LOCKBOXES AND GLIDE PATHS

How the Australian Government can save $30 billion per annum on age support, employees can double their retirement income, and retirees can access to defined benefit pensions.[1]

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Summary: *If you are an average retiring Australian you will immediately spend your super, go on the age pension, and, if aged care is needed, get the government to pony up. With more old people, government aged support spending is likely to rocket. Standing idly by is a bloated and inefficient super "helpers" industry, exploiting a captive, ill-informed customer base, corroding retirement savings with fees, and adding no value. If you want to stand on your own retired feet, you won't find the one product you'll likely crave: fairly priced pensions. This submission proposes: 1) employees pay for their future age pension and aged care while employed, saving the government an estimated $30 Bn pa; 2) the winding down of the super industry saving an estimated $1,300 pa per employee and doubling retirement incomes; 3) the super system to be properly choreographed so that retirees can buy fairly priced pensions.*

You may have read a <u>recent article</u> outlining William Sharpe's (the famous finance academic who won a Nobel prize) advice on what to do with your retirement savings once you retire. He suggests "lockboxes" where you divide your savings into parts, with each part locked away till each age in retirement: one lockbox for age 65, another for 66 and so on. You open each lockbox when you reach each age.   At death all your unopened lockboxes go to your partner or kids.

The lockbox strategy has less risk than a "glide path" strategy where you aim to smoothly glide your retirement savings downwards till they are exhausted at, hopefully, extreme old age, when you die.   With a glide path all your retirement savings are at constant risk of stock market turbulence and nose dives.   Sharpe also advises considering annuities to lock in guaranteed, albeit often mediocre, returns

The above appears sensible advice.   But for Australian super contributors it immediately raises questions.   Why wait till age 65 to create lockboxes?   Won't an early start avoid the "glide path" strategy of aiming for a big balance at 65?   And, as a taxpayer, wouldn't it be sensible if the government required at least some super to go straight into lockboxes.   After all if everyone had lockboxes from age 65 onwards then the government would only need to boost, on an annual basis, the income of those retirees with insufficient lockbox.[2] In a single stroke, the government would achieve its central aim for the super system: "<u>,,, to provide income in retirement to substitute or supplement the Age Pension.</u>"

Like most Australians, you probably don't care to think too much about these things. The government and the super industry will pat you on the back if you have a double "glide path" strategy: the first aiming for a big age 65 balance, the second for running down that balance in retirement. These "helpers" advise "life cycle investment" where, as you approach 65, you lay off the investment accelerator, drag down returns with cash and low risk bonds, and land without bumps.   After, they will help you take off again on your retirement glide path with much applause and encouragement from those smelling fat fees.

This may shock you, but all this eager and friendly help is costing you half of your super: for every dollar you receive, helpers also receive, or waste, a dollar (see <u>here</u> and <u>here</u>).   Don't be fooled by all the talk of "non profit," "working for members," and "fees are only 0.9%." Super funds are a huge business, without much to show for, and will take half, even if you crash. And the majority of

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[1] This was written for an Australian audience.   The Australian retirement system is briefly described in <u>Appendix M</u>. Click on underlined text to follow links.

[2] To avoid the repetitive use of "lockbox amount," I use "lockbox" both for the account and the amount in the account.

Australian do crash, right into the "First Pillar" of the government's "retirement policy framework" — the Age Pension.

But what can you do?   If you are like me and many Australians you will build as big a financial pile as possible, exploiting the ins and outs of the present system, retire, cross fingers, and hope and pray the pile will last, allowing for any aged care expenses.   Whatever is left can go to the kids. We might now even follow Sharpe's advice, and become cautious "lockboxers:" making lockboxes "just in case" we live to a ripe old age, with big ones for age 80 and beyond "just in case" we end up in expensive aged care.

All those crashes into the "First Pillar" do, from time to time, raise eyebrows, although not so much amongst helpers.   After all, they already do so much to navigate us through the super fog. On current projections, the government is facing ruinous age pension and aged care expenses. In the absence of radical reforms, you, in retirement, will be battling the young, as to who pays for the ever increasing needs of the ever increasing number old folk requiring government support.

Is there a better alternative?   Before getting into to this, let's recognise some truths.   The present system was strung together by three groups: the government, the unions, and "investment professionals."   The three had a common ambition: access to money — your money.   Although retirement financing is essentially an actuarial problem, not a single actuarial principle was used in its "design."   There is no risk sharing, no risk pool pricing, no demography, no actuarial finance. Just millions of mostly badly managed individual accumulation accounts, untouchable by you and me, constantly clipped and gouged for taxes, investment fees, administration charges and pointless insurances. As I mentioned previously, when you finally get to touch your super, half of it is gone, without you hardly noticing. If pressed on this, super helpers will say it was for your peace of mind and financial "health and safety."

