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An investigation into the effect of information on decision-making for members of Defined Contribution pension funds

In partial fulfilment of the requirements for the degree of Master of Business Science degree in Actuarial Science from the University of Cape Town

August 2012

By

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1 Introduction

On retirement individuals are expected to live on what they have saved over their working life-times if they are not to be dependent on the state or family. However, investments made over the working life-time may be inadequate to provide fully for retirement. Whilst it is obvious that one must save enough to retire on, it is not always clear how much is enough, or how best to save this. This can, and usually does, result in individuals retiring with less income than they need or expect (Masilela, 2011a), and in many cases, causes them to become dependent on their families or the state.

The most common method used by formally employed individuals to save for retirement is contributing into a pension fund¹ (Andrew, 2004). In some cases this is all an individual will have saved for retirement. As a result, there is a need to ensure that a pension fund meets its most basic objective of providing adequately for retirement.

For most, serious consideration of the adequacy of savings to meet retirement needs will come later in life than is optimal (Old Mutual, 2012). This can result in people retiring with less than what is actually required or desired. Facer and Reynolds (2010) suggest the three reasons below as the most common causes of inadequate retirement savings:

1. Individuals save too little, as a proportion of the total income that they earn.
2. Individuals start saving too late in their working life-time, decreasing the total amount that they can save and losing out on the benefit of compound interest on earlier savings.
3. Individuals do not invest their savings in a way that produces required returns for retirement adequacy. This can be as a result of making inappropriate asset allocations over the working life-time.

Other reasons for inadequate savings include a failure to preserve benefits at withdrawal, and a lack of knowledge of how much is enough when it comes to retirement saving (Groyer and Holtzhausen, 2006), such that individuals do not have specific target benefits. This results in not knowing when the savings held are on track to meet the retirement needs, and what corrective measures are required, if any.

All these factors are further worsened by the fact that individuals do not save readily. Masilela (2011a) noted that though there have been increasingly favourable conditions to encourage saving, such as higher income, the removal of retirement fund taxes, decreasing

¹ The term pension fund is used here and in the rest of the document to refer to pension funds, retirement funds and provident funds.

income taxes and decreasing inflation, the level of saving has actually decreased. Chiroro (2010) also notes how in spite of negotiated wage increases by trade unions and other favourable conditions, it is still difficult to get South Africans to save. The South African Savings Institute (Masilela, 2011b) says that individual savings in South Africa are declining every year. South Africa is estimated to have a savings rate of 15% as compared to other emerging economies, such as the East Asian markets, whose saving rates are consistently above 20% and average over 30% (Masilela, 2011a).

In South Africa, the greatest barrier to saving, including retirement saving, is the absence of a regular income, or a very low one (Chiroro, 2010). This is true for the lower income bracket. Chiroro (2010) further suggests that in the middle income bracket, where greater saving would be expected, the greatest barrier to saving for retirement is over-indebtedness caused by the excessive use of credit, making it difficult for these individuals to save.

Andrew (2004) noted the findings of the Mouton commission, that about 80% of formally employed individuals belong to an occupational retirement fund, which is usually sponsored by the employer or affiliated to a bargaining council. These individuals will likely contribute to these funds for as long as they are employed, or compelled to by their employer.

This research looks at some of the reasons behind inadequate retirement provisioning and the effect of improved member communication on the contribution and preservation decisions. The research is limited to defined contribution pension funds, as defined in section 3.1. The research considers whether increasing the quantity and quality of information provided to pension fund members could result in better decision-making and ultimately more adequate provisioning for retirement.

2 Research Problem

2.1 Pension funds and benefit adequacy

Uncertain events with financial consequences create the need for individuals to have a fall-back savings position such as an income protection plan or savings set aside for such incidences. Asher (2007) used the concept of the financial life-cycle, as explained by Modigliani (1986) to identify the various risks that individuals face prior to retirement. These risks include death, disability and retrenchment. Asher (2007) concluded that pension funds are a cost-effective way of not only meeting financial needs at retirement, but also providing for members and dependants in the event of any of the risk events occurring. This is because in addition to saving for retirement, pension funds may also include a cost-effective way of insuring the risks mentioned either through the fund or via an external insurer. The ability to cover most of the risk events makes membership and contribution into a pension fund attractive for most individuals.

