests. To differentiate between motivations for leaving bequests, we further ask individuals to allocate real high stake lotteries to their children and study the correlation between the allocation and children's behavior. We find that most people allocate lotteries equally across their children, in line with the motive of the joy of giving and against the reciprocity motive. Our structural estimation shows that households have strong bequest motive and bequests are luxury goods.

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1 Introduction

Intergenerational transfers is one of the major contributing factors to capital accumulation (Kotlikoff and Summers, 1981; Gale and Scholz, 1994), and a considerable proportion of intergenerational transfers were done via bequests. For example, Kotlikoff and Summers (1981) find that about 77% of U.S. net worth is due to intergenerational transfers while only a small proportion of capital accumulation can be traced to life-cycle savings. Some other studies conclude that life-cycle wealth plays a more important role than intergenerational transfers in capital accumulation (Modigliani, 1988). The relative importance between life-cycle savings and intergenerational transfers depends on whether bequests are left accidentally or intentionally. If people leave bequests accidentally, then we underestimate the role of life-cycle wealth and overestimate the role of intergenerational transfers.

A major source for accidental bequests is precautionary savings. One reason for precautionary savings is that health risks and medical expenses are stochastic. Both the arriving time and the amount of medical expenditures are random. The demand for precautionary saving also arises from the fact that people do not know in advance the exact date of their death even if they know their mortality probabilities, and they want to avoid low levels of consumption in the event that they live longer than expected. Hence, at the time of death, people generally hold some wealth, which is then passed on to their heirs. Besides leaving bequests accidentally, people could also leave bequests intentionally as they care about their children. Understanding the sources of bequests is important since bequest motive influences the decision of savings, the demand for life insurance, annuities and long-term care insurance (e.g Ameriks et al., 2011, 2019; Lockwood, 2012, 2018), and wealth inequality (e.g De Nardi, 2004; Benhabib et al., 2011).

The existing literature still remain inconclusive on whether there is intentional bequest motives. Some, such as Hurd (1987, 1989) and De Nardi et al. (2010), do not find support for intentional bequest motive while others, such as Ameriks et al. (2011), Koijen et al. (2016), De Nardi et al. (2016), and Lockwood (2018), find support for intentional bequest motive by analyzing additional information such as holdings of life insurance, annuities,

and long-term care insurance. Identifying intentional bequests is challenging due to the following difficulties in empirical tests: when individuals increase their savings, they increase both precautionary savings and bequests in case they die. There is no separate account for all committed bequests.

In this paper, we exploit the decisions of partial annuity plans in a unique institutional setting in Singapore to identify the intentional bequest motive. The Singapore Central Provident Fund (CPF) Board, which regulates the operation of the fund (a self-funded retirement plan), introduced a compulsory life annuity scheme called CPF Lifelong Income For the Elderly (CPF LIFE) on January 1, 2013. The scheme transforms the limited term payment scheme of the CPF into a partial annuity scheme. The scheme has two unique features that help us to identify the motives for leaving bequests. First, it is mandatory for all eligible CPF members. Second, it provides two annuity options with different levels of partial annuities: the LIFE Standard Plan and the LIFE Basic Plan. The former, which is the default choice, provides higher monthly payouts and lower bequests conditional on death at given ages than the latter does. Since CPF members cannot withdraw from CPF LIFE or change their plans, CPF LIFE creates a separate account with committed bequest.

The unique setting can help us to separate intentional bequest motives from precautionary savings: choosing the Basic plan(lower monthly payouts and higher bequests) only increases the committed bequest but does not increase precautionary savings to cope with medical or longevity risks. Our strategy is to test whether there is considerable proportion of people choosing the Basic plan. In the absence of intentional bequest motives, all members should choose the default Standard plan due to its higher monthly payouts. Observing a considerable proportion of people choosing the Basic plan provides a strong support for the existence of the intentional bequest motives. This strategy has one main advantage over previous studies: we do not rely on strong assumptions to identify intentional bequest motive. The main assumption we need is that people understand the trade-offs between these two CPF LIFE plans.

We surveyed more than 2,000 households from a representative sample of people who

were around 55, the age of making their CPF LIFE enrollment decisions. Our analyses show that about 20 percent of our sample choose the Basic plan (high bequests), suggesting that a significant proportion of people indeed leave bequests intentionally. Since the Standard plan is the default choice, our estimation is the lower bound of intentional bequest motives. Using knowledge questions about the CPF LIFE, we find supporting evidence for our assumption that people understand the trade-offs between the Standard plan and the Basic plan.

Further analyses on the relationship between people's choices of their CPF LIFE plans and their characteristics show that having children and education increases the likelihood of intentionally leaving bequests. These results are consistent with Koijen et al. (2016). We also find that less healthy people are more likely to intentionally leave bequests, which is consistent with adverse selection in the annuity market (Finkelstein and Poterba, 2004).

Having established the fact that people indeed leave bequests intentionally, we further examine the reasons for such bequests. People may intentionally leave bequests for three reasons: altruism, reciprocity, and "joy of giving". If people leave bequests purely out of altruism, their choices of CPF LIFE plans should be affected by income (wealth) differences between their children and themselves. Thus, it has a testable prediction: income (wealth) differences between themselves and their children should be negatively correlated with the probability of selecting the CPF LIFE Basic Plan. The reciprocity motive suggests that bequests are used as compensation for services rendered by heirs. This implies that those who choose the CPF Basic Plan should be visited more frequently by their children. The "joy of giving" motive implies that people would like to distribute their bequests equally among their children.

To test the implications of altruism and reciprocity motives, we collect information on people's beliefs of their children's financial security, their characteristics, and the frequency of their children's visits. We find that the probability of enrolling in the Basic plan is negatively correlated with their children's financial security and their adult children's education levels. This evidence is consistent with the prediction of the altruism motive. We did not find any relationship between the frequency of children's visits, which

is inconsistent with the prediction of the reciprocity motive.

We examine the "joy of giving" motive by studying how people allocate potential bequests to their children in two incentive-compatible survey questions. We give 10 real, identical, high-stake lottery tickets (Singapore TOTO tickets) to each respondent before the draw date. The Jackpot Prize of each ticket has a minimum guaranteed pool amount of $1 million Singapore dollars.[1] Then we use two strategic questions to ask them to allocate these lottery tickets to themselves and their children. The idea is similar to the strategic survey questions in Ameriks et al. (2011) and the main difference is that we use lottery to make the question incentive compatible. In the first question, we ask them to allocate the potential prizes (tickets) between themselves and their children. In the second question, we ask them to allocate the potential prizes only among their children. We implement these questions by asking the subjects to allocate 10 TOTO tickets into different envelops. Then we seal these envelops and send them to their children. Since the ten tickets are identical and the winning numbers will be drawn in the next few days, they are allocating a potential large amount of money to their children and their decisions are incentive compatible. Our analysis do not show any relationship between the allocation and the frequency of children's visits, which is consistent with the prediction of the "joy of giving" motive but inconsistent with the reciprocity motive.

We further exploit the variation of CPF LIFE choices and use the General Method of Moment (GMM) to structurally estimate intentional bequest motives in a life-cycle model. We combine both the survey data and CPF LIFE choices to estimate the parameters of intentional bequest motives. We show that households have strong bequest motive and bequests are luxury goods. Our analysis indicates that the design of partial annuities might help to mitigate the low demand of life annuities.

This paper is related to two strands of literature. First, it contributes to the literature to distinguish accidental and intentional bequest motives. Existing literature generally use two approaches to distinguish intentional and accidental bequest. The first approach relies on strong assumptions about individual preferences. For example, some studies

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[1] 1 USD=1.37 Singapore dollar(SGD) in Dec 2018

assume that those having children have stronger bequest motives than others (Hurd, 1989). Some other studies assume that those buying life insurance plans have bequest motives (Inkmann and Michaelides, 2012). The second approach is to set up a life-cycle model and to structurally estimate the parameters of bequest motives (e.g. Ameriks et al., 2011; Lockwood, 2012; Koijen et al., 2016). We exploit the novel setting in Singapore and use the decision of partial annuities to distinguish accidental and intentional bequest motive. The choice of the Basic plan is similar to the strategic locked box question in Ameriks et al. (2011). We also structurally estimate the parameters of bequest motive in a life-cycle model. Our findings are consistent with a large body of literature that people indeed leave bequests intentionally (e.g. Bernheim, 1991; Inkmann and Michaelides, 2012; Kopczuk and Lupton, 2007; Ameriks et al., 2011; Lockwood, 2012; Koijen et al., 2016) without resorting to any assumptions on people's preferences, such as childless people have less incentives to leave bequests than others, which strengthens the existing evidence. Actually, by analyzing the impact of various demographic characteristics on people's choices of CPF LIFE plans, we provide empirical support for the assumption that childless people have less incentives to leave bequests. Nevertheless, even among childless people, there is still a considerable proportion of them, 14 out of 102, enrolled in the Basic plan, suggesting that some of them still have incentives to leave bequests.

The existing literature still remain inconclusive on whether there is intentional bequest motives. Observing that retirees with and without children follow quite similar patterns of asset decumulation, Hurd (1987, 1989) conclude that people only leave bequests accidentally. This is because models with intentional bequest motives predict that retirees with and without intentional bequest motives should have different dissaving patterns.[2] Even within the group of researchers accepting the existence of intentional bequest motives, they disagree on the impacts of bequest motives on the savings behavior of retirees. De Nardi (2010) find that the bequest parameters are not statistically significant and do not help improve the fit of the model. Ameriks et al. (2011) and Ameriks et al. (2019) find

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[2]Barczyk et al. (2019) give an alternative explanation of the similar savings and bequests behavior between households with and without children: childless cannot count on informal care or financial transfers from their children, and they face larger risks and thus accumulate higher precautionary savings.

that precautionary savings for long-term care are much more important than intentional bequest motives, while Lockwood (2018) finds that models without intentional bequest motives cannot match retirees' choices of savings and long-term care insurance. We exploit the unique setting of partial annuities in Singapore and provide supporting evidence to intentional bequest motives.

