ACTUARIAL SOCIETY 2015 CONVENTION

Defined-contribution retirement fund investment strategies: an appropriate default?

SM Levitan and RC Merton

INTRODUCTION

- Prior to 1980, most large SA pension funds were DB
- Majority of employees in SA private sector now belong to DC funds
- How much evolution of investment strategies is "bells and whistles"?
- On a clean sheet of paper, what would a default investment strategy look like for a DC fund

INTRODUCTION

- Reached out to Robert C Merton
  - School of Management Distinguished Professor of Finance at the MIT Sloan School of Management
  - University Professor Emeritus of Harvard University
  - Alfred Nobel Memorial Prize in Economic Sciences in 1997

INTRODUCTION

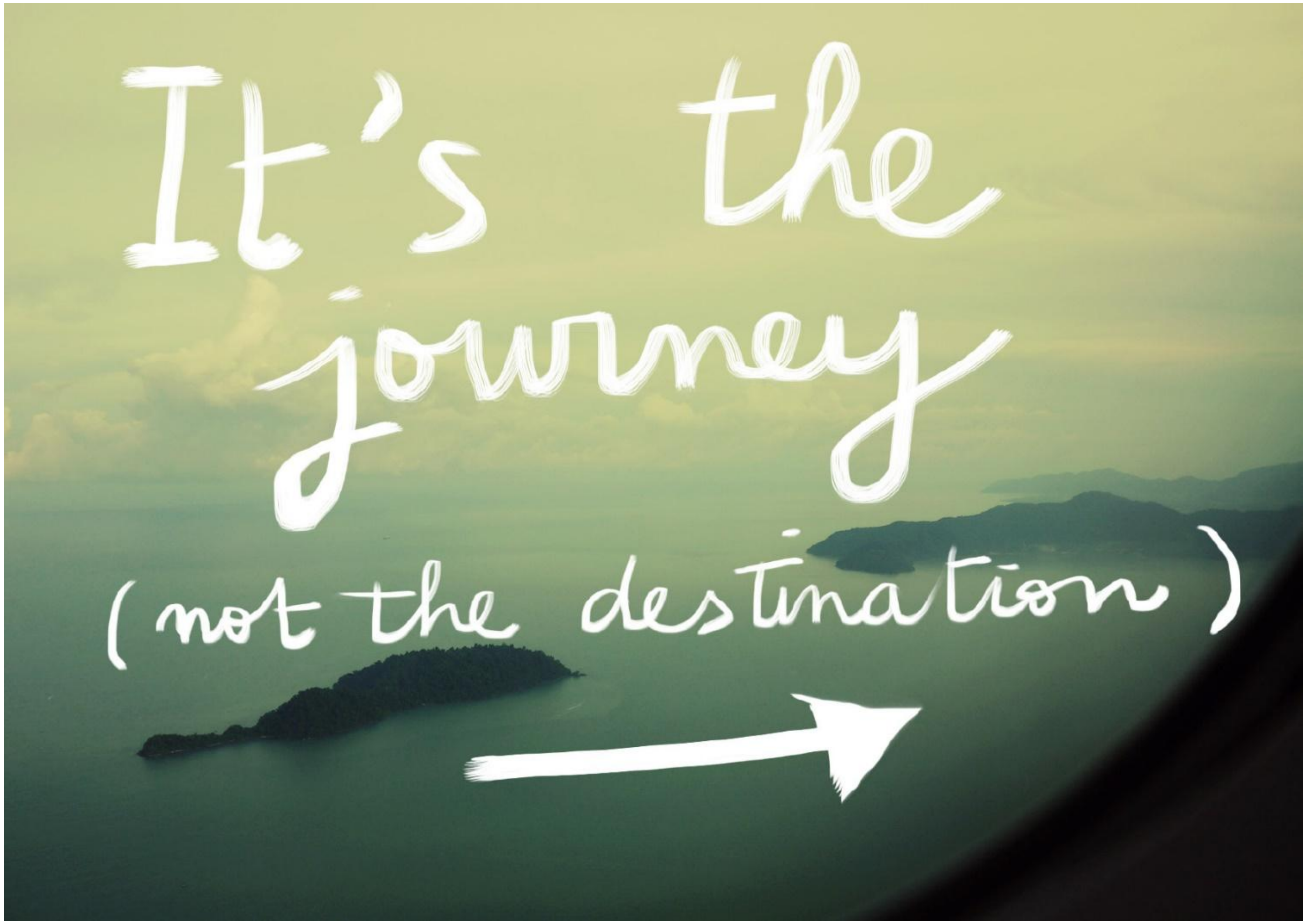
INTRODUCTION

- Paper proposes a framework for the investment strategy of a DC fund and challenges the status quo
- It does so by focusing on areas of the current system that we believe need to change
- Lifestage investment strategies need a complete overhaul
- DC is what we have – how do we use it most effectively?