However, a pension fund is only as good as its ability to meet the needs of its members adequately, or to the full measure of their expectation. Groyer and Holtzhausen (2006) discussed the difference between the objectively projected benefits given saving levels and expected returns, and the retirement benefit that is anticipated by the member. They found that a gap exists between what the pension fund will provide at retirement and what the member expects it to provide. The implications are inadequate retirement savings, as no additional assets are kept to meet retirement needs. Further to this, if no remedial action is taken over the working life-time to cover this gap the result is the same.

In order to close the gap between member expectation and actual fund provision, the researcher suggests two primary questions the member must be able to answer. These are:

1. How much do I need to fund for my retirement? This sets a goal or target benefit that the member aims for. It also gives a measure through which current savings can be compared to see if they will meet the required benefit. This measure is usually given as the net replacement ratio² of the fund benefit. Old Mutual (2012) found that the net replacement ratio was a key measure used in the industry to project retirement benefits. This measure is commonly understood by pension fund members, but has its own drawbacks. As an example, the net replacement ratio only refers to income

² Net replacement ratio is defined as the annualised monthly income in the month following the retirement date divided by the salary in the year immediately preceding retirement (Butler, 2011).

immediately after retirement. As income requirements in the years subsequent to the retirement date are expected to vary, an appropriate annuity factor that takes this into account should be used. This, however, is not always available (Butler, 2011).

2. How much have I saved so far? Whilst most members will have a general idea of the monetary value of their savings, few will know what it represents in relation to their targeted benefit. Sunden (2006) stated that members of a pension fund are likely to over-estimate what their pension benefits will be. This is because the value of their total share of fund is large when compared with their monthly income, but is actually small when spread over fifteen to twenty years in retirement. It is only in relation to the target benefit that any meaningful analysis of the adequacy of what has been saved to date can be done.

2.2 The state of retirement funding in South Africa

We now consider how the retirement industry in South Africa has fared with regard to benefit adequacy. Masilela (2011a) estimated that most South Africans will retire with a replacement ratio of less than 30%. Facer and Reynolds (2010) suggest that there are three main issues to building adequate retirement savings. These are:

1. contributing at least 15% to 18% of salary;
2. achieving modest returns over your working life-time; and,
3. starting to save early.

The prevalence of inadequate funding, however, suggests that these have not been fully implemented. This may be due to members being unable to afford to contribute at higher rates due to low salaries or debts being serviced (Chiroro, 2010). Returns on investments may also be consistently low over a long period of time. This is a danger for members whose funds allow investment choice. Where inadequate information is provided on what returns a member should target given their age and contribution rates, investment choices that fail to meet targets can be made. The information that is provided to members may affect the decisions that they make regarding how much they contribute into the pension fund, and the portfolios they invest in. Members can also be informed on the dangers of non-preservation of benefits over their working life-time. This research will consider the effect of information provided to members of defined contribution pension funds on decision-making regarding how much to contribute and the preservation of benefits when changing employers.

2.3 Bridging the gap between the actual and anticipated benefit in a pension fund

In order to bridge the gap between actual and anticipated retirement benefits, it is important that a member is educated, and regularly communicated with, to shape his benefit expectation correctly. Michael Pomery, a former president of the Institute of Actuaries, made the following statement in his inaugural address: “The biggest challenge for actuaries will be the need to communicate with individual members rather than with employers or trustees as we have been used to doing” (Groyer and Holtzhausen, 2006). This comment was made with specific reference to defined contribution funds. It is interesting to note that in a trustee survey conducted in the UK, where trustees were asked to list their roles and contribution to a pension fund, the issue of member communication does not arise as being important (Kakabadse, Kakabadse and Kouzmin, 2003).

2.4 The research problem

This paper considers how the information provided to members of defined contribution pension funds affects the way they fund for their retirement. The author considers the failure of many pension fund members to achieve benefit adequacy by the time they retire, and seeks to research whether increasing the quality and quantity of information provided to defined contribution pension fund members is likely to influence their decision-making positively.

3 Background

3.1 A brief history

Pension funds are designed to provide for the wellbeing of an individual on his retirement and at other times of transition during his working life-time. Bodie (1989) suggested that pension funds can be seen as a form of retirement insurance. There are two main types of pension funds in operation:

1. Defined Benefit (DB) Fund - this is where the benefit to a member, in relation to final salary, is known in advance, and the employer or sponsor of the fund bears the cost of ensuring that the member receives the full benefit promised to them.
2. Defined Contribution (DC) Fund – this is where the contribution made by the employer and the member is determined in advance and the member receives the accumulated value of these contributions on retirement. The benefit is therefore dependent on many factors, amongst them the investment return earned on the fund assets.