Second, our paper contributes to the literature to understand the mechanisms behind intentional bequest motives. Intentional bequest motives may come from three sources: altruism, reciprocity, and "joy of giving". Previous studies found evidence to support reciprocity and the strategic motive (e.g Bernheim et al., 1985; Perozek, 1998). We design a real lottery allocation task to understand how people would share a potential large amount of money with children, and study the relationship between the allocation of real lottery and children's behavior. Our results support altruism and "joy of giving" motives, but do not support the reciprocity or the strategy motive.

The rest of the paper is organized as follows. Section 2 describes the institutional background of our survey. Section 3 presents our research strategies. We show our empirical results in Section 4. Section 5 contains our structural estimation procedures and results. Section 6 concludes the paper.

2 Institutional background

The Central Provident Fund (CPF) is a compulsory comprehensive savings plan to fund their retirement, healthcare, and housing needs. At the end of 2018, the CPF has 3.91 million members with a total account balance of S\$391,117 million (Singapore CPF Board, 2019), or S\$100,030 per member, which is 32% of household financial assets and 21% of households net worth.

In 2018, Singapore's life expectancy is 83.2 at birth and 86.1 at age 65(Singapore Department of Statistics, 2019). Before 2013, CPF is a self-funded pension system with no risk pooling. Members start to receive monthly payouts at age 65 if they are born after 1954 or at 60 if they are born before 1943 for approximately 20 years. The amount of payouts depends on their Retirement Account balances. Given the fact that more than

half of the current 55-year-olds will still be alive at 85 and 15% of them will still be alive at age 95, CPF savings will be exhausted for most CPF member in the later stage of their life.

To address this issue, the Singapore government introduced the CPF Lifelong Income scheme for the Elderly (CPF LIFE) on January 1, 2013. CPF LIFE is a life annuity that provides a monthly payout until death. It is compulsory for Singapore Citizen or Permanent Resident. CPF members born after January 1, 1958 would be automatically enrolled into the scheme when they turn 55 years old if they have at least S$40,000 in their RA at age 55, or S$60,000 at payout eligibility age (65). Other members can opt in to the scheme any time between age 55 and 80.

The CPF LIFE scheme consists of two plans: the LIFE Standard Plan and the LIFE Basic Plan. The former, which is the default choice, provides higher monthly payouts and lower bequests conditional on death at given ages than the latter does. From 2013 to 2015, CPF members need to make a decision at age 55. A CPF member will receive a invitation letter to choose her CPF LIFE plan one month after her 55th birthday. If no selection is made within the following 6 months, the member will be placed on the Standard Plan (default). Within 30 days from the date of the policy letter, the member can change the choice only once. Then there is no chance to change the choice.

As at the end of 2014, more than 140,000 CPF members have participated in the scheme and a total of S$509.5 million had been distributed since September 2009 (Singapore CPF Board, 2014). From January 1, 2016, CPF members will only need to choose their CPF LIFE plans from age 65 to 70 at the point when they wish to receive the CPF LIFE payouts. The differences in monthly payouts and bequests are considerable (see Appendix Table B.1). For instance, for a male CPF member born in 1958 with a Retirement Sum of S$180,000 at age 55, his monthly payout is S$1,246 and can leave a bequest of S$51,779 at age 75 if he chooses the Standard Plan. His monthly payout will be reduced to S$1,149 and his bequest will be increased to S$171,006.

Figure 1 shows the internal rate of return for each CPF LIFE plan by gender and CFP balance at age 55. Gender-specific mortality rate is used to calculate the internal rate of

return. Panel A shows the internal rate of return for males in different CPF LIFE plans. Panel B shows the internal rate of return for females. The horizontal axis represents the CPF balance at age 55. The vertical axis is the internal rate of return. We observe that the Basic plan has slightly higher return than the Standard plan for those with low CPF balance, but slightly lower return than the Standard plan for those with high CPF balance. Note that the internal rate of return just reflect the net present value of future cash flow, regardless whether it is in the form of monthly payoffs or bequests. It does not reflect utility directly since subjects have different weights on monthly payoffs and bequests.

3 Research design

The CPF LIFE scheme provides us a unique opportunity to identify the existence of the intentional bequest motives: it creates a separate account for committed bequest. Actively selecting the CPF LIFE Basic Plan implies a member is willing to sacrifice their own consumption to commit larger bequests conditional on dying at each age. To identify the intentional bequest, we conduct household surveys with eligible household after they made CPF LIFE choice. We study the proportion of Basic plan, and its relationship with individual characteristics

Using a random sample of addresses drawn by the Singapore Department of Statistics, we first conducted a pilot survey in July 2015. The target population is households with at least one member aged 50-64 in 2015. We collected information on the respondent's age, nationality, gender, ethnicity, education, health status, labor market status, home ownership, CPF balance, knowledge of CPF LIFE plans, CPF LIFE choice, and preferences.

To increase the probability of surveying individuals who are old enough to qualify for choosing the CPF LIFE plans, we narrowed the target population to households with at least one member aged between 55-59 when we started our main survey in July 2016. Because it is very difficult to enter private gated residents, we only survey households living in apartments built by the Singapore Housing and Development Board (HDB), which accounts for 82% of Singapore resident population (Singapore Housing and Development

Board, 2016). People living in HDB housing tend to be poorer and are less likely to be foreigners who are not covered by the CPF schemes.[3]

The household survey consists of four parts. The first part collects social economic information, such as age, gender, education, health status, life expectancy, and labor market status. The second part collects information on financial assets, such as home ownership, CPF balance, and CPF LIFE choice. The third part collects information about the number of children, and relationships with their children. The fourth collects information on individual's risk preference, time preference and social preference.

Individual preference is measured according to the literature of experimental economics. Social preference is measured by the questions in Charness and Rabin (2002). We ask respondents to choose between the option of equal payoffs for them and other people and the option of unequal payoffs. There are one equal payoff option (S$20 each) and two types of unequal payoffs. In the first setting, we ask respondents to choose between equal payoffs option and an unequal payoffs option where the respondent receive less month than the others, starting with S$15 for the respondent and S$30 for others (see Appendix A question 48). In the second setting, we ask respondents to choose between the equal payoff option and an unequal payoff option where the respondent receives more than the others, starting with S$15 for the respondent and S$10 for the others (see Appendix A question 49). In both settings, we gradually increase the payment for the respondent if he chooses the equal payoff option proceeds to the next question once the respondents choose the unequal payoff option or at the sixth round even if the respondent still chooses the unequal payoff option. We use the number of rounds as a measure of altruism.

Following Holt and Laury's (2002) design on measuring risk preference, we ask our respondents to choose between escalating amounts of guaranteed money (riskless option 1) starting from S$25 and a gambling (risky option 2) with 50% chances of winning S$200 and 50% chances of receiving nothing (see Appendix A question 50).[4] Once a respondent chooses the riskless option or reaches the sixth round of the question, we will proceed

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[3]According to the 2010 Singapore census, the monthly household income of 18.5% of HDB residents exceed S$10,000, the corresponding number is 59% for households living in private apartments.

[4]Both time preference and risk attitude are elicited without monetary incentive.

to the next survey question. A respondent's degree of risk aversion is measured by the number of rounds needed to induce him/her to choose the riskless option, i.e. the degree of risk aversion of a respondent takes the value of n if he/she chooses the riskless option at the nth round. For those who still choose the risky option at the end of the question (round six), whose degree of risk aversion will be set at seven. The amount of guaranteed money in the last round of the question is S$150.

Time preferences are elicited in a similar fashion. We ask respondents to choose between receiving S$1,000 now (option A) and an increasing amount of money one year later (option B) starting from S$1,063 (see Appendix A question 51). Once a respondent chooses the option B or reaches the sixth round of the question, we will proceed to the next survey question. A respondent's degree of impatient is measured by the number of rounds needed to induce him/her to choose the risk free option, i.e. the degree of impatient of a respondent takes the value of n if he/she chooses option B at the nth round. For those who still choose option A at the end of the question (round six), whose degree of impatient will be set at seven. The amount of future payment in the last round of the question is S$1,688.

The last part of the survey consists with some contingent valuation questions that help us to understand the willingness to pay for bequests. We apply the contingent valuation method to elicit individuals' state preference under changing conditions of CPF LIFE. The main tradeoff for CPF LIFE is the monthly payment before death and the bequest after death. We fix the bequest amount and increase the monthly payment of Standard plan to elicit how much individuals need to switch from the Basic plan to Standard plan. Similarly, we increase the monthly payment of Basic plan to elicit how much individuals need to switch from the Standard plan to Basic plan.

In order to understand the mechanisms of the bequest motive, we also ask some incentivized strategic survey questions to understand how they allocate bequest to their children. The idea is similar to the strategic survey questions in Ameriks et al. (2011). We explore the feature of TOTO lottery in Singapore Pools to add incentives in these questions. TOTO is a popular lottery game in Singapore. Games are offered by Singa-

pore Pools twice per week, and the company draws 6 numbers as "Winning Numbers" from 1 to 49. For Ordinary Entry TOTO, a player pays $1 to select 6 numbers from 1 to 49, and he wins a prize if he picked at least 3 of the Winning Numbers. The prize is $10 for Group 7 prize and may be over $1 million for Group 1 prize. The detailed information of TOTO lottery in Singapore is in Appendix Table B.2.