Ask a simple question such as: "How much does it cost to pay $21,500 plus any aged care expenses to a person currently 40 years old if they survive to 75?" Few people have any idea — even those in government or super professionals.   They will tell you it's a difficult problem and it depends on many things, most of them unknown. Yet somehow, you and I, as well as the government, have to plan on the basis of these kind of costs. By the way, $21,500 is one year's worth of the age pension.

Here is my suggestion for super reform.   It hits the government's super target "... to provide income in retirement to substitute or supplement the Age Pension" bullseye.   And cuts out all the stupefying intricacy, enormous waste and rorting of the present system.   Bear with me as the proposal has a few twists and turns.

Require every employee, from age 30 onwards, to put the first $5,000 of annual super into a "low cost - high return - shared" lockbox that pays out 35 years later.   I'll come to the "low cost - high return — shared" stuff shortly.   So at 30 you lock super away for age 65.   At age 31 you lock away for age 66, and so on till age 64 when you put the first $5,000 of super into a lockbox for age 99. $5,000 is about 10% of the median Australian salary. So half of all employees will have all their super go into 35 year lockboxes, while the other half may have super contributions left over for "gliding" to an age 65 balance: to pay off the mortgage, help the kids, and so on.

Don't high returns require expensive "professional" investment advice? Not according to Warren Buffett who says: "A low-cost [ETF] is the most sensible equity investment for the great majority of investors.   By periodically investing in an [ETF], the know—nothing investor can actually out-perform most investment professionals."   That's you and me: know—nothing investors. Those "investment professionals" are those costly super fund execs. Look here If you think your super fund knows better than Mr. Buffett.

Don't "high returns" mean "high risk?" That's the conventional wisdom of super advisers who constantly churn portfolios to generate fees. Thirty five year lockboxes are truly long term. The relentless compounding force of high returns of a diversified ETF, will, over the 35 years, completely overwhelm even the biggest market gyrations. ETF lockboxes are immune to the urge to redecorate your super in line with your "life cycle," latest hot investment, or bogeyman scare.

Thirty five year lockboxes reduce risk by a factor of 6.   So with lockboxes you can lock in high returns, stop worrying, and enjoy life.

Will 35 year $5,000 lockboxes provide a modest retirement income and cover potential expensive aged care costs?   Yes, provided the lockbox is shared.   All 30 year old "lockboxers" agree that those who do not survive to age 65 will forfeit their age 65 lockbox.   The same for age 31 and so on.   Fast forward to age 64. Few 64 year olds will survive to 99 so there will be many forfeited age 99 lockboxes.   Many of the 99 year old survivors will be in expensive aged care. Fortunately, the number of abandoned lockboxes will be more than cover the most expensive old folks home. Details are here and here.

The net effect of the shared lockboxes is that from age 30 to 64 employees put up to $5,000 of their yearly super contribution "to provide income in retirement to substitute or supplement the Age Pension." No ifs or buts. Aged care expenses are covered too.   Retirees will only need age support if 35 years previous they made an annual super contribution of less than $5,000.

Lockboxes eradicate a huge army of "super helpers." The first to go are the generals — super chiefs, investment professionals and financial heavies: all lockbox monies are invested in ETF. The rest of the army is replaced by a single, modest, ATM.[3]   The ATM swallows your super cash and in return spits out 35 year shared lockbox.   As with your bank's ATMs, stuff happens behind the scenes which the average user can ignore, but which I will briefly explain to show how super helpers, even actuaries, become obsolete.

Behind the scenes, when you put in your cash, the ATM simultaneously buys ETF in your name and sells off "cohort" shares (c-shares) stamped with your age. Your ETF is "rain checked" and becomes your lockbox, entitling you, personally, to redeem the rain check in 35 years. C-shares are bought by investors and entitles them to fractional ETF payout in 35 years: the fraction of deaths in your age group.   The cost of your lockbox is the ETF price, less the c-share price. Older lockbox buyers pay less for their lockbox since their c-shares sells for more — the c-share payout will likely be bigger. So boomers receive more lockbox for their $5,000 contribution than millennials.

Thirty five years later the ATM automatically sells your ETF and, if you are still around, sends you the cash. Otherwise the cash, together with all other unredeemed rain checks in your age group, is sent to "lost & found" and shared by c-shareholders at a "lost & found" fest. C-shareholders bear the risk of more survivors than expected — the "lost & found" will be smaller and the fest more subdued.   The ATM can never run out of cash, and so, to the relief of taxpayers and regulators, no standby trucks with extra cash will ever be required.