The purpose of a retirement fund

- Vehicle for retirement savings has changed but the actual needs of members has not

The purpose of a retirement fund



The purpose of a retirement fund

- Ultimate objective for these funds is what it has always been
- To provide a good retirement
- If you google "good retirement"… these are some of the images you will see

What is a "good retirement"?

What is a “good retirement”?

- A good retirement is one in which the standard of living is maintained in retirement
- We measure standard of living based on income (and consumption)
- Members are used to thinking about standard of living in terms of income (e.g. travel, living)

Income is the goal

- Traditional DB fund had a specific promise (guaranteed income at retirement)
- E.g. an employee in a fund promising an accrual rate of 2% p.a. per year of service knew that working for 35 years would result in 70% of their pre-retirement salary payable as their starting annual pension for life.

Income is the goal

- Almost every retirement system (except DC) express benefit promise in terms of income
- Even SA state old-age pension is a means-test benefit that provides a monthly income

Income is the goal

Members are used to thinking about their standard of living in terms of income

Ultimate objective of the retirement fund is to maintain the member's standard of living

We submit that the appropriate objective and goal for a retirement plan is to provide members with a stream of income in retirement.

Treating retirement account as a savings account

- An actuary's role for a DB fund includes placing a value on the income stream to pensioners and commenting on the appropriateness of the investment strategy
- Language of DC funds in SA is very different
- We refer to the "liability" of the fund as being equal to the fund credit balance in respect of each member

Consider the Balance Sheet of the member (status quo)

Assets	**Liabilities**
- Fund Credit	- Fund Credit

Treating retirement account as a savings account

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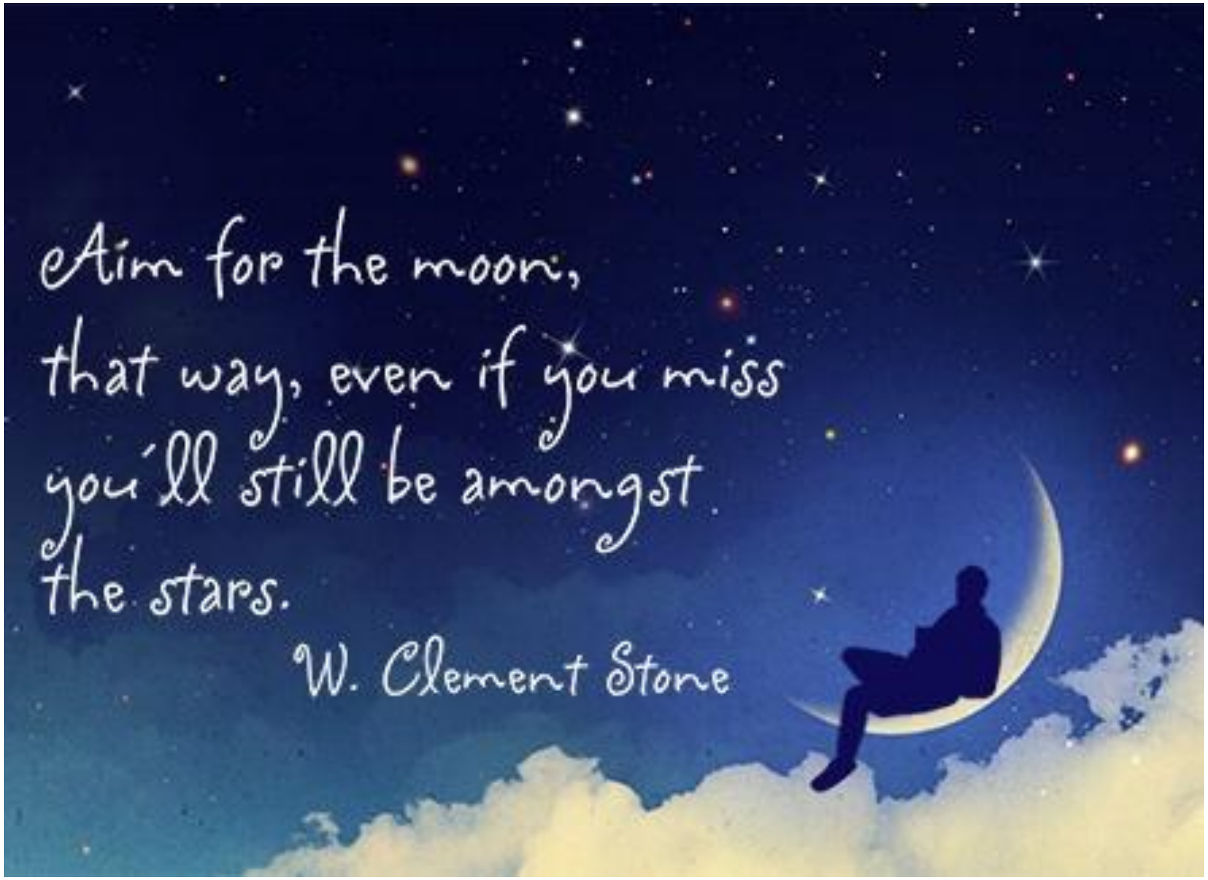
- Actuary focuses on fund credit balances
- Trustees and members of focus on fund credit balances
- Regulator focuses on fund credit balances
- Focusing on fund credit balance is an entrenched practice
- Members taught from a very early stage to treat their DC savings like a bank account and focus on investment performance