We give ten one-dollar TOTO tickets of identical numbers to each subject and ask them two strategic questions on how to allocate potential bequest. In the first question, we ask them to allocate these tickets between themselves and their children. "We will give you ten one-dollar tickets with identical ticket number for TOTO lottery from Singapore pool. Group 1 prize will be over 1 million dollars. Suppose you win 250,000 dollar with these tickets, how would you like to allocate the winnings? What percentage do you want to allocate to your children, and to yourself (including your spouse)?" The purpose of asking this question is to measure the general bequest motive. In the second question, we ask them to allocate these tickets only among their children. "We will give you ten one-dollar tickets with identical ticket number for TOTO lottery from Singapore pool. Group 1 prize will be over 1 million dollars. Suppose you win 250,000 dollars with these tickets, how would you like to allocate the winnings? You have the choice to divide them between your children. What percentage do you want to allocate to your child 1,2,3?" The purpose of asking the second question is to analyze the relationship between the allocation and children's characteristics in order to study the mechanisms of the bequest motive. After they answer these two questions, we flip a coin. If heads, we implement the allocation given in the first question, otherwise we implement the allocation given in the second question. According to the answer given by the subject, we divide the TOTO tickets into different envelopes, one for each child. Then we seal the envelops and send it to their children. Since the 10 TOTO tickets are identical and the winning number will be drawn in the next few days, they are allocating a potential large amount of money to their children and their decisions are incentive compatible.

4 Empirical Results

4.1 The existence of intentional bequest motives

Table 1 reports the summary statistics of the key variables. Among those who has already enrolled or in the process of enrolling in the CPF LIFE at the time of the survey, 18.4% of them enrolled in the Basic Plan.Given the sample size of 746, the statistic is significantly different from 0 at the 1% level. Under the assumption that people understand the trade-offs between these two CPF LIFE schemes, this is direct evidence for the existence of the intentional bequest motive. There is no heritage tax in Singapore and no different tax treatment for the Standard plan and the Basic plan. Thus, the choice is unlikely to be affected by tax incentives.

To illustrate the difference in terms of monthly payout and bequest, let us consider a male member who have $180,000 in his CPF account at the age of 55. He will start to receive a monthly payout of $1,149 if he enrolls in the Basic Plan and $1,246 if he enrolls in the Standard Plan. For the $97 difference in monthly payout, he can leave $171,006 to his hires in comparison to $51,779 if he dies at the age of 75. However, if he dies at the age of 90, he will not be able to leave anything to his hires no matter which plan he enrolls. Since the difference in monthly payouts do not vary with age while the difference in bequest amount decreases as the policy holder ages, even for people who have very strong bequest motives, the advantages of enrolling in the Basic Plan decreases with the number of years he expects himself to stay alive. If a person is sure that he will survive his 90th birthday, he should not enroll in the Basic Plan even if he has a strong bequest motive. Nevertheless, for people without any bequest motives, the Standard Plan should always dominate the Basic Plan regardless of his longevity.

We document the fact that a considerable proportion of subjects choose the Basic plan. One alternative explanation is that they do not understand the trade-offs between the Standard plan and the Basic plan. To check the validity of our key identification assumption that people know the differences between these two plans, we ask our respondents two trade-off questions before asking them the hypothetical question. First, which plan

provides a higher monthly payout? Second, which plan offers a larger bequest? Among those who have enrolled, 75% of them have answered at least one question correctly, 60% of answered at least two questions correctly, and 73% of them knew the Standard Plan has a higher payout. Among those who understand the trade-offs, 20% choose the Basic plan. These results suggest that most people knew that they will receive a lower monthly payout if they choose the Basic plan, hence have an intention to leave bequests.

Another alternative explanation is that subjects collude with children, i.e. their children would transfer to parents in return for more bequests. To test this possibility, we design detailed survey questions to ask them how they make the CPF LIFE choices. We find that 90% of subjects do not discuss with their children before they make the CPF LIFE decision, and 88% of subjects do not tell their children the CPF LIFE choice after they make the decision. We further ask a hypothetical question, "Would you like to tell your children our CPF LIFE choices if we offer you 10 SGD?" 61% of subjects reply "No". These results suggest that parents do not generally discuss the CPF LIFE choice with children. We also find that 18.7% choose the Basic plan among those who do not discuss with Children. The results suggest that collusion with children is unlikely to explain our results.

To gain information on people's preference on CPF LIFE choices for those who had not enrolled at the time of the survey, we asked our respondents to choose a CPF LIFE Plan if they have $100,000 in their CPF account at age 55. In the question, we clearly state the annual payout from each plan and the bequest amount at various ages. Among the 1,890 respondents who answered this question, about 27% of them chose the CPF LIFE basic plan, which is larger than the proportion of people who actually chose the basic plan. Among CPF LIFE enrollees, their choice of the hypothetical plan is highly consistent with their actual enrollment decision, 83% of them chose the same plan. Because our question clearly listed the bequests and payout information,[5] our respondents should be well informed when they answered the question even if they knew nothing about CPF LIFE before. The high degree of consistency between the actual and hypothetical choices

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[5]See questions 53 and 54 in Appendix A.

suggests that most people were informed when they made their CPF LIFE choices. More-over, the higher enrollment rate in the hypothetical decision suggests that being able to see the tradeoff when people made the decision could encourage them to trade periodical payout for bequests. Hence, the enrollment in the Basic Plan is an informed instead of a random choice. It should be noted that choosing a different plan in the hypothetical choice from actual choice does not necessarily imply inconsistency in decision making. This is because the choice might depend on their CPF account balances, and the assumed balance could differ considerably from what they actually had. The balance given in the question is $100,000 while the mean balance in our sample is only S$55,801.

Given the fact that a considerable proportion of our respondents are willing to sacrifice their own consumption for bequests, we further collect information on factors that are potentially related with their incentives to leave bequests, such as having children, health status, wealth, and their children's characteristics. 15% of our sample do not have any children, mostly because they have never married. 12% of our respondents believe their health is very good, and only 12.6% of the respondents believe that they will live longer than the life expectancy of 55-year old Singaporean (at 81.9 years for males and 85.8 years for females), which suggests many people underestimate their longevity. The mean CPF balance is S$55,801. About 29% of our respondents completed at least nine years of schooling while the mean years of schooling their adult children is 13.4 (at least 18 years old). Although, on average, children are much better educated than their parents, about 12% of the parents still worried about their children's financial security.

To have a general idea on what types of people are more likely to choose the Basic Plan, we report the proportion of people who enrolled in the Basic plan by several personal characteristics in Table 2. The probability of enrolling in the Basic plan is 21% for people who answered at least one question correctly, and 11% for others, and the difference is statistically significant. The evidence suggests that the action of enrolling in the CPF LIFE Basic plan is an informed decision. People with children are more likely to enrol in the Basic Plan, which provides direct support for a commonly used assumption in the literature: people with children have a stronger incentive to leave bequests than childless

people (e.g. Hurd, 1987, 1989; Bernheim et al., 1985; Perozek, 1998). Healthier people are less likely to enrol in the Basic Plan as they are expected to enjoy a longer period of receiving a higher payout from the Standard plan and higher probability of leaving no bequests even if they choose the Basic Plan. Wealth, measured either by CPF account balance or by the size of residence, has a positive impact on the probability of enrolling in the Basic Plan, which is consistent with the finding of Lockwood (2018). Better educated people were also more likely to enrol in the Basic plan. Interestingly, people whose non-housing assets were higher than their CPF asset were almost equally likely to enrol in the Basic Plan to others, and females and Chinese were also equally likely to enrol in the Basic Plan comparing with males and non-Chinese.

4.2 Mechanisms for bequest motives

Table 3 examines the impact of various factors on people's CPF LIFE plan choice jointly. In column (1), we only control for basic personal characteristics and knowledge about CPF LIFE. Similar to the results reported in Table 2, knowledge of CPF LIFE increase people's probability of enrolling in the Basic plan, suggesting enrolling in the Basic Plan is an informed action, so is the choice of leaving more bequests. We also find that people with children and less healthy individuals are more likely to enrol the Basic Plan than others even after controlling for other basic personal characteristics. The former justifies the assumption that people with children have a stronger incentive to leave bequests than others. The latter shows that people indeed consider the tradeoff between the amount of bequests and the potential lifetime payouts, which further suggests that people indeed leave bequests intentionally. Education also increases people's probability of enrolling in the Basic plan. This could be because people need to actively apply for the Basic Plan while the Standard Plan is the default choice, and the application process might be less costly for educated people. It could also be because educated people are richer or have a difference preference.

In columns (2) to (4), we add controls for three wealth measures separately. Except for CPF account balance, none of these variables has a statistically significant effect on

people's CPF LIFE choice, albeit the coefficients on the other two wealth measures are both positive, suggesting that wealthier people have a higher probability to enrol in the Basic plan, hence a stronger incentive to leave bequests. The coefficient on the CPF account balance suggests that a one percent increase in the CPF account balance raises the probability of enrolling in the Basic Plan by 0.029 percentage points, or about 15% of the mean enrollment rate, which is considerable. This is likely because, for people with little money in their CPF account, a small difference in their CPF LIFE payouts could have a larger impact on their utility.

The difference in the propensity to enrol in the Basic Plan between people who have a considerable amount of non-CPF asset and those who mostly rely on the CPF to leave bequests can reveal whether having other means of leaving bequests beyond CPF affects their choices. For the former, they could use other assets as a mean to leave bequests, hence might reduce their incentive to enrol in the Basic Plan (the substitution effect). On the other hand, these people are also likely to be wealthier than others, hence are more likely to enrol in the Basic Plan (the wealth effect). The results reported in column (4) suggest these people are equally likely to enrol in the Basic Plan as others. This suggests that the substitution effects and wealth effects canceled out. Column (5) shows that people are less likely to enrol in the Basic Plan if their children have more years of schooling and columns (6) shows that people are more likely to enrol in the Basic Plan if they think that their children are financially insecure. The evidence supports the altruistic motive hypothesis. Result in column (7) shows that the coefficient on the number of visits of children is positive, but is insignificant both economically and statistically, which is inconsistent with the prediction of the strategic motive as documented by Bernheim et al. (1985).

To examine whether people treat their children equally when they decide on how to distribute bequests, we rely on how people distribute the 10 lottery tickets given to them during the survey. The reason for doing so is mostly because people do not have a will or are not willing to share the information on how they will distribute their bequests. Related to the lottery distribution, we ask two strategic questions. In the first question,

we ask them to allocate the potential prizes between themselves and their children.[6] In the second question, we ask them to allocate the potentials prizes among their children. Table 4 report the estimation results where we use the distribution of lottery tickets among their children as the dependent variable. None of the coefficients reported are statistically significant even at the 10%. The magnitudes are very small relative to the sample mean of 37. These results further challenge the strategical motive.