How much will taxpayers save with a lockbox system? In 2019 the Australian Government spent $77 billion on age pensions and aged care support. If a lockbox system had been in place 35 years ago, no one earning more than the median salary in 1984 would qualify for 2019 assistance: their lockbox would be sufficient. Those with 1984 earnings below the median would potentially be eligible for fractional assistance: the proportion their 1984 income fell short of the 1984 median. Read here how 2019 government expenditure for aged support would have been cut by about $30 billion — that's $2,700 per employee.   Add the expected $1,300 pa per employee savings in super fees and administration costs, gives a total saving of $4,000 pa per employee.   That's 80% of the current median super contribution! Or savings in super industry costs can be used to boost retirement income of the average Australian by about 25%.

Before finishing, I want to stress the benefits of those backstage c-shares. I am a 70 year old male and recently went shopping for a lifetime income stream. Challenger offers $5,130 pa for as long as I live for $100,000 up front. So I'd have to live to 90 to get my money back. I feel pretty healthy and hope to live to a 100, but $100k seems awfully steep.   But how can you or I tell?

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[3] The ATM is "virtual," best implemented and run, dirt cheap, as a blockchain contract.

With c-shares it's easy to check out if a deal like this stacks up. You can <u>work out</u> the market price of 1 year lockbox for 70 year olds from the 36/34 c-share[4] price.   Similarly the 37/33 c-share price gives the market price of 2 year lockbox. And so on for 38/32, …, 64/6.   The total of these prices is the market price of lifetime income for a guy my age.   The total will be far less than the price quoted by Challenger.[5]

Everyone, including Challenger, will profit from the market in c-shares.   Challenger will benefit by not having to charge over the odds: its longevity risk can be laid off.   Lower prices will dramatically increase its business.   It will also be able to expand into other "lifetime" business by offering attractively priced specialised income streams, joint annuities, reverse mortgages, life insurance, old age care insurance and so on.   You and I will benefit from a huge selection of realistically priced "lifetime" products. The change will be as dramatic as in the 1980's, when tariffs and subsidies were scrapped and overpriced stodgy clothes, dodgy consumer products and Trabant quality cars gave way to a vast array of inexpensive, vastly more attractive offerings.

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[4] The 36/34 c-share is the c-share attached to the 36 age cohort after 34 years — when the "36ers" are 36+34=70.

[5] Using current mortality tables my expected remaining lifetime is 14.8 years.   So at 0% interest the "actuarially fair" price of $5,130 pa for life is 14.8 x 5130 = $76,000. At 6% the actuarially fair price is about $46,000. No wonder Challenger has so little business.

APPENDICES

A. Lockbox benefit from $5,000 contribution

Compounding and survivorship benefits are displayed in Table 1.   Rates of return are in the rows.   Lockbox start and end ages are in columns.   Payments increase as you move along each rows because of fewer 35 year survivors.

Table 1 — Payouts on 35 year $5,000 lockboxes

Rate of return	Savings Account	30 → 65 Lockbox	40 → 75 Lockbox	50 → 85 Lockbox	60 → 95 Lockbox
0%	$5,000	$5,600	$6,600	$11,000	$59,000
2%	$10,100	$11,300	$13,200	$22,100	$118,700
4%	$20,300	$22,700	$26,600	$44,500	$239,000
6%	$40,800	$45,700	$53,600	$89,700	$481,200

A $5,000 contribution at age 30 at a rate of return of 4% per annum pays, at age 65, about the current maximum age pension.   A $5,000 lockbox contribution at age 60, compounding at 4%, grows to to more than $239,000.

B. Double your retirement income

Abe is my excellent, but somewhat eccentric, dentist who has become a friend of mine.   For about 15 minutes after each consultation we shoot the breeze. Recently, to avoid dwelling too long on the finer points of gum disease and root canals, I countered with an equally riveting topic: retirement planning.   Abe proudly stated he was with a top notch investment adviser charging only 2% pa.   Aware of Buffett's ETF advice, I turned a skeptical eye.

I happened to have a copy of Table 1 with me and showed it to him pointing out that as you go down each column, amounts about double every time the rate of return increases byTo 2%.   Put another way, I told him, if you're paying 2% pa, in 35 years time, half your retirement balance will be gone.   Even if the return is negative.   The news didn't go down well with him — worse than the news of my forthcoming root canal went down with me.