Treating retirement account as a savings account



Actuarial Risk

- Objective of an investment strategy – "Maximise expected return subject to minimizing risk"
- What is risk?
- You cannot define risk without reference to liabilities
- In other words – the individual member's targeted income at retirement.

Meaningful and Important Information

- Important to distinguish between "important" and "meaningful" information

Poll Question

You receive your annual fund statement and it shows that your accumulated fund credit is R1 million

Based on this information,

1) You have no idea what level of income you will likely receive in retirement

2) You have some idea what level of income you will receive but not enough confidence to make any big decisions without getting more advice/information

3) You have a very good idea what level of income you will likely receive in retirement

4) Woohoo – R1 million

Meaningful and Important Information

- Important to distinguish between "important" and "meaningful" information
- We provide members with
  - Fund credit
  - Investment return
- What do we expect them to do with it?

Providing members with meaningful information

- Lindiwe aged 55 receives her statement and it reveals an accumulated fund balance of R1 million (normal retirement age of 65)
- She believes she is on track for a great retirement
- Largely based on her perception that one million rand is a lot of money.

Providing members with meaningful information

Providing members with meaningful information

The reality is that knowing her account balance provides Lindiwe with no insight into her likely standard of living in retirement.

This is the standard market practice

We might actually be encouraging undesirable member behaviour

DC members do have a liability

- The provision of an income that will allow the member to have a reasonable standard of living in retirement
- Should increase annually with inflation
- Payable for as long as the member is alive

DC members do have a liability

- An inflation-linked annuity issued by an insurer is the only financial product that mitigates the three key risks present after retirement (ignoring credit risk)
  - Investment risk.
  - Inflation risk.
  - Longevity risk.
- Appropriate default

Appropriate risk-free asset

- Liability has a market value that can be determined with reference to the cost of an inflation-linked annuity provided by an insurer.
- A key feature of the South African market is the ability to purchase inflation-linked annuities from an insurer.