Table 5 repeats all the regressions in Table 3 but use the hypothetical choice as the dependent variable. Because we clearly specified the CPF amount balance, the annualized payout, and bequest amount under two plans, all of our respondents know the trade off between the Basic and Standard plan. As a result, we do not control for people's knowledge of CPF LIFE in all the regressions. Similar to Table 3 childless people are less likely to leave bequests. The magnitude of the estimated impact is not sensitive to the specification and similar to what have been reported in Table 3. Interestingly, the coefficients on health status and education are small and insignificant, the CPF account does not affect the choice of CPF LIFE Plan either. Nevertheless, child schooling still has a significant negative impact, suggesting the existence of the altruistic motive, but the impact of child financial status becomes marginally insignificant. The difference between the hypothetical and real choice could either because all respondents are provided the information on the difference between the two CPF LIFE plans while only some people know the difference when they made their enrollment choices. Another potential reason is they did not think carefully when answering the hypothetical questions.

Having documented that a considerable proportion of our sample population is willing to trade a constant stream of payouts for bequests at the current setting, we further analyze how much additional annual payouts are needed to persuade people to switch their plans. In the survey, for people who choose the Standard Plan in the hypothetical question, we ask them to choose between the basic and standard plan again if we raise the

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[6]The number of lottery tickets given to their children is positively correlated with both the probability of actually enrolled in the CPF LIFE Basic Plan and hypothetically chose the Basic Plan, suggesting that people who have a stronger incentive to leave bequests are also more likely to allocate more lottery tickets to their Children. Unfortunately, due to religious reasons, a disproportion of Malays refused the lottery tickets. As a result, our results are mostly based on non-Malays. There are also a considerable proportion of people from other races refused our lottery offer.

annual payout from \$8,760 to \$9,000, \$9,240, \$9,480, \$9,600, and then to \$9,720, but fix the amount of bequest. Clearly, once the payout increases to \$9,720, which is the annual payout of the standard plan but with a much lower bequest, an individual should always choose the basic plan as long as the marginal utility of leaving bequests is positive. For people who choose the Basic Plan in the hypothetical question, we ask them to choose between the basic and standard plan again if we raise the annual payout from \$9,720 to \$10,200, \$10,800, \$11,400, \$12,000, and then to \$13,200, but fix the amount of bequest. The difference between the annual payout where a person switch her choices and the initial annual payout from the hypothetical Basic Plan reveals the respondent's value of the difference in the bequests between these to two plans, which is \$32,000 if a person dies at age 65 and \$98,000 if a person dies at 75, etc.

Table 6 reports the estimation results for people initially chose the Standard Plan. The results show even among people who chose the Standard Plan, those without children, or with better educated children still put a lower value on bequests, while better educated individuals and individuals with a larger CPF account balance has a higher value on bequests, which are similar to the results reported in Table 3.

In sum, we find strong evidence to support the existence of intentional bequest motives and having children is a strong predictor for having intentional bequest motives. Regarding the various mechanisms of the bequest motive, we find supporting evidence for altruism and joy of giving but failed to find support for reciprocity or the strategy motive.

5 Structural Estimation

5.1 The structural model

We assume that a agent's utility from consumption c at age t is

$$u(c_t) = \frac{c_t^{1-\gamma}}{1-\gamma},$$

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and the agent's utility from leave bequests b is

$$v(b) = \phi_1 \left(1 + \frac{b}{\phi_2}\right)^{1-\sigma},$$

where ϕ_1 is the bequest motive intensity and ϕ_2 and σ represent the extent to which bequests are a luxury good(De Nardi, 2004).

At age 55 a agent has to decide on which CPF LIFE plans to enroll in,

$$V_{55}(i, edu, RA_{55}, a_{55}) = \max\left\{V_{55}^s(i, edu, RA_{55}, a_{55}), V_{55}^b(i, edu, RA_{55}, a_{55})\right\},$$

where $i = m$ or f represents the agent's gender. $V_t^s(i, edu, RA_{55}, a_t)$ is the value function of the agent who chooses the LIFE Standard Plan, and $V_t^b(i, edu, RA_{55}, a_t)$ is the value function of the agent who chooses the LIFE Basic Plan. RA_{55} denotes the balance of the CPF retirement account at age 55. The asset at age t is a_t.

When an agent is between age 55 and 64, he/she will work and receive annual income, but will not receive payoffs from CPF LIFE plans. Under the LIFE Standard Plan, the agent's problem is

$$V_t^s(i, edu, RA_{55}, a_t) = \max\left\{u(c_t) + \beta E_t\left[(1 - p_t(i))V_{t+1}^s(i, edu, RA_{55}, a_{t+1}) + p_t(i)v(b_{t+1})\right]\right\}$$

$$s.t. \; a_{t+1} = R(a_t - c_t) + y_{t+1}(i, edu),$$

$$c_t \leq a_t,$$

$$b_{t+1} = R(a_t - c_t) + g_{t+1}^s(i, RA_{55}),$$

where $p_t(i)$ is the agent's death probability at age t. The bequest at age $t+1$ is b_{t+1}. The bequest payment from the CPF is $g_{t+1}^s(i, RA_{55})$ if the agent is under the LIFE Standard Plan. The interest rate is r and then $R = 1 + r$ is the gross rate of return on savings. $y_{t+1}(i, edu)$ is the agent's labor income.

Under the LIFE Basic Plan, the agent's problem is

$$V_t^b(i, edu, RA_{55}, a_t) = \max \left\{ u(c_t) + \beta E_t \left[(1 - p_t(i))V_{t+1}^b(i, edu, RA_{55}, a_{t+1}) + p_t(i)v(b_{t+1}) \right] \right\}$$

$$s.t. \ a_{t+1} = R(a_t - c_t) + y_{t+1}(i, edu),$$

$$c_t \leq a_t,$$

$$b_{t+1} = R(a_t - c_t) + g_{t+1}^b(i, RA_{55}),$$

where $g_{t+1}^b(i, RA_{55})$ is the bequest payment from the CPF if the agent is under the LIFE Basic Plan.

After agent 65 agents receive pension payments from the CPF and the pension payments depend on the CPF LIFE plan that the agent chose at age 55.

For an agent older than 65, he/she has health status h_t. The health status h_t takes one of the four states $\{1, 2, 3, 4\}$. The transition probability matrix is P. The health expenditure for the health status h_t is $d(h_t)$. The health shock causes the agent's precautionary savings.

The government has a subsidy program which guarantees that the elderly agent has a minimum consumption level c_m. Thus the government subsidy is

$$ys = \max \left\{ 0, c_m + d(h_t) - a_t \right\}.$$

Under the LIFE Standard Plan, the agent's problem is

$$V_t^s(i, edu, RA_{55}, a_t, h_t) = \max \left\{ u(c_t) + \beta E_t \left[(1 - p_t(i))V_{t+1}^s(i, edu, RA_{55}, a_{t+1}, h_{t+1}) + p_t(i)v(b_{t+1}) \right] \right\}$$

$$s.t. \ a_{t+1} = R(a_t + ys - c_t - d(h_t)) + y_{t+1}(i, edu) + f_{t+1}^s(i, RA_{55}),$$

$$c_t + d(h_t) \leq a_t + ys,$$

$$b_{t+1} = R(a_t + ys - c_t - d(h_t)) + g_{t+1}^s(i, RA_{55}),$$

where $f_{t+1}^s(i, RA_{55})$ is the monthly payout from the CPF if the agent is under the LIFE

Standard Plan.

Under the LIFE Basic Plan, his/her objective function is

$$V_t^b(i, edu, RA_{55}, a_t, h_t) = \max \left\{ u(c_t) + \beta E_t \left[(1 - p_t(i))V_{t+1}^b(i, edu, RA_{55}, a_{t+1}, h_{t+1}) + p_t(i)v(b_{t+1}) \right] \right\}$$

$$s.t.\ a_{t+1} = R(a_t + ys - c_t - d(h_t)) + y_{t+1}(i, edu) + f_{t+1}^b(i, RA_{55}),$$

$$c_t + d(h_t) \leq a_t + ys,$$

$$b_{t+1} = R(a_t + ys - c_t - d(h_t)) + g_{t+1}^b(i, RA_{55}),$$

where $f_{t+1}^b(i, RA_{55})$ is the monthly payout from the CPF if the agent is under the LIFE Basic Plan.

An agent's problem at age 100 is

$$V_{100}^b(i, edu, RA_{55}, a_{100}, h_{100}) = V_{100}^s(i, edu, RA_{55}, a_{100}, h_{100}) = \max \left\{ u(c_{100}) + \beta v(b_{101}) \right\}$$

$$s.t.\ b_{101} = R(a_{100} + ys - c_{100} - d(h_{100})),$$

$$c_{100} + d(h_{100}) \leq a_{100} + ys.$$

5.2 Estimation results of the structural model

The key parameters of interest are ϕ_1 and ϕ_2 in the bequest utility function, which will be estimated using the General Method of Moment(GMM). We follow the literature to make assumptions about β, γ, σ, r, and c_m.

Parameters	Values
Time discount factor β	0.95
Risk aversion $\gamma = \sigma$	2
Interest rate r	0.02
Consumption floor c_m ($1,000$)	2

To estimate the parameters ϕ_1 and ϕ_2, we combine both data from the actual CPF LIFE choice and the contingent valuation of hypothetical CPF LIFE choices (Ameriks et al. (2011)). We separate the sample by male and female due to different mortality risk. We have 12 moments. There are 2 moments from actual CPF LIFE choices: the fraction of female members choosing the Basic plan, that of male members choosing the Basic plan. Since there are 5 hypothetical CPF LIFE chioce questions, we have 10 moments from the contingent valuation for both male and female.