The bottom line is, avoid "helper" fees.   Also, with lockboxes, it makes a sense to up your expected return by taking on more risk. Cutting out 1% in helper fees and upping your expected return by 1% will double your retirement income.

C. I don't want to share my lockbox when I die

Eric, a neighbour of mine, is, I gather, not a fan of the "sharing economy."   He buys his own carpet shampooer, air compressor, box trailer, holiday home, boat, and, I guess if he could afford it, private beach, and plane.   I'm guessing here, but I don't think Eric would ever share an Uber.   Fair enough, whatever floats your boat.

I'm also guessing Eric would dislike sharing his lockbox, adamant that when he dies his lockbox should pass to his kids. Again, fair enough. But to have his lockbox stamped "private," like that private beach, he will have to pay the full price. Full prices for $5,000 shared lockboxes are in the first row of Table 1.   Eric is 60, so on top of $5,000 he would have to pay $54,000 to privatise his age 95 lockbox — no matter what the rate of return.   And next year a higher amount still.   Those are big bills and will test his resolve to avoid the sharing economy.

If he's told the price of "private" lockbox, Eric might argue that he won't be needing such large age 95 benefits, as he's not planning to be in expensive aged care.   But here's the thing, if things don't quite work out as planned, who should pick up the tab?

D. Government savings of $30 Bn pa

One of my sons used to complain I made things complicated when I tried to help him solve homework problems. He claimed it would be better if I just showed him which buttons to push on his calculator.   He got miffed when I told him I didn't know how to operate his calculator and it would be easier to just use a bit of "logic."   Both of us walked away unhappy.

I feel the same may happen now.   In Canberra, I understand, there is a huge computer model able to simulate the economic fortunes of all Australians over time.   You'd probably like it if I just told you "Expert computer simulation model shows Government will save $30 Bn with lockboxes." Unfortunately I don't have access to this computer model, don't know how to operate it, and in any case, as with my son's homework, prefer to use a bit of logic.

Pick a current retiree and suppose their 35 year ago, 1984, annual salary was y. If he or she was not working in 1984 then $y=0$ and, under a lockbox system, would not have made a lockbox contribution and would for this year, draw the maximum government age pension g say. If $0<y<m$ where m is the 1984 median salary, then assuming the retiree is currently on maximum benefit g, the saving under a lockbox system would be about $g(1-y/m)$ for an expected saving of about $g/2$. If $y>m$ then the retiree would not, under a lockbox system require any government assistance and the expected saving would be about $3g/4$, assuming the latter are, on average, receiving 3/4 of the maximum assistance . Assuming 60% of current retirees were employed in 1984 and evenly split between those earning above and below the 1984 median income, the expected savings per retiree is

60% x { 1/2 (Expected saving if $0<y<m$) + 1/2 (Expected saving if $y>m$) } = 0.3 x (0.5+0.75) x g .

There are about 3.75 million Australians over 65 and the maximum pension g is $21,500 pa. Thus total savings would have been

0.3 x (0.5+0.75) x 21,500 x 3,750,000 = $ 30 Bn

To predict future savings, requires extrapolations how the present system will mature in the absence of any changes. We will probably need that computer in Canberra to work it all out. On present projections, barring any changes a majority of employed Australians, despite a lifetime of super contributions, will end up drawing a full or part age pension and a significant proportion will require financial support for aged care. Much of this age support will not be required with a lockbox system

E. Super funds add no investment value

Make-up can make any investment performance, including mine, look respectable. If the latest year is not so good, I'll pick maybe the last 3 years, or even better, the last 10 years, since the depth of the GFC. If that doesn't work, I'll talk about "risk adjusted" returns, the "deep value" of my portfolio, and my "long term horizon" strategy. And I can smooth over problem spots by bringing in "franking credits" where others don't, or muddy the waters with tax etc, and keep fees and charges under wraps. As the final touche, I would compare myself to this year's flabby and ugly losers and self righteously bang on about the need to get rid of "underperformers."