In recent years there has been a shift from DB funds to DC funds. This move was initially brought about by pressure from bargaining councils (Barrientos, 2002). This was in response to the inequalities of DB funds which did not provide fair withdrawal values when an employee moved jobs (Andrew, 2004). This issue has subsequently been dealt with through the Pension Funds Second Amendment Act (2001) in South Africa. Members were also readily willing to accept a switch to a defined contribution arrangement as markets were performing very well, and they could share in the higher returns directly in a DC arrangement (Andrew, 2004). Access to surplus held in the DB fund was a further motivating factor for the move to a DC arrangement, as some of the surplus would be used to provide a sweetener to the conversion values used (Groyer and Holtzhausen, 2006).

There has been a continued movement to DC funds even after investment returns lowered in subsequent years, and the issue of poor withdrawal benefits in DB arrangements had been dealt with. Facer and Reynolds (2010) suggested that in the United Kingdom this was due to deteriorating balance sheets of employers, markets' reaction to the reduction of social security benefits and asset allocation limits set by the regulator, which were more stringent for DB funds. More recently the global financial crisis has made the de-risking of DB pension funds even more attractive to employers. This will likely result in more DB funds

becoming closed to new members and a faster move to DC arrangements (Faculty of Actuaries Students Society, 2010).

Pension funds have specific rules that determine what proportion the employer contributes, and what the employee contributes. It had been proposed that from March 2012 the employer's contributions on pension funds would be treated as a fringe benefit in the hands of the employee. The tax deductible portion of the employees' contribution would increase to 22.5% of taxable income. These changes would have encouraged pension fund structures that maximise the new tax structure, resulting in funds changing their rules to remove the employer contribution and increasing the member contribution to optimise the tax benefit for members. The lack of an employer contribution would then be offset by a proportional increase in salary. Whilst both DB and DC structures allow for the full contribution to be made by the employee, after the required rule changes have been made, and thus be tax-efficient, the DB structure would still require the employer to fund any deficits that arise, and these would be taxed as a fringe benefit in the hands of the employee. As a result, DB structures could become less attractive to employees if the proposal is adopted in its current form. These changes to the tax structure of pension fund contributions could further accelerate the move to DC funds (NMG News Watch, 2011). The Revenue authority and the South African National Treasury are considering how the tax rules can be amended to create an exemption from the treatment of employer contribution as a fringe benefit, thus making them tax deductible to a limit for select DB funds (National Treasury, 2012a).

3.2 The retirement liability

Individuals will have an idea of the future costs they will incur and need to fund for. Examples of these include debt or mortgage repayments, college tuition for their children and their day-to-day expenses. Some of these can be funded on a pay-as-you-go basis, whereby they are met when they arise out of the current income stream. Others have to be funded over a longer period of time. Expenses post-retirement are one such cost. This cost can be viewed as a liability³ that an individual holds which must be funded for over their working lifetime. An individual is likely to target a benefit that maintains his current standard of living post-

³ We have used the term liability to reflect the full amount required by an individual on their retirement in order to maintain the same standard of living post-retirement as in pre-retirement. This liability will therefore not necessarily equal what the member has saved up or expects to receive at retirement from his pension fund.

retirement, hence the need to save in order to provide an adequate income when no longer working.

Of particular importance in this discussion is the costs brought about by the financial needs of members at retirement. In this instance, we have used the term liability to mean the financial obligation an individual has to fund for their day-to-day living expenses if they are not to become dependent on the state or extended family members. Every individual will have this obligation and can fund it through a pension fund or rely on government social security schemes to supplement their savings. Alternatively, it can be funded through other savings vehicles. The full value of this cost is dependent on the member's particular needs at retirement and life expectancy. It is therefore important for individuals to know what proportion of the total post retirement costs they have transferred or funded for.