Our sample consists of 279 females and 285 who enrolled in one of the CPF LIFE plans. We use additional datasets to calibrate the income process, medical risk, and mortality risk. The earnings used is the gender specific mean based on our survey. The payouts of CPF LIFE are annualized based on information downloaded from CPF web calculator, using 1958 birth cohorts with assumed return of 4.25[7]. Medical expenditure based on hospital expenditure. Since less than 50% of the population actually went to a hospital in a particular year. The expenditure at the 25th and 50th percentile are interpolated based on the 25th percentile of the hospital expenditure. Mortality rates are extracted from Singapore life table 2016[8].

To solve the agent's problem, we use the value function iteration method to find the value function at age 55 if the agent would choose the Basic plan of CPF LIFE and the value function at age 55 if the agent would choose the Standard plan of CPF LIFE. Then the agent's problem is to compares these two value functions at age 55 to make her choice. We use the agent's CPF account balance as a proxy for wealth at age 55. We use GMM to estimate values of ϕ_1 and ϕ_2. The estimation results are

Key parameters	ϕ_1	ϕ_2 ($1,000s)
Estimation results	0.25	210
	(0.082)	(238)

Standard errors are in parentheses.

Our structural estimation results show that people have bequest motives. Because we use the participation fractions of the Basic plan as the identification targets of the

[7]https://www.cpf.gov.sg/eSvc/Web/Schemes/LifeEstimator/LifeEstimator
[8]https://www.singstat.gov.sg/publications/population/complete-life-table

parameters ϕ_1 and ϕ_2 in the bequest utility function, and the Standard plan is the default option, we should interpret these estimates as the lower bound of the true values. Our estimation results are in line with those in Kopczuk and Lupton (2007), Ameriks et al. (2011), and Lockwood (2018).

Figure 2 shows how well our estimation fit the actual data. The horizontal axis represents the probability of choosing the Basic plan in the actual data. The vertical axis is the predicted probability of choosing the Basic plan. Each dot is one of the 12 moments from the estimation: "Actual" is from the actual CPF LIFE choices. "H1" to "H5" are moments from hypothetical CPF LIFE choices. We can see that 7 out of 12 predicted moments are close to 45 degree line and the other 5 are not far away. It suggests that our estimation fit the actual data reasonably well.

6 Conclusion

Bequests are a major contributing factor for intergenerational transfers and constitutes a large proportion of net wealth. For instance, Kotlikoff and Summers (1981) find that about 77% of aggregate U.S. capital formation is due to intergenerational transfers. In this paper, we exploit the 2013 introduction of the Central Provident Fund Lifelong Income for the Elderly (CPF LIFE) plan by the Singapore government to identify the intentional bequest motive. The CPF LIFE consists of two plans, the Standard Plan (SP) and the Basic Plan (BP). The SP offers a higher monthly payout but a lower bequest than the BP. We conduct about 2,000 door-to-door households surveys from a representative sample who are eligible for the CPF LIFE scheme in Singapore. Our analysis shows that about one-third of people choose the BP, suggesting that people indeed leave bequest intentionally. We find that households with children and more educated households are more likely to intentionally leave bequests. Less healthy people are more likely to intentionally leave bequests, which is are consistent with adverse selection in the annuity market.

Having identified the existence of intentional bequests, we further explore the potential reasons for people to leave bequests. In the literature, bequest motive may come from three sources: altruism, reciprocity, and joy of giving. To investigate the mechanisms, we

collect information on children's educational attainment and the respondents' view of their children's financial security, and how frequently their children visit or call them. We find that people are more likely to leave bequests if their children are poorly educated or they worry about their children's financial security. This supports the altruism motive. The frequency of children's visit has no impact on the probability of leaving bequests, which is inconsistent with reciprocity. We also ask each individual to allocate real high stake lotteries to their children and study the correlation between the allocation and children's behavior. We find that most people allocate them equally across their children, implying the motive of the joy of giving.

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Figure 1: Return of the CPF LIFE plans

Panel A. Return: male
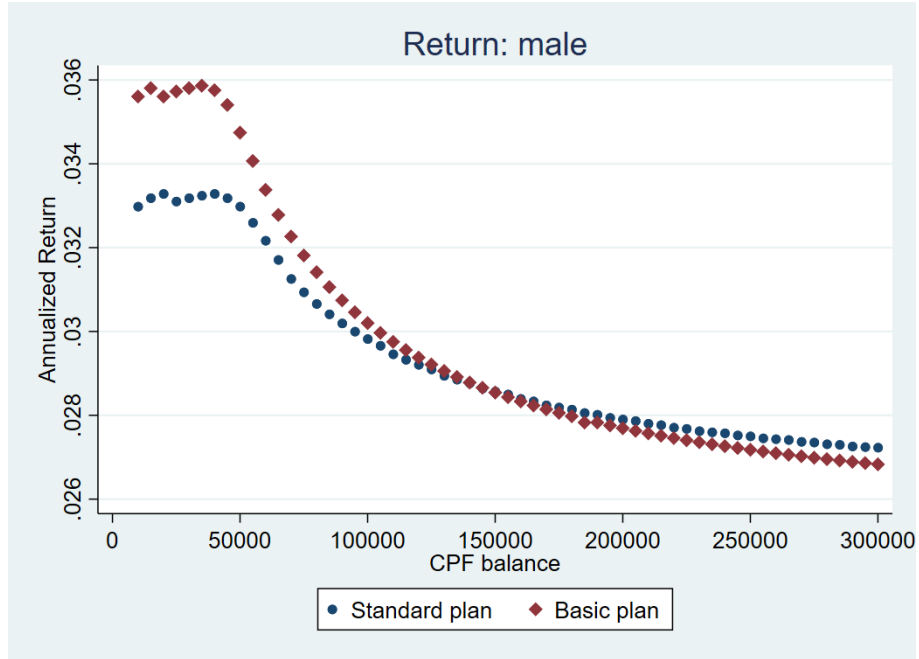
Panel B. Return: female
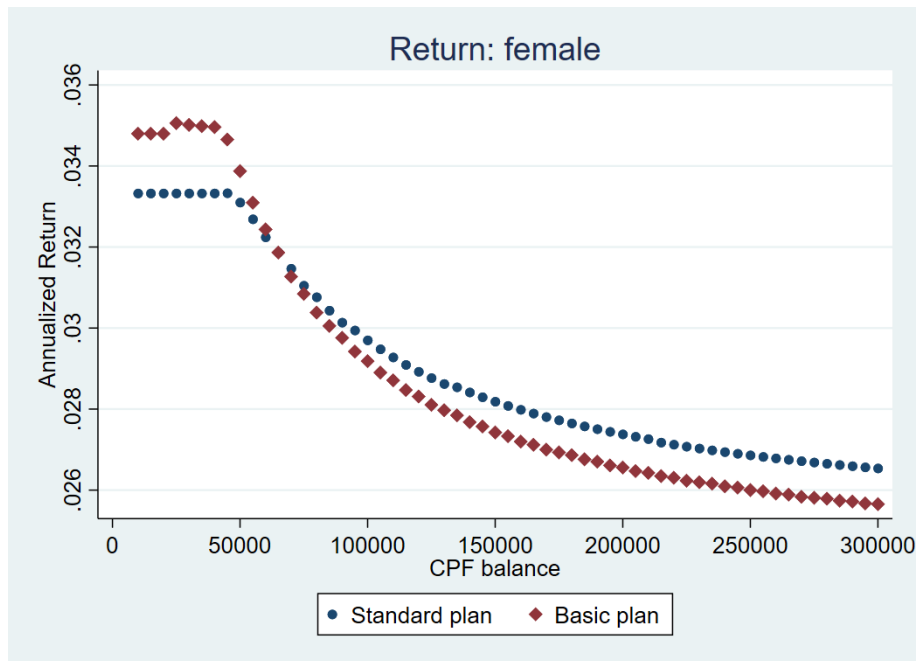
This figure shows the internal rate of return for each CPF LIFE plan by gender and CFP balance at age 55. Gender-specific mortality rate is used to calculate the internal rate of return. Panel A shows the internal rate of return for males in different CPF LIFE plans. Panel B shows the internal rate of return for females in different CPF LIFE plans. The horizontal axis represents the CPF balance at age 55. The vertical axis is the internal rate of return.
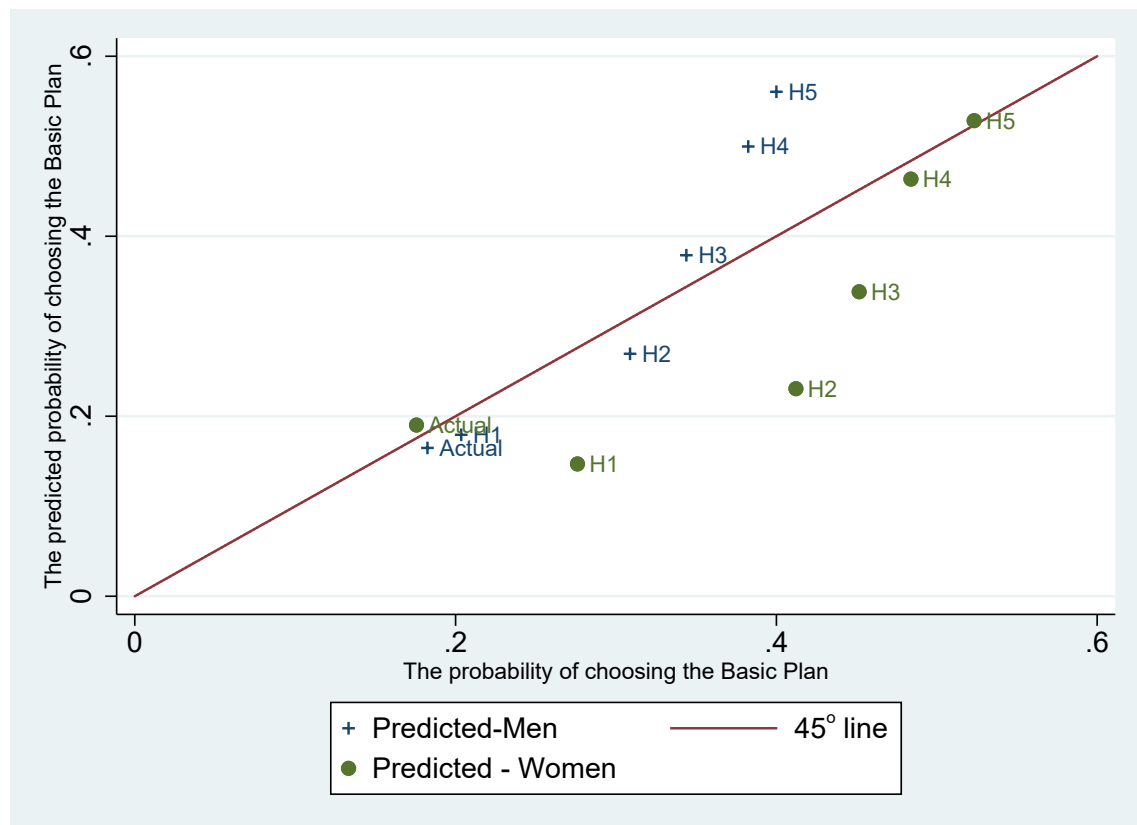
Figure 2: Predicted and actual moments

The horizontal axis represents the probability of choosing the Basic plan in the actual data. The vertical axis is the predicted probability of choosing the Basic plan. Each dot is one of the 12 moments from the estimation: "Actual" is from the actual CPF LIFE choices. "H1" to "H5" are moments from hypothetical CPF LIFE choices.