Do not compare yourself against the "know—nothing" low cost index ETF index investor — you might be embarrassed. The graph below compares the performance of AustralianSuper and Unisuper "high growth" funds against the run-of-the- mill ASX200 accumulation ETF. AustralianSuper advertises itself as "Australia's best performing fund over 10 years." Unisuper is the fund I was conscripted into when joining Macquarie University.
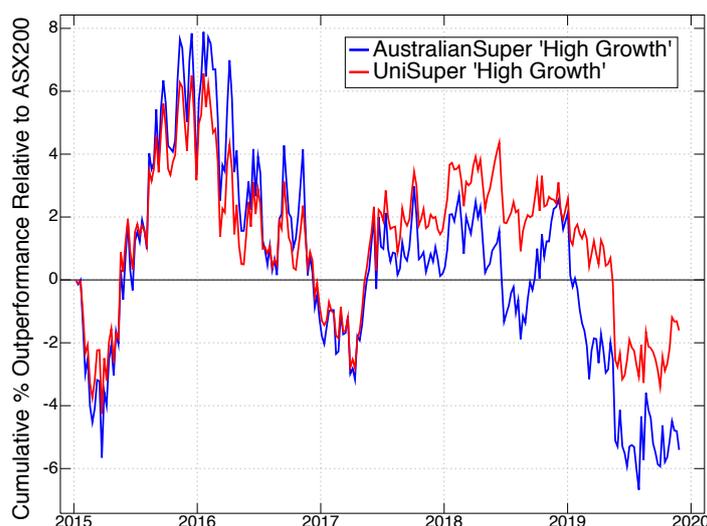
The graphs are based on published daily super returns which include franking credits but exclude expenses of around 0.6%-0.7% pa. The ASX200 accumulation benchmark incorporates unfranked dividends. To permit comparison, 0.65% pa has been subtracted from the super funds' returns while a 1% pa franking credit adjustment has been added to the ASX200 benchmark. The 1% increase is calculated as follows. Franking increases dividends by up to 42.8% but not all companies pay franked dividends, let alone dividends. Assuming an average unfranked dividend yield of about 4.5% pa, franking increases returns by about 1% pa.

Money placed with Australian Super or Unisuper at the end of 2014 in their "high growth" option, would have performed, respectively, -5% and -1% relative to the ASX200 accumulation ETF.

In 2019 Super funds managed about $2,000 Bn in funds. Investment fees average 0.65% pa. Administration fees typically add another 0.1% for total fees of 2,000 x 0.0075 = $15 Bn pa. With about 11 million Australians in employment, the average cost per employee is around 15,000/11 = $1,363 pa. There is little justification for this vast expenditure for what is essentially record keeping with an "investment" arm adding, if anything, paltry value. Under a lockbox system an average of $1,363 pa would be returned to employees.

F. Lockbox purchasers can aim for higher returns

Lockboxes are a "set and forget" investment: locked away in 35 year time capsules, ample time to ride out most volatility. Over 35 years, even the 1987, 2000 and 2009 market upheavals look like storms in teacups. Yes, at the time, it looked as if the roof was falling in. But if you sat tight on a diversified ETF, keeping away from the feeding frenzies and throw up fits, the gyrations were, once you zoomed out, investment hiccups.

The zooming out effect can be made concrete. If you buy a stock with volatility v pa then over 35 years you can expect an average annual return equal to the expected annual return, but with volatility $v/\sqrt{35} \approx \sigma/6$: a six fold reduction. So plucking higher expected returns — and holding on tight — will hardly increase risk.

To illustrate, suppose two investments: 2% pa guaranteed or 4% pa with a volatility of 8%. Over 35 years the 2% pa guaranteed investment doubles in value, while the 4% riskier investment is expected to more than quadruple. There is only about a 1 in 20 chance[6] the riskier asset will underperform the 2% guaranteed investment. Even a risk averse person will accept a more than tripling in expected return for a 1 in 20 chance of underperformance.

Older lockboxers can be happy-go-lucky investors like 30 year olds— all lockboxes have a 35 year horizon. Plus, all investment risks are bundled into 35 discrete boxes. Thus even if, in a certain year of retirement, lockbox is low, subsequent lockboxes may well be more than adequate. We can expect about 33 out of the 35 of the 4% lockboxes to outperform the 2% guaranteed investment, with more than half having more than twice the funds. Even then, in the unlikely event lockbox is deficient, the Government age pension provides a safety net.

G. Lockboxes take care of aged care expenses

My wife's grandfather was a sprightly, healthy 96 year old. One morning he woke up early as usual and made breakfast. At breakfast he said he wasn't feeling 100%. At 10 am he died while reading the newspaper. He never required any aged care. We should all be this lucky.

Many of us will require aged care — more so at old age. Aged care can be, and often is, very expensive: the 85 year old mother of a friend of mine is in a modest care home costing $100,000 pa. Who should pay? Who can pay?

Fortunately lockboxes can pay. Put away $5,000 at age 50 into a 4% shared lockbox. Then at age 85 (see Table 1), you have about twice the age pension. Suppose all age 50 lockboxers agree to draw only the age pension with the excess allocated to those requiring aged care. If 1/3 of all 85 year olds require aged care then, since 2=2/3+4/3, four times the age pension is available for those in need. That's around $100,000 each. So the $5000 super contribution covers both the age pension and, if required, aged care.