Appropriate risk-free asset

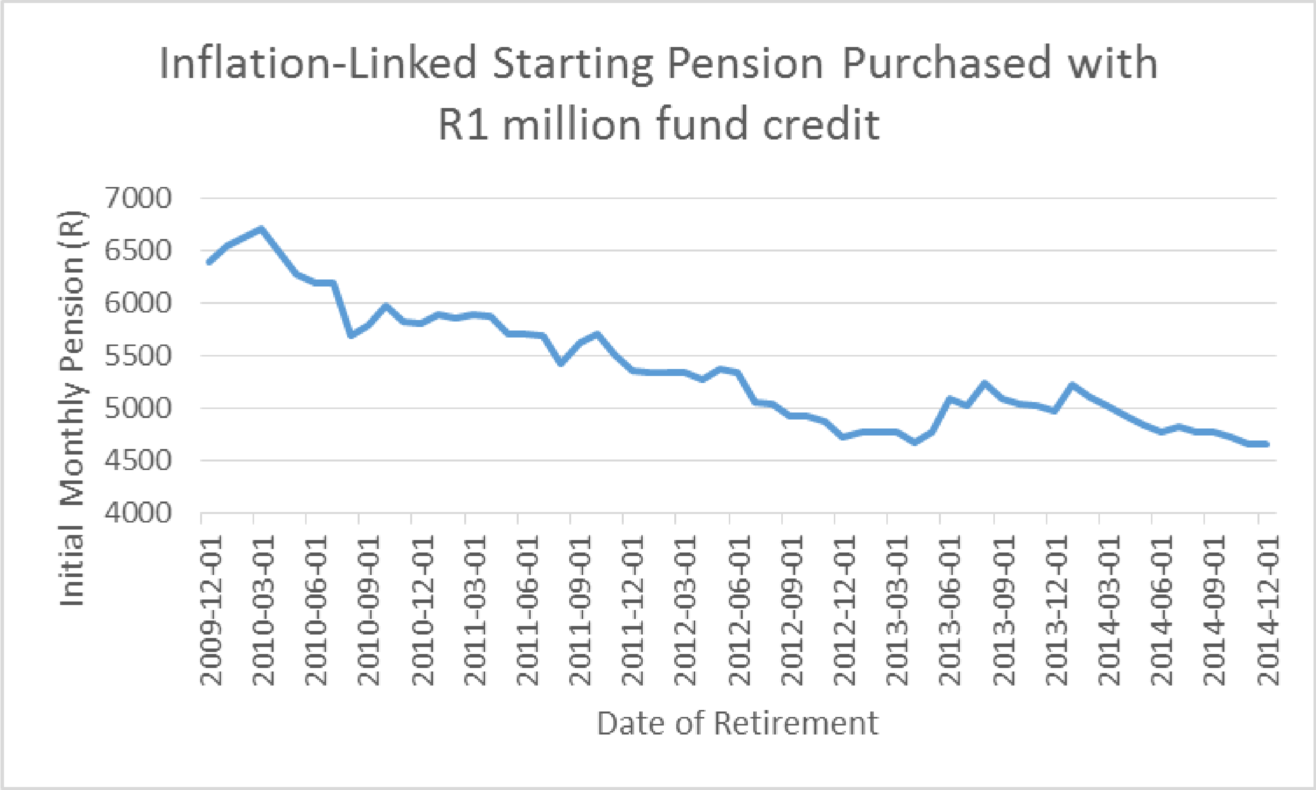
- Suppose a member retired at the end of 2009 at the age of 65
- She required R6500 a month for life increasing with inflation
- Based on prevailing real rates, the cost of securing this income stream was approximately R1 million.
- Our member's liability (to receive R6500 per month) was thus assessed at approximately R1 million at the date of retirement.

Appropriate risk-free asset

- As at end of 2009, R1m fund credit could be used to purchase R6500 in inflation-linked income
- As at end of 2014, this had reduced to R4650 in inflation-linked monthly income
- Deterioration of almost 30% over a five year period
- This ignores the inflation difference

Appropriate risk-free asset

- Monthly income is volatile depending on point of retirement



Appropriate risk-free asset

Retirement objective thus cannot be met by setting a fund credit threshold as an objective or goal.

Investment Implications for the risk-free asset

- By establishing an inflation-linked income goal as the retirement objective, inflation-linked instruments become the basis for the member's risk-free asset

Investment Implications for the risk-free asset

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- Currently no widely available deferred inflation-linked annuities available
- Possible to create a replicating portfolio using inflation-linked bonds
- Each member theoretically has their own risk-free portfolio which will change through time

Investment Implications for the risk-free asset

- Suppose Robert is one year from retirement and has sufficient assets to purchase their required income stream of R10 000 (with contributions)
- In DB terms, they are 100% funded
- Liability is the cost of purchasing a deferred inflation-linked annuity at retirement.

Cash is not the risk-free asset

- Consider three investment strategies in the year prior to retirement:
- A dedicated money market fund (STEFI);
- A nominal bond portfolio (ALBI); and
- The bespoke inflation-linked bond portfolio (Risk-free)

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Cash is not the risk-free asset

	Stefi Portfolio	ALBI Portfolio
% of the time where income fell below R10 000 real	66%	61%
Minimum real income received	R8625	R8669
Median income	R9815	R9792

Cash is not the risk-free asset

	Stefi Portfolio	ALBI Portfolio
% of the time where funding level reduced	66%	61%
Minimum funding level	86.3%	86.7%
Average Outperformance of Liability	-2.3%	-0.70%
Tracking Error	7.9%	6.8%
Information Ratio	-0.30	-0.10

Cash is not the risk-free asset

- Cash is not the risk-free asset
- Nominal fixed income does not track the income promise at retirement
- **A bespoke inflation-linked bond portfolio is the risk-free asset and provides the appropriate hedge**
- Even thought a deferred inflation-linked annuity cannot be purchased, it is still possible to hedge the price change of one