Table 1: Summary Statistics

| VARIABLES	(1) N	(2) mean	(3) sd	(4) max	(5) min
Choose the CPF LIFE Basic Plan	746	0.184	0.387	1	0
Would choose CPF LIFE Basic Plan	1,890	0.271	0.445	1	0
Knowledgable about CPF LIFE	2,005	0.777	0.937	2	0
CPF account balance (S$)	1,448	55,801	52,867	200,000	0
Have other bequest in addition to CPF	1,906	0.352	0.478	1	0
Non-housing asset > CPF	1,897	0.346	0.476	1	0
Living in a 5-room flat	1,906	0.313	0.464	1	0
Age	2,010	58.86	3.149	75.73	50.55
Very good health	2,011	0.127	0.333	1	0
Do not have any children	2,011	0.159	0.366	1	0
Currently married	2,011	0.802	0.399	1	0
Chinese	1,956	0.812	0.391	1	0
Female	2,011	0.564	0.496	1	0
Years of schooling > 9	2,011	0.286	0.452	1	0
Preference toward inequality 1	2,011	0.398	0.490	1	0
Preference toward inequality 2	2,011	0.493	0.500	1	0
Risk aversion	2,011	0.895	1.695	6	0
Patient	2,011	2.400	2.625	6	0
Percents of lottery tickets to others	1,241	38.99	30.54	100	0
Ave. schooling of all adult children	1,478	13.42	1.975	18	0
Ave. financial security	1,535	3.436	0.798	5	1
Financially insecure of all children	1,535	0.123	0.329	1	0
Mean number of visits	516	3.075	1.321	5	0
Born between 1/1/1958 and 31/7/1960	2,011	0.405	0.491	1	0
Qualify for CPF LIFE	2,011	0.736	0.441	1	0
Monthly earnings	780	3,034	2,162	10,000	130
Home owner	1,813	0.926	0.263	1	0
Own another house	1,953	0.0568	0.232	1	0
Values of the difference in bequests between the two Plans (in term of annual payout)[d]	1,839	1,261	2,042	5,440	0

Notes: Enrollment to CPF LIFE is compulsory for CPF members born between 1/1/1959 and 31/7/1960 if the member's CPF retirement account balance is S$40,000 or more at age 55, or S$60,000 at age 65. CPF member born before 1/8/1960 are eligible to join the CPF LIFE scheme. Preference toward equality 1 and 2 measures the preference toward equal distribution when the subject received more and less money than others, respectively.

[a] the sample is restricted to people who have already enrolled in one of the two CPF LIFE plans. [b] measures the preference if the respondents are in an advantaged position, and [c] measures the preference if the respondents are in a disadvantaged position. [d] For those who choose the Standard plan initially, the value is the additional annual payout when they switch to the Basic plan. For those who choose the Basic Plan initially, the value is negative one times the additional annual payout when they switch to the Standard plan.

Table 2: The probability of enrolling in the Basic plan across different groups

Grouping variables	No	Yes	(2)-(1)
	(1)	(2)	(3)
Have some knowledge about CPF LIFE	0.112	0.209	0.097
	(0.316)	(0.407)	(0.033)
Do not have any children	0.197	0.124	-0.073
	(0.398)	(0.331)	(0.037)
Very good health	0.201	0.088	-0.113
	(0.401)	(0.284)	(0.039)
Top 50% in CPF account balance	0.142	0.220	0.078
	(0.349)	(0.415)	(0.032)
Living in a 5-room flat	0.153	0.238	0.085
	(0.360)	(0.427)	(0.030)
Years of schooling > 9	0.141	0.244	0.103
	(0.349)	(0.430)	(0.029)
Non-housing asset > CPF	0.186	0.182	-0.004
	(0.390)	(0.387)	(0.030)
Female	0.190	0.177	-0.013
	(0.393)	(0.382)	(0.028)
Chinese	0.144	0.193	0.049
	(0.352)	(0.395)	(0.037)

Notes: The sample consists of respondents who have already enrolled or was in the process of enrolling in a CPF LIFE plan. The numbers reported in columns (1) and (2) are the probability of enrolling in the Basic Plan of a given group while Numbers in parenthesis are standard deviations in columns (1) and (2). Huber-White robust standard errors are reported in parenthesis in column (3). (* $p<0.1$; ** $p<0.05$; *** $p<0.01$).

Table 3: The probability of enrolling in the CPF LIFE Basic plan

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Knowledgable about CPF LIFE	0.037**	0.040***	0.050***	0.039**	0.056***	0.041**	0.062**
	(0.015)	(0.015)	(0.017)	(0.015)	(0.017)	(0.018)	(0.030)
Do not have any children	-0.082**	-0.077**	-0.083**	-0.074**			
	(0.033)	(0.034)	(0.037)	(0.034)			
Very good health	-0.127***	-0.125***	-0.119***	-0.129***	-0.107***	-0.127***	-0.099
	(0.032)	(0.032)	(0.035)	(0.034)	(0.039)	(0.037)	(0.070)
Years of schooling $¿$ 9	0.095***	0.086***	0.083**	0.090***	0.105***	0.107***	0.086
	(0.030)	(0.032)	(0.035)	(0.030)	(0.035)	(0.035)	(0.070)
Chinese	0.048	0.037	0.003	0.049	0.061	0.060	-0.038
	(0.035)	(0.036)	(0.041)	(0.035)	(0.038)	(0.038)	(0.071)
Female	-0.003	0.006	0.019	-0.004	0.033	0.015	0.082
	(0.028)	(0.028)	(0.033)	(0.028)	(0.033)	(0.033)	(0.058)
Living in a 5-room flat		0.041					
		(0.034)					
Log of CPF balance			0.031**				
			(0.014)				
Non-housing asset $¿$ CPF				0.001			
				(0.031)			
Ave. schooling of all adult children					-0.018**		
					(0.008)		
Financially insecure of all children						0.130**	
						(0.063)	
Mean number of visits							0.001
							(0.022)
Constant	0.091**	0.080**	-0.227	0.090**	0.272**	0.049	0.078
	(0.037)	(0.037)	(0.157)	(0.037)	(0.112)	(0.041)	(0.084)
Observations	743	722	582	729	550	567	177
R-squared	0.044	0.048	0.058	0.042	0.054	0.055	0.051
Mean of dependent variable	.184	.184	.186	.185	.189	.198	.192

Notes: The dependent variable equals 1 if a respondent prefer the hypothetical CPF LIFE Basic plan and 0 otherwise. The sample consists of respondents who have already enrolled or was in the process of enrolling in a CPF LIFE plan. Huber-White robust standard errors are reported in parenthesis. (* p<0.1; ** p<0.05; *** p<0.01).

Table 4: The distribution of lottery tickets among children

VARIABLES	(1)	(2)	(3)	(4)
Child is a male	-0.450	-0.379	-0.374	-0.847
	(0.611)	(0.630)	(0.623)	(0.786)
Birth order	-0.063	-0.101	-0.112	-0.712
	(0.309)	(0.332)	(0.317)	(0.712)
Child schooling		0.059		
		(0.311)		
Financially insecure (child)			-0.995	
			(1.471)	
No. of visits (Per month)				1.263
				(0.913)
Family fixed-effects	YES	YES		YES
Observations	1,426	1,389	1,384	490
R-squared	0.001	0.001	0.002	0.064
Number of families	589	584	576	303
Mean of y	36.692	36.651	36.656	35.135

Notes: The dependent variable is the proportion of lotteries allocated to a child. The sample consists of respondents who accepted the lottery tickets and have at least one child who were at least 18 years old at the time of the survey. No. of visits including both physical visits and phone calls. Standard errors are clustered at the household level. (* $p<0.1$; ** $p<0.05$; *** $p<0.01$).