The aged care insurance agreement is struck 35 years beforehand. So everyone is likely to agree. Neither the taxpayer, nor c-share holders will be exposed to any aged care blowouts with funding sourced solely from lockboxes.

H. Super contributions over $5,000 pa

I have a 32 year old hard working son, eager to get ahead, about to tie the knot, and probably thinking of starting a family. He's earning well north of $50,000 pa. For every $10,000 north of $50,000 he is forced to kiss $1,000 goodbye to super. Perhaps in 35 odd years he'll derive some half hearted benefit from those thousands of dollars.

Two things are clear though. Under a lockbox system, none of those extra thousands will be required to keep him off government age support: his initial $5,000 contribution takes care of that. Second, like most Australians, he probably has much better uses for those dollars — starting a family and all that. Even if he chooses to save and invest, as a "know—nothing" ETF index investor he can readily match the performance of those pricey "investment professionals" at his super fund whilst protecting his savings from fees and gouging.

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[6] The probability a standard normal is less than $(0.02 - 0.042)/(0.08/5.91) = -1.60$

Maybe the government wants to help him to save for leaner years?   A tried and tested way of doing this is using income deferral accounts — like 401(k)'s in the US, and RRSP's in Canada.   Monies put into these accounts is subtracted from gross income. There is no tax on the way in and during accumulation.   Money can be taken out at any time and treated as taxable income.

I.   Transitioning to a lockbox retirement system

If 2020 is the first year of lockbox operation then the government saves the equivalent of $30 Bn pa from 2055 onwards. In the meantime how does the government avoid an age support black hole?   However 2020 would mark the beginning of a market with pricing of 30/0 (age 30 duration 0) through to 64/0 c-shares.   These prices can be used to work out survival prices for ages 30 through to 99.   These survival prices in turn enable fair market price switches of existing super balances "to provide income in retirement to substitute or supplement the Age Pension."

J.   Lockboxes and defined benefit pensions

I started my first "real" job 45 years ago. Nixon had resigned, Whitlam was still hanging on, and inflation was around 15%.   On my first day, I was ushered into a sparse back office to sign forms related to a pension: I had already passed an army style medical.   I vaguely comprehended what I was supposed to be signing off on— stiff up front premiums, dim benefits in a far distant future, calculated according to some intricate formula, couched with all kinds of provisos, all controlled and fiddled with by experts.   This, I was informed, was a "gold standard" Defined Benefit (DB) pension plan cementing my yet to be revealed retirement dreams. Stupidly, I ticked the box not to join.

Had I pried further, I would have discovered DB pensions are like shared lockboxes: only paid while alive although allowance is often made for reduced benefits to a surviving partner or dependants.

The benefits of DB pensions are defined and guaranteed at the time of purchase.   This sounds clear-cut and forceful, but in reality things are more cagey.   For example defined dollar benefits are often reneged on during wars or economic crises, and debased by inflation. DBs were then couched relative to eg final salary or tied to the cost of living. Even then there was considerable scope for worry. The ultimate shock occurred when some pension funds became insolvent and benefits, no matter how well defined and guaranteed, were unpaid.   DB pensions are now largely defunct, except for public servants, politicians and judges, courtesy of taxpayers.

Shared lockboxes resurrect DB pensions for the masses. The benefit is defined in terms of an ETF. Lockboxes will bolster the market for higher return long term infrastructure bonds: both are very long term investments.

K.   Cohort shares

C-shares for each age cohort trade for 35 years. For example 42/0, 42/1, …, 42/35 tracks c-shares attached to the age 42 cohort from year 0 through to year 35. The 42/0 price, per unit ETF, is what the market initially expects to be the fraction of deaths prior to age 42+35=77. The 42/1 price is what the market expects 1 year later: the price may differ from the 42/0 price because actual deaths in the cohort are unusually low or high.   Similarly for 42/2, 42/3, and so on. The 42/35 price per unit ETF is the payout on each c-share: the fraction of actual deaths in the age 42 cohort.

Buying c-share and paying for it by shorting the ETF, creates a portfolio whose value is only affected by the market expectation of the 35 year fraction cohort deaths.

C-share prices sets the price any lockbox. The c-share price, per unit ETF is $p=q+(1-q)(1-r)$ where q is the fraction of deaths to date and r is the market expectation of the probability of survival. So $r=(1-p)/(1-q)$. In words, divide the percentage discount on the c-share price relative to the ETF by the percentage of the age cohort still alive.   For example if the ETF is trading at 6900 and the 42/12 price is 1500 and 97% of the 42 year old age cohort is still alive, then the price of 23 year lockbox for a 64 year old is (6900-1500)/(6900x0.97)=0.81 per unit ETF.