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Implied risk-free asset

- Lifestage frameworks allocate to cash or nominal bonds (especially in the phase down period)
- Implication is that we are either focusing on fund credit (which we do)
- Or that we are targeting a level annuity in retirement (inflation is the silent assassin)

Human Capital

- Investment strategy should incorporate another important asset of the individual member – their human capital
- Future contributions that are expected to be made by the member towards retirement provision

Human Capital

- Human capital is the largest single asset most members will have for a significant part of their life before retirement
- The large human capital component for young members is the main justification for a high equity allocation
- Lifestage strategy does not take human capital into account and motivates high equity exposure on the basis that SD of return reduces through time

Consider the Balance Sheet of the member (status quo)

Assets	**Liabilities**
- Fund Credit	- Fund Credit

Consider the Balance Sheet of the member

Assets

- Fund Credit

- Human Capital

Liabilities

- Required income at retirement

Providing members with meaningful information

Suppose Lindiwe instead received a statement from her DC fund that showed the following:

- Accumulated savings expected to generate R6100 pm
- Future contributions towards retirement savings to generate R1100 pm
- She is therefore on track to receive R7200 a month

Increasing annually with inflation for life

Providing members with meaningful information

- Calculations required for the statement can easily be done by actuaries
- They are transparent, objective and market consistent.
- Nature of the statement has dramatically changed from referring to a pot of money to a likely stream of real retirement income
- Did not require a significant education exercise on the part of the trustees, the fund or the employer

Appropriate Income Goal – the Replacement Ratio Objective

- Important for trustees to measure to set a default income goal for each member of the fund
- This objective will define the liability in our framework
- We advocate the Replacement Ratio measure to express the income objective

Appropriate Income Goal – the Replacement Ratio Objective

- Some problems with how this is done in practice
  - Replacement ratio target simplified to targeting a real return or a market benchmark
  - What does outperformance of the SWIX or CPI+5% mean?
- "What good is beating the benchmark if you don't reach your goals?"

Appropriate Income Goal – the Replacement Ratio Objective

- Essential that an appropriate Replacement Ratio is targeted
- Should be customized in a pre-defined way for each individual member
- Suppose the trustees decided on Replacement Ratio target for member with 35 years in the fund and retire at the normal retirement age

Determining an appropriate Replacement Ratio Target

- Most common request is for RR target equal to 100%
- Many reasons why standard of living can be maintained with lower RR
  - The member is no longer saving for retirement;
  - The taxation in retirement is lower than that prior to retirement; and
  - There are lower costs (e.g. lower debt or fewer dependents) of living in retirement (the caveat here being healthcare costs)

Determining an appropriate Replacement Ratio Target

- Munnell and Soto state that 65%-75% RR maintains lifestyle
- Seshadri (2009) states median optimal RR is 75% for married, lower for singles
- Government's objective: 75% for individuals retiring at age 65 with the possibility of a lower percentage applying at higher income levels

Determining an appropriate Replacement Ratio Target

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- Under current conditions, we believe that Government's objective is unlikely to be achieved
- Misconceptions
- Acknowledgement that things change

Determining an appropriate Replacement Ratio Target

- Clean sheet of paper… what is an achievable target?
- Key Assumptions:
  - Contribution Rate
  - Working Lifetime
  - Investment Return
  - Annuity purchased at retirement

Determining an appropriate Replacement Ratio Target

- *Contribution Rates*
- The contribution rate is normally set in terms of the rules of a fund.
- National Treasury (2004) state that it is reasonable to **10% cont**.
- The Alexander Forbes Benefits Barometer (2014) showed a range of contribution rates in the private sector towards retirement savings depending on industry. This range was between **12.1% and 15.7%.**

Determining an appropriate Replacement Ratio Target

- *Investment Return Assumption*
- Maximum expected real return per annum that can be expected over the working lifetime is **4.6% p.a.**