Table 5: The probability of preferring the hypothetical CPF LIFE Basic plan

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Do not have any children	-0.118***	-0.116***	-0.140***	-0.118***			
	(0.024)	(0.025)	(0.028)	(0.025)			
Very good health	-0.013	-0.005	-0.034	-0.012	-0.004	-0.023	-0.004
	(0.030)	(0.031)	(0.034)	(0.030)	(0.034)	(0.034)	(0.062)
Years of schooling > 9	0.006	-0.000	0.002	0.006	0.041	0.028	0.022
	(0.022)	(0.024)	(0.027)	(0.023)	(0.027)	(0.027)	(0.050)
Chinese	-0.024	-0.032	-0.047	-0.023	-0.029	-0.041	-0.058
	(0.027)	(0.027)	(0.031)	(0.027)	(0.031)	(0.031)	(0.049)
Female	0.019	0.017	0.033	0.024	0.057**	0.036	0.058
	(0.021)	(0.021)	(0.025)	(0.021)	(0.024)	(0.024)	(0.041)
Living in a 5-room flat		0.033					
		(0.024)					
Log of CPF balance			0.018				
			(0.011)				
Non-housing asset > CPF				-0.035			
				(0.021)			
Ave. schooling of all adult children					-0.022***		
					(0.006)		
Financially insecure of all children						0.060	
						(0.037)	
Mean number of visits							-0.018
							(0.016)
Observations	1,889	1,839	1,401	1,838	1,432	1,497	502
R-squared	0.011	0.013	0.019	0.013	0.014	0.005	0.009
Mean of dependent variable	.271	.269	.271	.267	.279	.289	.279

Notes: The dependent variable equals 1 if a respondent prefer the hypothetical CPF LIFE Basic plan and 0 otherwise. The sample consists of all respondents who answered the hypothetical CPF LIFE plan question. Huber–White robust standard errors are reported in parenthesis. (* $p<0.1$; ** $p<0.05$; *** $p<0.01$).

Table 6: The value of the additional bequests in terms of annual payout for people chose the Standard Plan

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Do not have any children	-36.538**	-32.981*	-63.636***	-35.699*			
	(18.575)	(19.149)	(21.512)	(18.867)			
Very good health	0.905	6.704	-8.261	1.208	18.234	22.651	85.064
	(23.001)	(23.584)	(27.254)	(23.667)	(26.263)	(26.325)	(52.366)
Years of schooling > 9	76.235***	74.663***	71.146***	76.294***	67.385***	65.917***	86.247**
	(18.344)	(19.257)	(22.201)	(18.544)	(21.275)	(21.026)	(38.781)
Chinese	-5.454	-6.950	-3.965	-6.715	16.801	-9.339	-18.912
	(20.198)	(20.373)	(23.848)	(20.373)	(22.655)	(22.956)	(36.412)
Female	7.885	8.778	23.878	9.807	8.575	11.895	-20.743
	(15.754)	(15.950)	(19.016)	(15.902)	(18.086)	(17.884)	(29.637)
Living in a 5-room flat		-1.241					
		(17.854)					
Log of CPF balance			22.941***				
			(8.460)				
Non-housing asset > CPF				-4.739			
				(16.429)			
Ave. schooling of all adult children					-17.676***		
					(4.760)		
Financially insecure of all children						37.848	
						(29.747)	
Mean number of visits							-13.286
							(11.932)
Observations	1,356	1,324	1,005	1,328	1,021	1,053	359
R-squared	0.016	0.015	0.031	0.017	0.024	0.013	0.040
Mean of dependent variable	160.31	159.381	170.925	159.985	156.964	161.425	142.897

Notes: The sample consists of all respondents who prefer the hypothetical CPF LIFE Standard plan. The dependent variable is the difference in the annualized payout of the Basic plan at which a person would switch to the Basic plan and that of the Standard Plan (S\$9720). Huber-White robust standard errors are reported in parenthesis. (* $p<0.1$; ** $p<0.05$; *** $p<0.01$).

35

Appendix A: Related Survey Information:

Part A: CPF knowledge questions:

Now, we would like to ask you a few questions about the differences between the Standard Plan and the Basic Plan

27.3 Which plan offers a higher monthly payment? 1) Standard Plan and 2) Basic Plan

27.4 Which plan offers a higher bequest? 1) Standard Plan and 2) Basic Plan

27.5 If you did not choose a CPF LIFE plan, which plan would you be placed on?
1) The LIFE Standard Plan
2) The LIFE Basic Plan

Part B: Lottery allocation questions:

For the next two questions, we will give you 10 dollar TOTO lottery tickets for you to allocate. One of the question will be implemented by flip a coin after you make your choices.

30 We will give you ten one-dollar tickets with identical ticket number for TOTO lottery from Singapore pool. Group 1 prize for 10 dollar tickets will be over 380,000 dollar. Suppose you win 250,000 dollar with these tickets, how would you like to allocate the winnings? What percentage do you want to allocate to your children, and to yourself (including your spouse)? We will allocate the lottery tickets in several envelops according to your choices and mail envelops to your children. Please write your children's name and mailing address on the envelopes.

	Yourself	Child 1	Child 2	Child 3	Child 4	Child 5	Child 6
Lottery allocation (%)							
Name							
Mailing address or contact information							
Number of tickets							

31 We will give you ten one-dollar tickets with identical ticket number for TOTO lottery from Singapore pool. Group 1 prize for 10 dollar tickets will be over 380,000 dollar. Suppose you win 250,000 dollar with these tickets, how would you like to allocate the winnings? You have the choice to divide them between your children. What percentage do you want to allocate to your child 1,2,3? We will allocate the lottery tickets in several envelopes according to your choices and mail the envelopes to your children.

	Child 1	Child 2	Child 3	Child 4	Child 5	Child 6
Lottery allocation (%)						
Name						
Mailing address or contact information						
Number of tickets						

Part C: Social Preference questions

48 Please choose one from the two options in each line. (If subjects choose option 1 in some line, fill "1" in this line and all lines below. If subjects choose option 2 in some line, fill "2" in this line and ask the question in the next line.)

	Option 1		Option 2		Your choice: 1 or 2?
	You	Other	You	Other	
A	15 SGD	30 SGD	20 SGD	20 SGD	
B	19 SGD	30 SGD	20 SGD	20 SGD	
C	20 SGD	30 SGD	20 SGD	20 SGD	
D	21 SGD	30 SGD	20 SGD	20 SGD	
E	25 SGD	30 SGD	20 SGD	20 SGD	
F	29 SGD	30 SGD	20 SGD	20 SGD	

49 Please choose one from the two options in each line. (If subjects choose option 1 in some line, fill "1" in this line and all lines below. If subjects choose option 2 in some line, fill "2" in this line and ask the question in the next line.)

	Option 1		Option 2		Your choice: 1 or 2?
	You	Other	You	Other	
A	15 SGD	10 SGD	20 SGD	20 SGD	
B	19 SGD	10 SGD	20 SGD	20 SGD	
C	20 SGD	10 SGD	20 SGD	20 SGD	
D	21 SGD	10 SGD	20 SGD	20 SGD	
E	25 SGD	10 SGD	20 SGD	20 SGD	
F	29 SGD	10 SGD	20 SGD	20 SGD	

50 Please choose one from the two options in each line (If subjects choose option 1 in some line, fill "1" in this line and all lines below; If subjects choose option 2 in some line, fill "2" in this line and ask the question in the next line.)

	Option 1	Option 2	Your choice: 1 or 2?
A	Gain SGD25	Throw the coin. If head shows up, you will be paid SGD200, or you will be paid nothing.	
B	Gain SGD50	Throw the coin. If head shows up, you will be paid SGD200, or you will be paid nothing.	
C	Gain SGD80	Throw the coin. If head shows up, you will be paid SGD200, or you will be paid nothing.	
D	Gain SGD100	Throw the coin. If head shows up, you will be paid SGD200, or you will be paid nothing.	
E	Gain SGD120	Throw the coin. If head shows up, you will be paid SGD200, or you will be paid nothing.	
F	Gain SGD150	Throw the coin. If head shows up, you will be paid SGD200, or you will be paid nothing.	

51 Please choose one from the two options in each line (If subjects choose option 2 in some line, fill "2" in this line and all lines below; If subjects choose option 1 in some line, fill "1" in this line and ask the question in the next line.)

	Option 1	Option 2	Your choice: 1 or 2?
A	SGD1000 at present	SGD1063 one year later	
B	SGD1000 at present	SGD1188 one year later	
C	SGD1000 at present	SGD1313 one year later	
D	SGD1000 at present	SGD1437 one year later	
E	SGD1000 at present	SGD1563 one year later	
F	SGD1000 at present	SGD1688 one year later	

Part D: Private value of a given CPF LIFE Plan

53 Mr Tan is a Singaporean who will be 55 in Jan 2014. He has $100,000 in his RA and will be placed on CPF LIFE. He can choose between the two existing plans (the LIFE Standard Plan or the LIFE Basic Plan). The table below is based on the CPF LIFE payout calculator. The bequest amount is rounded to the nearest 1000. https://www.cpf.gov.sg/cpf_trans/ssl/financial_model/lifecal/Life_Estimator.asp

Plan	Option 1: LIFE Standard	Option 2: LIFE Basic
Annualized payout from 65	9,720	8,760
Bequest left for your beneficiaries at selected ages		
Bequest at age 65	$108,000	$140,000
Bequest at age 75	$14,000	$102,000
Bequest at age 85	$0	$47,000
Bequest at age 95	$0	$0

Suppose you have $100,000 in your RA, which plan will you choose?
> i.   The LIFE Standard Plan (go to 54)
> ii. The LIFE Basic Plan (go to question 55)

54 If the subject choose Standard plan in question 53.
>   a. (If subjects choose option 2 in some line, fill "2" in this line and all lines below; If subjects choose option 1 in some line, fill "1" in this line and ask the question in the next line.)

Plan	Option 1: LIFE Standard	Option 2: Plan X	Choice 1 or 2
Bequest at age 65	$108,000	$140,000	
Bequest at age 75	$14,000	$102,000	
Bequest at age 85	$0	$47,000	
Bequest at age 95	$0	$0	
Annualized payout from 65	9,720	9,000	
Annualized payout from 65	9,720	9,240	
Annualized payout from 65	9,720	9,480	
Annualized payout from 65	9,720	9,600	
Annualized payout from 65	9,720	9,720	

55 If the subject choose Basic plan in question 53.
    a.   (If subjects choose option 1 in some line, fill "1" in this line and all lines below; If subjects choose option 2 in some line, fill "2" in this line and ask the question in the next line.)