L.   Lockbox annuities

With lockboxes swallowing the first $5,000 of super and the remainder directed into income deferral accounts, do we need super funds?   As money growers, super funds, like most of us, do no better than a diversified ETF. If super funds think they can add investment value, they should get into the business of mutual funds and compete for savings.

Many super fund members take their money and run as soon as they retire.   If you do stick around you won't find the one product many retirees crave: reasonably priced lifetime pensions. After almost 30 years, super funds are still working on it.   My fund, Unisuper, is a rare exception, advising freshman retirees to consider buying, from them, an indexed lifetime pension to "address the concern of outliving your retirement savings." Reading the fine print, the

lifetime pension may be reneged upon due to legislative, cyber, operational and investment misfortune.   There is no mention of cost. But at least, unlike all those other super funds, I can "address" that niggling worry of spending my final years in poverty.

If you live to 100 it might be due to people like you overall living much longer, or simply luck.   The overall risk can be priced and insured, provided "people like you" is a well defined large group. The luck thing can be dealt with by risk sharing: early deaths counterbalanced by long livers.   The classic way of providing lifetime pensions is to form a group of retirees, collecting cash up front, and slowly releasing funds hoping, in aggregate, there is enough to last everyone. This is both a dismal and inaccurate science especially when bundling together different ages, muddying things up with dollops of investment risk, and grappling with the longevity peculiarities of the group.   I suspect that if super funds ever get round to offering lifetime pensions, they will use this classic recipe, adding in fat fees, charges and provisos, and hide everything under wraps so as to keep the average punter completely befuddled.

But there is a better way.   William Sharpe, the financial guru mentioned before, proposes lockbox annuities.   These uncouple investment and longevity risk — similar to the shared lockbox proposal for the first $5,000 of super. Take a group of freshman retirees and imagine how many survivors there will be in each future year.   Now match this up with a similar profile of lockboxes, each containing rain checked ETF. Shortage in the number of lockboxes is insured with an insurance company.   For example the insurer may decide a 10% margin on the lockbox number is adequate, so it buys 10% extra ETF, passing on the cost as insurance premium. The insurance company covers excess lockbox requirements while the ETF covers off on investment risk. There is no mingling, juggling or financial fog.

Lockbox shortage insurance, will be a specialised business focussed solely on longevity. If insurance companies don't step up to the plate, you can achieve the same by buying an overabundance of lockboxes and selling off shares in any surplus.   This avoids sleepless nights for retirees and regulators worrying about insurance company bankruptcy.   With shares, all capital is put up front, pricing is open market, and there is no default risk.

Super funds can of course "self insure" their lockbox number.   But why should members become unwitting longevity insurers? Especially if this same tedious activity is carried out across many different funds with no economies of scale or risk diversification. Separating longevity and investment risk leaves super funds mostly idle, other than perhaps collect contributions, buy ETF rain checks, and, one way or another, arrange lockbox number insurance.

M. The Australian retirement system

For those unfamiliar with the Australian retirement system, here are the main features.   It consists of three "pillars."   The first pillar is a means tested age pension paying at most $21,500 pa.   There are no contribution qualifications as in the US or Canadian systems. The second pillar are defined contributions (DC) accounts managed by "superannuation funds."   At present every employee must pay about 10% of their salary into "super."   Contributions and returns are taxed at a flat 15%.   There is no tax or limits on withdrawals which can occur anytime after retirement in the early 60's. Contributors can chose to place their super contributions into different portfolios: "balanced," "growth," "high growth," etc.   Super funds do not offer lifetime annuities and are basically investment clubs.   The third pillar is personal savings eg shares, real estate, etc.   If you have lots of "second or third pillar" you won't qualify for the "free" age pension or aged care, although your primary residence is excluded from the asset test.   Not surprisingly a popular retirement strategy of many Australians is to withdraw their tax free super once they retire, spend it, and go on the age pension.

N. Frequently Asked Questions

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1.   Who benefits from lockboxes?

Retirees: Defined benefit pensions.
Australian taxpayers: $30 Bn pa savings available for eg health, education and infrastructure, tax cuts
Australian Economy: $15 Bn pa savings from Super fund dead loss operating costs.
Insurance industry: Develop, price and hedge longevity related products (reverse mortgages, annuities)
Investors: Access to a new investment class.