Determining an appropriate Replacement Ratio Target

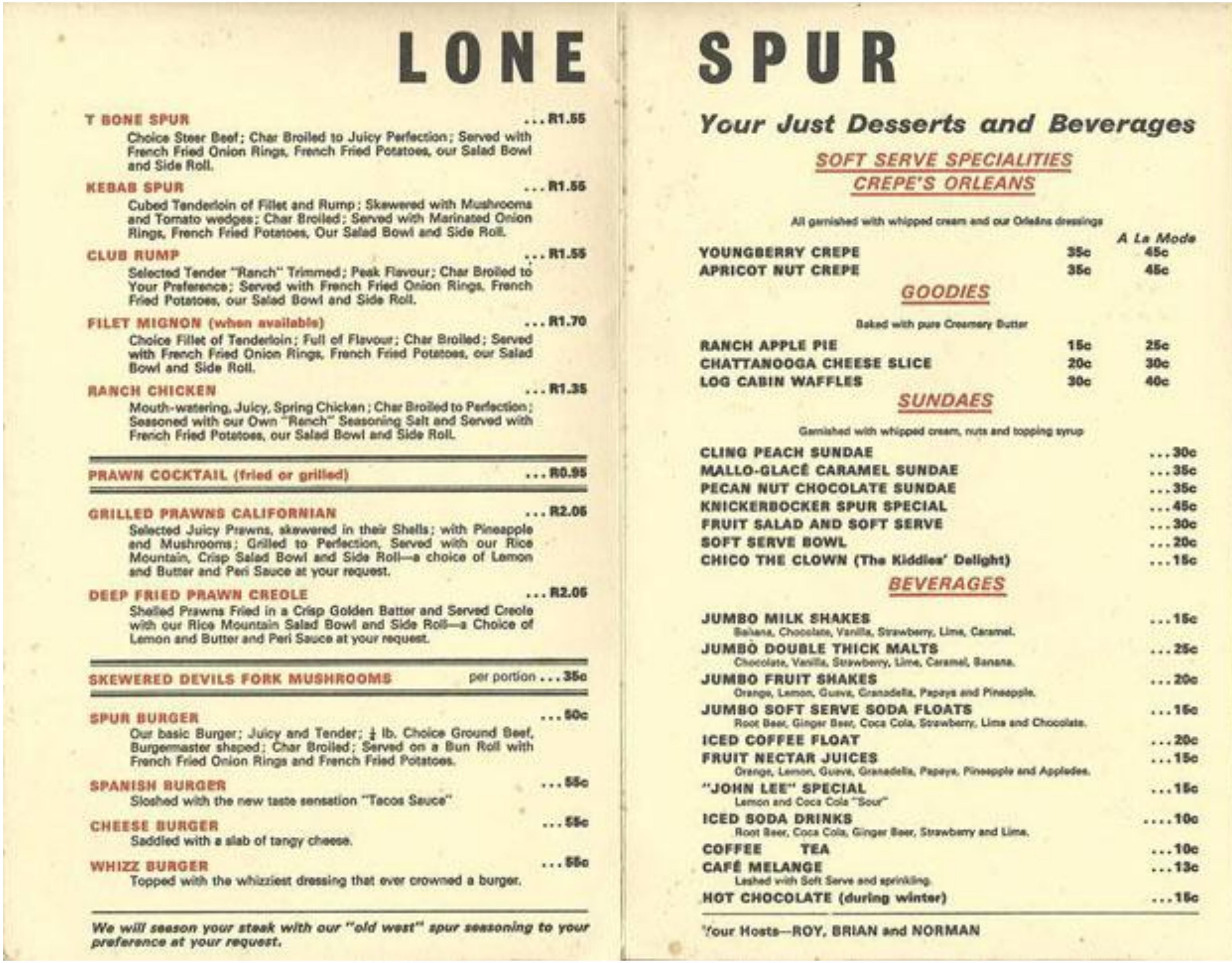
- Avg real rate of return in SA is currently 2% p.a. on lt gov ILBs.
- Assume an ERP of 3% (Dimson, March and Staunton (2011))
- Inflation-risk premium of 0.5%
- Expected return on equities is approximately 5.5% p.a.
- Regulation 28 results in 75% maximum allocation to equities
- Alpha = Fees

Determining an appropriate Replacement Ratio Target

- *Cost of annuity at retirement*
- Assume annuity at retirement is inflation-linked
- Least risk choice

Determining an appropriate Replacement Ratio Target

- Contribution rate of 12.5% and a real return of 5% over 35 years yields an expected RR of 54%!
- If this increases to 15% p.a. towards retirement provision, then expected RR is 65%
- Remuneration structure an NB consideration (tctc)
- Essential that each fund does analysis based on their fund circumstances


LONE SPUR

T BONE SPUR ...R1.55
Choice Steer Beef; Char Broiled to Juicy Perfection; Served with French Fried Onion Rings, French Fried Potatoes, our Salad Bowl and Side Roll.

KEBAB SPUR ...R1.55
Cubed Tenderloin of Fillet and Rump; Skewered with Mushrooms and Tomato wedges; Char Broiled; Served with Marinated Onion Rings, French Fried Potatoes, Our Salad Bowl and Side Roll.