Plan	Option 1: Plan X	Option2: LIFE Basic	Choice 1 or 2
Bequest at age 65	$108,000	$140,000	
Bequest at age 75	$14,000	$102,000	
Bequest at age 85	$0	$47,000	
Bequest at age 95	$0	$0	
Annualized payout from 65	10,200	8,760	
Annualized payout from 65	10,800	8,760	
Annualized payout from 65	11,400	8,760	
Annualized payout from 65	12,000	8,760	
Annualized payout from 65	13,200	8,760	

B Institutional Background

B.1 CPF and CPF LIFE plans

The Central Provident Fund (CPF), created by the British colonial government in 1955, is the predominant pillar of Singapore's pension system. It is a self-funded pension system with no risk pooling before the introduction of the CPF Lifelong Income scheme for the Elderly (CPF LIFE). Both employers and employees need to contribute. The contribution rate is regulated at 5% for both the employer and the employee at the beginning. Both the employer and employee contribution rates have progressively increased along with the growth of Singapore's economy. Starting from January 1 2016, the employer contributes 17% of its employee's wage while the employee contributes 20% of his/her wage to the fund for workers who are at most 55 years old. Total contributions are capped at S$2,220 per month. The contribution rates reduce to 13% for both the employer and the employee once the employee reaches age 56, and to 7.5% for the employer and 9% for the employee once the employee reaches age 61.[9] The contributions are divided into three accounts: 46% to the Ordinary Account (OA), 14% to the Special Account (SA), and 46% Medisave Account (MA). CPF members can either manage their own accounts or leave the management to the CPF board. If they choose the latter, these accounts will yield risk-free interests, guaranteed by the government. The interest rate ranges from 2.5% - 3.5% for the OA to 4 - 5% for MA in 2015.

The SA is designated for retirement needs and CPF members cannot withdraw any money from it before they 55. The MA can only be used to pay for their immediate family member's health expenditures or approved medical insurances. CPF members can use some of their OA to purchase homes. The CPF board creates a Retirement Account (RA) when its members turn 55. Savings from the OA and SA will be transferred to this account and form the Retirement Sum. Before the transfer, members have the option to withdraw some of their CPF savings. The amount of withdrawal depends on account balance and home ownership. Members can withdraw all savings in their OA and SA if the combined balance is S$5,000 or less. If the balance exceeds S$5,000, CPF members

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[9]See appendix C for a detailed description of CPF contribution rate in 2016.

can withdraw the up to S\$5,000 if the balance is less than S\$171,000 (referred to as the Full Retirement Sum) or the balance above S\$171,000 otherwise. If members own homes, they can pledge to refund their CPF account if they sell their homes. For them, they can withdraw the balance above S\$80,500 (referred to as the Basic Retirement Sum).

The initial CPF LIFE scheme consists of four planes: Basic Plan, Balanced Plan (the default), Plus Plan, and Income Plan. These plans differ in monthly payouts and bequest. The Basic Plan offers the lowest monthly payout, but highest bequest, while the Income Plan offers the highest monthly payout, but lowest bequest. The scheme was further simplified to only two plans on January 1, 2013: Basic Plan and Standard Plan (the default). For individuals who opted in before 2013, they can choose either to stay with their original choice or to switch to the new plans or opted out. As at the end of 2014, more than 140,000 CPF members have participated in the scheme and a total of S\$509.5 million had been distributed since September 2009 (Singapore CPF Board, 2014). From January 1, 2016, CPF members will only need to choose their CPF LIFE plans from age 65 to 70 at the point when they wish to receive the CPF LIFE payouts. The differences in monthly payouts and bequests are considerable. For instance, for a male CPF member born in 1958 with a Retirement Sum of S\$180,000 at age 55, his monthly payout is S\$1,246 and can leave a bequest of S\$51,779 at age 75 if he chooses the Standard Plan. His monthly payout will be reduced to S\$1,149 and his bequest will be increased to S\$171,006.

The CPF LIFE scheme have two choices: the Standard Plan (the default) and the Basic Plan
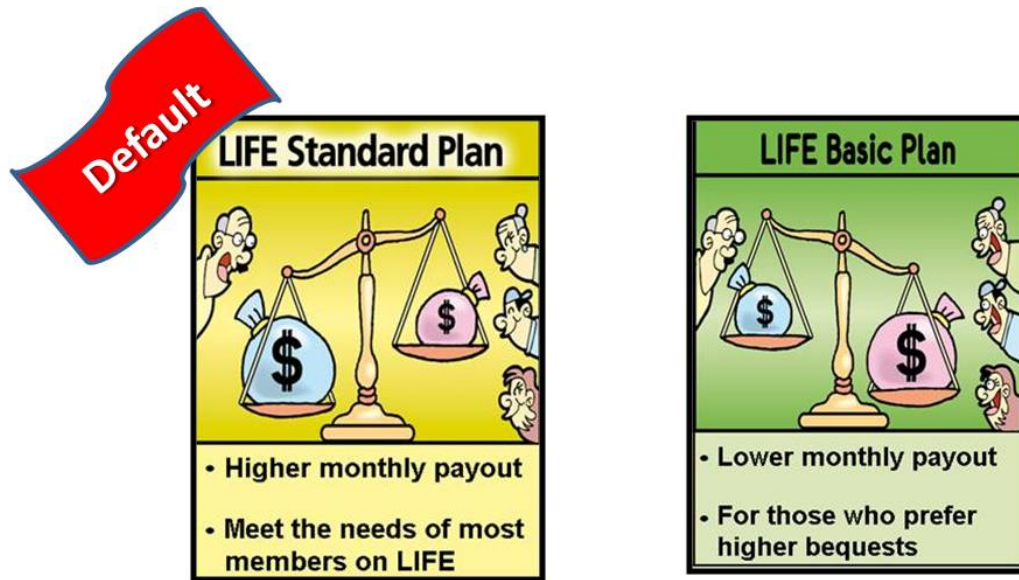
Figure B.1: CPF LIFE plans

Table B.1: Payoff of the CPF LIFE plans

					Bequests after death at age		
Balance	Birth Year	Gender	Plan	Monthly Payouts	65	75	85
180,000	1958	Male	standard	1,246	208,651	51,779	0
180,000	1958	Male	basic	1,149	235,259	171,006	78,604
180,000	1958	Female	standard	1,137	208,760	63,239	0
180,000	1958	Female	basic	1,097	233,104	171,920	83,930

This table shows the monthly payouts and the bequests if the member dies at different ages. Based on the life table in Singapore, the probability of dying is 0.008 between age 65 and 66, 0.023 between age 75 and 76, and 0.072 between age 85 and 86.

B.3

B.2   TOTO lottery

TOTO is the second most popular lottery game in Singapore, which has the highest prize.[10] The size of the prize pool is about 54% of the net amount of total stake collection of that draw, less GST. It is similar to the Lotto offered in New York Stata. It is operated by the "Singapore Pools" and the tickets can be purchased from any of the 300 Singapore Pools outlets across Singapore. Draws are conducted every Monday and Thursday. The operator draws six numbers ("Winning Numbers") and then one more number ("Additional Number") from 1 to 49. The payout and odds ratio for various prizes are as follows. If there are no winners in one of the groups (1 to 4), the respective group's prize will

Table B.2: TOTO lottery

Prize Group	Matches	Prize	Odds of winning
1 (Jackpot)	6 numbers	38% of prize pool	1 in 13,983,816
2	5 numbers + the additional number	8% of prize pool	1 in 2,330,636
3	5 numbers	5.5% of prize pool	1 in 55,491
4	4 numbers + the additional number	3% of prize pool	1 in 22,197
5	4 numbers	$50 per winning combination	1 in 1,083
6	3 numbers + the additional number	$25 per winning combination	1 in 812
7	3 numbers	$10 per winning combination	1 in 61

be snowballed to the next draw. Group 1 prizes can only be snowballed up to 4 draws, thereafter, the prize will be cascaded to Group 2. If there is more than 1 winner in a Group (1 to 4), they share the winnings equally.

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[10]The most popular lottery in Singapore is 4-D with a highest prize of S$3,000.

Appendix C: CPF Contribution schedule

**CPF Contribution Rate (From 1 January 2016) Table for
Singapore Citizens or Singapore Permanent Residents (3rd Year Onwards)**

Employee's Age (Years)	Employee's total wages for the calendar month	Total CPF contributions (Employer's & Employee's share)	Employee's share of CPF contributions
55 & below	≤ $50	Nil	Nil
	> $50 to $500	17% (TW)	Nil
	> $500 to < $750	17% (TW) + 0.6 (TW - $500)	0.6 (TW - $500)
	≥ $750	[37% (OW)]* + 37% (AW) * Max. of $2,220	[20% (OW)]* + 20% (AW) * Max. of $1,200
Above 55 - 60	≤ $50	Nil	Nil
	> $50 to $500	13% (TW)	Nil
	> $500 to < $750	13% (TW) + 0.39 (TW - $500)	0.39 (TW - $500)
	≥ $750	[26% (OW)]* + 26% (AW) * Max. of $1,560	[13% (OW)]* + 13% (AW) * Max. of $780
Above 60 - 65	≤ $50	Nil	Nil
	> $50 to $500	9% (TW)	Nil
	> $500 to < $750	9% (TW) + 0.225 (TW - $500)	0.225 (TW - $500)
	≥ $750	[16.5% (OW)]* + 16.5% (AW) *Max. of $990	[7.5% (OW)]* + 7.5% (AW) * Max. of $450
Above 65	≤ $50	Nil	Nil
	> $50 to $500	7.5% (TW)	Nil
	> $500 to < $750	7.5% (TW) + 0.15 (TW - $500)	0.15 (TW - $500)
	≥ $750	[12.5% (OW)]* + 12.5% (AW) * Max. of $750	[5% (OW)]* + 5% (AW) * Max. of $300

Notes:
OW: Ordinary Wages (capped at OW Ceiling of $6,000)
AW: Additional Wages
TW: Total Wages = OW + AW

Steps to compute CPF contribution:
1) Compute the total CPF contribution (rounded to the nearest dollar). An amount of 50 cents should be regarded as an additional dollar.
2) Compute the employee's share of CPF contribution (cents should be dropped).
3) Employer's share = Total contribution - Employee's share