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2.   Who loses with lockboxes?

Inheritors. Those people who inherit from people previously on the Age Pension or Aged Care support.
Those who spend their super and then go on the Age Pension or Aged Care support
Those who use the super system ins and outs to transfer wealth to kids.
Super Industry & super "helpers:" Accountants, Age Pension and Age Care admin workforce, financial planners.

3. **Why not just have a properly taxpayer funded age support system?**

Lockboxes fund future age support for the currently employed, paid for by the same group. Government funded systems using general revenue are notorious for running up huge shortfalls (as is in many European countries), bureaucratic bloat, young versus old conflict, and endless wrangling about who should pay and get what. Lockboxes avoid most of these problems.

4. **Experts tell us the Australian super system is one of the best in the world. Why change it?**

These experts are usually directly or indirectly employed super industry "helpers." The current system is great for super helpers, not so much for the average Australian: a huge bureaucracy, a labyrinth of rules and regulations, extensive gaming, no added investment value, $15 Bn pa in fees and few reasonably priced retirement income stream products.

5. **I'm very happy with my super fund, they made me 8% last year. I don't want any change.**

Even the best performing super funds consistently underperform the overall market. For this under achievement they charge up to 2% pa in fees even if you lose. You would have made more if you had simply bought the ASX200 ETF. Over your lifetime they are taking or wasting half your potential retirement income.

6. **Will I lose my entitlement to age support?**

Only those with insufficient lockbox will receive the age pension or aged care support.

7. **Why should all employees contribute to a shared lockbox system?**

Lockboxes enable you to share your longevity risk with all other employed Australians in your age group. Pooled longevity risk, the risk of your group on average living longer is, in effect, insured in an open longevity market. The bigger the group, the lower the margin for error and the lower the cost of this insurance

8. **Is it good to buy retirement income while working?**

With lockboxes, <u>income in retirement to substitute or supplement the Age Pension</u> is purchased incrementally over 35 years at constantly evolving market prices. The population is largely immune from adverse selection and the price is smoothed across 35 years worth of interest rate cycles. In contrast, retirement income voluntarily purchased with cash at retirement is heavily influenced by health status, adverse selection, and prevailing yields, which usually makes them risky and very poor value.

9. **How are gaps in employment handled?**

At 65 there can be a one—off rebalancing of the future lockbox income stream. For example suppose there is no employment from ages 33 through to 38 meaning no lockbox for ages 68 through to 73. At age 65, the person may be required to swap lockbox from one retirement age to another, at swap prices dictated by c-share prices. Since these are future swaps with limits, there is minimal scope for gaming. Super balances can also be tax incentivised to be spent, at market prices, on future deficient lockbox.

10. **What about partners?**

Employed partners buy their own lockbox. Those with unemployed partners can be required or tax incentivised to buy lockbox for their partners. In either case each partner has their own retirement income stream.

"Joint" lockboxes, paying out if at least one in a partnership is alive, can be priced off c-share prices. Suppose u and v are per unit ETF lockbox prices determined from the c-share prices as discussed <u>here</u>. Then $1-uv$ is the fair price of a "joint" lockbox. On marriage, partner u can convert his or her "single" lockbox into a "joint" lockbox by paying an extra $1-uv-(1-u)=u(1-v)$. On divorce a "joint" lockbox can be converted into two "singles" on payment of $1-u+1-v-(1-uv)=(1-u)(1-v)$. For example a 31 and 34 year old marry. The 31 year old has one lockbox, maturing at age 65 currently worth $5500. The 34 year old has no lockbox. The couple want to

upgrade the lockbox to "joint" status. The 30/1 and 30/4 bonds are trading so that u=0.1 and v=0.14. So the upgrade cost is 0.1x(1-0.14)x5500=$473.

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11. Why don't we just improve the present system as suggested by experts?

Super "experts" want you and the government to obsess about things like "the family home in the age pension test," "getting rid of underperforming funds," "increasing the super guarantee to 12%" (more money for them), "franking credits and tightening rules around SMSFs," "increasing the preservation age." Most issues are distractions to avoid discussing the real problems: labyrinth complexity; enormous super system operating costs, lack of added value; gaming and rorting by all sides, price and fee gouging; tax and inheritance gaming; the lack of fairly priced retirement income streams; the pig-headed focus on retirement "balances"; the increasing exposure of taxpayers and government to pension and aged care liabilities; and the lack of continuity and certainty. Their solutions to these problems? Extra, more intricate, layers of rules, regulations, bureaucracy and fancy super jobs. Most issues disappear with income deferral accounts and lockboxes.