CLUB RUMP ...R1.55
Selected Tender "Ranch" Trimmed; Peak Flavour; Char Broiled to Your Preference; Served with French Fried Onion Rings, French Fried Potatoes, our Salad Bowl and Side Roll.

FILET MIGNON (when available) ...R1.70
Choice Fillet of Tenderloin; Full of Flavour; Char Broiled; Served with French Fried Onion Rings, French Fried Potatoes, our Salad Bowl and Side Roll.

RANCH CHICKEN ...R1.35
Mouth-watering, Juicy, Spring Chicken; Char Broiled to Perfection; Seasoned with our Own "Ranch" Seasoning Salt and Served with French Fried Potatoes, our Salad Bowl and Side Roll.

PRAWN COCKTAIL (fried or grilled) ...R0.95

GRILLED PRAWNS CALIFORNIAN ...R2.05
Selected Juicy Prawns, skewered in their Shells; with Pineapple and Mushrooms; Grilled to Perfection, Served with our Rice Mountain, Crisp Salad Bowl and Side Roll—a choice of Lemon and Butter and Peri Sauce at your request.

DEEP FRIED PRAWN CREOLE ...R2.05
Shelled Prawns Fried in a Crisp Golden Batter and Served Creole with our Rice Mountain Salad Bowl and Side Roll—a Choice of Lemon and Butter and Peri Sauce at your request.

SKEWERED DEVILS FORK MUSHROOMS per portion ...35c

SPUR BURGER ...50c
Our basic Burger; Juicy and Tender; ¼ lb. Choice Ground Beef, Burgermaster shaped; Char Broiled; Served on a Bun Roll with French Fried Onion Rings and French Fried Potatoes.

SPANISH BURGER ...55c
Sloshed with the new taste sensation "Tacos Sauce"

CHEESE BURGER ...55c
Saddled with a slab of tangy cheese.

WHIZZ BURGER ...55c
Topped with the whizziest dressing that ever crowned a burger.

We will season your steak with our "old west" spur seasoning to your preference at your request.

Your Just Desserts and Beverages

SOFT SERVE SPECIALITIES
CREPE'S ORLEANS

All garnished with whipped cream and our Orléans dressings

		A La Mode
YOUNGBERRY CREPE	35c	45c
APRICOT NUT CREPE	35c	45c

GOODIES

Baked with pure Creamery Butter

RANCH APPLE PIE	15c	25c
CHATTANOOGA CHEESE SLICE	20c	30c
LOG CABIN WAFFLES	30c	40c

SUNDAES

Garnished with whipped cream, nuts and topping syrup

CLING PEACH SUNDAE ...30c
MALLO-GLACÉ CARAMEL SUNDAE ...35c
PECAN NUT CHOCOLATE SUNDAE ...35c
KNICKERBOCKER SPUR SPECIAL ...45c
FRUIT SALAD AND SOFT SERVE ...30c
SOFT SERVE BOWL ...20c
CHICO THE CLOWN (The Kiddies' Delight) ...15c

BEVERAGES

JUMBO MILK SHAKES ...15c
Banana, Chocolate, Vanilla, Strawberry, Lime, Caramel.
JUMBO DOUBLE THICK MALTS ...25c
Chocolate, Vanilla, Strawberry, Lime, Caramel, Banana.
JUMBO FRUIT SHAKES ...20c
Orange, Lemon, Guava, Granadella, Papaya and Pineapple.
JUMBO SOFT SERVE SODA FLOATS ...15c
Root Beer, Ginger Beer, Coca Cola, Strawberry, Lime and Chocolate.
ICED COFFEE FLOAT ...20c
FRUIT NECTAR JUICES ...15c
Orange, Lemon, Guava, Granadella, Papaya, Pineapple and Appledes.
"JOHN LEE" SPECIAL ...15c
Lemon and Coca Cola "Sour"
ICED SODA DRINKS 10c
Root Beer, Coca Cola, Ginger Beer, Strawberry and Lime.
COFFEE TEA ...10c
CAFÉ MELANGE ...13c
Lashed with Soft Serve and sprinkling.
HOT CHOCOLATE (during winter) ...15c

Your Hosts—ROY, BRIAN and NORMAN

Determining an appropriate Replacement Ratio Target

- Prevailing yields on inflation-linked bonds have fallen.
- Real yield for R202 has fallen from a level of 3.5% to 2% over ten years.
- NB to reflect market consistent expectations
- A fall in 1.5% in expected returns over ten years
- People are living longer