Under the DB arrangement, there is a clear definition of the liability that the fund holds with regard to its members. In exchange for a contribution from the member, or his employer, the fund assumes the member's retirement liability in respect of the value of the benefit as defined in the rules. The member will have essentially transferred his retirement liability in part or in full to the pension fund, depending on the level of benefit provided compared to the member's needs at retirement. The fund will now have an obligation to cover a certain level of the member's retirement liability as agreed and the member will need to only save for the liability over and above that covered by the fund. This means that if individuals know they will require a net replacement ratio of 80 per cent of their final salary to retire comfortably, and their pension fund provides 60 per cent, they will know well in advance to save for the remaining 20 per cent.

When a DB fund is valued, the holder of the liability, in this case the fund through its sponsor, is given a clear monetary value of the liability it holds for each member. Each time a valuation is performed, the liability holder knows how much he needs to set aside in reserve today to meet his future obligations as they arise, given specified assumptions about future experience. This allows for a definite target to be set with regard to the assets backing the liability, the investment strategies to be employed and the contribution rates by the employer. The member in this fund will also be communicated with and informed about the current level of liability he has transferred to the fund, as the benefit statement will include the pension annuity to which the member is entitled⁴.

⁴ The DB fund valuation will, in reality, be more complex than this. We have only considered the valuation in relation to the liability held by the employer and the benefit due to the member. Other issues including asset valuation, contribution rates, funding of deficits and distribution of surplus will need to be considered.

Under the DC arrangement the member retains his retirement liability, and the fund acts as a savings vehicle through which the member can save for his retirement. This means the member is not guaranteed any level of benefit other than what he and his employer have contributed and the return earned on that. When a DC fund is valued, the fund's liabilities are taken to be equal to the contributions made into that fund, plus the return on the fund assets less the expenses. The members are provided with benefit statements⁵ that specify the benefit on exit. This value is what the member has accumulated and is not linked to the retirement liability that he currently holds. In addition, this value does not always inform the member, who in this case also holds the liability, whether he has enough set aside in reserve (his share of fund) to meet his future retirement liability. This usually results in the member over-estimating the value of what he has saved (Sunden, 2006). The information provided is not always sufficient for financial planning, and therefore not a good guide for decision-making (Groyer and Holtzhausen, 2006).

There is a clear difference in the reporting standards between the two arrangements. A DC fund member may not get the full information required to know if he is on track to meeting his retirement goals. Groyer and Holtzhausen (2006) suggest that DC funds should be treated as individual member DB funds and the valuation report include information relating to how far the member has gone towards meeting his retirement goals and what rate he should be contributing at to stay on track.

Another important point to consider is that of the member's reasonable benefit expectation, which is what the average member expects to receive based on the information they have at hand and the past practice of the pension fund. In a DB fund this will be created by the rules of the fund and the projections given on benefit statements. Under a DC fund, the rules will specify how the member's benefit is to be determined on retirement and withdrawal. However, how well this benefit is likely to meet retirement needs is not communicated. This means members may have final benefit expectations related to either past benefits given under DB funds (Groyer and Holtzhausen, 2006) or what they hope their accumulated share of fund will be able to purchase at retirement. This may not be met in some instances.

⁵ DC fund benefit statements usually show the following information:

- Personal details
- Benefit on all forms of retirement and withdrawal as a lump-sum
- Insured benefits e.g. on death or disability

In addition some statements will also show the projected net replacement ratio given the member's contribution rate and annuity that can be purchased with the lump-sum.

The move from DB to DC pension funds means that investment risk is transferred to the members from the employer (Masilela, 2011a). However, where there is insufficient knowledge and training, this risk is unlikely to be managed as well by a member in a DC arrangement as by the employer or sponsor in a DB arrangement. When an employer retains the investment risk constant reviews are done to ensure the returns earned are in line with what is required to meet the retirement obligation in full. Additionally, the fund will hold solvency reserves and margins as a cushion against adverse investment experience. Contribution rates are set by the actuary to ensure the fund can meet the final obligation at retirement. When the fund is valued, any shortfalls that may have arisen due to lower than expected returns are then funded by the employer via an increased contribution or a lump-sum payment into the fund.

However, in a DC fund, where the member holds the investment risk, lower than expected returns will not necessarily be funded through an increased contribution rate (Groyer and Holtzhausen, 2006) or a lump-sum payment at each valuation date, as the legal liability of the DC fund is always equal to the value of the assets held. It is assumed (or hoped) that higher returns in later years will compensate for any underperformance in earlier years. This is especially risky where an individual is close to retirement, and the time for such smoothing to occur is short.