Default investment strategy

- Default investment strategy is crucial
- Draft regulations contemplate a “default investment strategy”
- Most members stay in the default
  - 85% (AF)
  - Participation paradox
  - Members trust their employer and trustees

Default investment strategy (unengaged member)

Default investment strategy (unengaged member)

- Individual members assets allocated to two broad portfolio types
  - Risk-free portfolio
    - Appropriate Inflation-linked bond Portfolio
  - Growth portfolio
    - Liability outperformance

Default investment strategy (unengaged member)

- Allocation between portfolios will change through time to optimize the likelihood of achieving the income goal
- In theory, an individual with sufficient assets to achieve the income goal will be allocated mainly to the risk-free portfolio
- **Risk is a tool used to achieve the goal**
- **Current lifestage approach has no feedback mechanism to see whether a member is on course!**

Default investment strategy (unengaged member)

- Change in asset allocation not based mechanically on age
- Portfolio allocation will change through time for market-related and individual reasons
- Market-related reasons include:
  - Change in the value of the accumulated funds; and
  - Change in real interest rates and inflation

Default investment strategy (unengaged member)

- Individual reasons include:
  - Change in salary;
  - Change in contribution rate towards retirement funding;
  - Change in income goal; and
  - Change in retirement date

Default investment strategy (engaged member)

- Most members unengaged when joining a fund
- At some point, members will become engaged
- Important that a member is able to appropriately engage with their retirement provision.

Determining an appropriate Replacement Ratio Target

Whilst trustees will be unable able to specify a specific rand pension amount on behalf of their members, the framework can allow for individuals to select an explicit pension amount when they are engaged and able to specify it.

Default investment strategy (engaged member)

- Lindiwe’s statement revealed she was on track for an income of R7200 per month
- Only Lindiwe can determine if this will be sufficient

Default investment strategy (engaged member)

- Lindiwe only has three options to boost her retirement income:
  1) Contribute more towards retirement provision;
  2) Retire later; and
  3) Take more investment risk.

Default investment strategy (engaged member)

- Suppose investment statement presented with the following information:
- Impact of contributing more
- Impact of changing retirement age

Default investment strategy (engaged member)

- Suppose Lindiwe was 100% funded where R7200 is target
  - Largely allocated to risk-free portfolio
- If target is now R8000 of income pm, then now 90% funded (more Growth required)

Alternative annuity types

- Proposed framework can equally be applied to different default annuity types that might be deemed appropriate in retirement
- We submit inflation-linked annuity is the risk-free option for an individual member because it removes inflation, investment and longevity risk

Alternative annuity types

DC members do have a liability

- Inflation-linked annuity is the "risk-free" default investment option at retirement
- Does not imply that selecting the risk-free choice is the most appropriate option for the member.
- Without further member specific knowledge, the inflation-linked annuity is an appropriate default option at retirement.

Alternative annuity types

- Trustees, on the advice of their consultants or actuaries, might elect a different annuity type as a default in retirement
- A different annuity type will have implications for the risk-free asset in the framework

Alternative annuity types

- Other annuity types or products might have a higher starting pension
  - Exposes member to one or more of investment, inflation or longevity risk.
- LA popularity not an argument for using it as part of a default investment strategy at retirement

Summary and conclusion

- We establish the goal of a DC fund is to provide a good standard of living in retirement
- Can be achieved by providing a stream of inflation-linked income in retirement for as long as the member is alive
- There is therefore an implicit liability that can be calculated for each member (not the fund credit)

Summary and conclusion

- Income target should be expressed as a Replacement Ratio and boards of trustees should ensure that the target is appropriate and achievable
- *Ad hoc* rules of thumb and older targets are likely to no longer be appropriate. The target should also be adjusted at a member level to recognise their expected time in the fund.

Summary and conclusion

- Implications for the “risk free” asset which is an appropriately structured inflation-linked bond portfolio whose value will track the change in the cost of a notional deferred inflation-linked annuity
- Risk free in this context is not cash or nominal bond instruments

Summary and conclusion

- By incorporating a member's human capital, it is possible to determine whether the member is on track to meet their income needs in retirement
- Possible to select a portfolio of assets that maximises the likelihood of achieving a given level of real income in retirement
- This does not require member intervention and will be done automatically

Summary and conclusion

- Need to distinguish between providing important information (e.g. accumulated fund credit) and meaningful information
- The lifestage approach in widespread use today fails to meet many of the design criteria put forward

Summary and conclusion

- In South Africa, we have the tools required to make substantial changes to retirement provision
- Draft retirement default regulations provide a unique opportunity
- As actuaries we are uniquely placed to lead this

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