3.3 Legislative, Regulatory and Professional Guidance

The issue of communication to members of a pension fund has been addressed to some extent by regulation and professional guidance. Circular PF130 of the Financial Services Board (2007) states the minimum standards of communication required for stakeholders of a pension fund, particularly members and trustees. In particular, the circular states that a pension fund should have a communication policy that governs how it communicates with its members and other beneficiaries. The communication is required to be appropriate, timely, useful, informative and comprehensive among other attributes. The challenge lies with how one would judge the usefulness or comprehensiveness of information provided. National Treasury (2012c) has proposed that Circular PF130 become legally enforceable by the Registrar of Pension Funds. This may result in clearer standards on the communication policy for pension funds.

UK professional guidance for actuaries requires that members of DC funds be provided with benefit illustrations. The Pensions Technical Actuarial Standards (TAS) (Board for Actuarial Standards, 2011) under section C.1.22 and C.1.23 recommends what

these benefit illustrations should include, allowing for appropriate assumptions that consider the economic outlook. The Pensions TAS is relevant locally as it is recommended practice for members of the Actuarial Society of South Africa. Among other features, this guidance requires the actuary providing projections to illustrate them such that the recipient can relate the benefit to his current income. The illustration must also be complete and balanced, include risk warnings and advise the member to receive regular illustrations.

The TAS does not require the provision of benefit projections, but simply states the standard to be kept should these be provided. This means that while South African guidance endorses the guidelines provided in the Pensions TAS, there is no regulatory requirement for this projection to be done for DC members. However, in the UK the Occupational and Personal Pension Schemes Amendment Regulations (2002) requires that all members of personal pension schemes and other money purchase pension funds must be provided with illustrations of the annuity benefit they would receive in real terms. The Board of Actuarial Standards issued the Technical Memorandum TM1: Statutory Money Purchase Illustrations to show what is required in these illustrations⁶ as it is not covered by the Pensions TAS.

The Financial Services Board Circular PF86 (1996) gives a minimum standard of what is required to be disclosed to members on their benefit statements and how frequently these must be produced. This standard, however, is lacking in respect of communication to DC members, especially when compared to the requirements of the UK regulation. The circular requires that members be told how their retirement or withdrawal benefit will be constituted, which for most DC funds is the member's share of fund as at the date of retirement or other such withdrawal. While this gives the DC member a clear picture of how his benefit is calculated, it does little to help the member realise how much of his retirement liability is currently catered for by the fund or what his current share of fund could amount to at retirement or as an annuity. This makes the information provided inappropriate for decision-making and risk assessment as is required of individual members of a DC fund.

Mr Charles Pillai, the former Pension Funds adjudicator brought this to light in the Principal Officers Association Annual Conference (Maxim, 2010), when he commented that there existed a communication gap between the fund and its members. He highlighted the need for better quality information to members and suggested that good communication was

⁶ The aim of the statutory money purchase illustrations is to assist individuals in assessing the adequacy of their pension arrangements, the extent to which they need to make further provision and the uncertainty involved in the illustrations provided. Statutory money purchase illustrations specify limits on some of the assumptions that can be used (Board of Actuarial Standards, 2011).

more than just sending benefit statements to members, but could lead to better management of member expectations and as a result reduced litigation between the fund and its members.

This opinion reflected the spirit of the ruling of *Wentworth vs. GG Umbrella Provident Fund* (2009), when the adjudicator stated that Circular PF86 was inadequate and not up to the standards of its UK and USA counterparts with regard to the minimum information that members must be given in benefit statements (Pension Funds Adjudicator, 2007). No action has been taken as yet to improve the regulation on what constitutes adequate minimum information to be provided to members of DC funds.

There is a need for the regulatory authorities, professional bodies and industry forums in South Africa to reassess their current requirements and make changes as is appropriate to best meet member needs.

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4 Literature Review

The issue of the inadequacy of retirement provision in DC schemes has been researched by many authors. Many reasons have been identified for inadequate provisioning. The literature below identifies a number of factors which contribute to inadequate retirement saving, namely:

- inadequate contributions over the working life-time;
- non-participation in pension funds and apathy of current members;
- non-preservation of benefits upon withdrawal prior to retirement;
- the effect of default options on member choice;
- behavioural biases; and
- social factors.

We will consider the literature on each of these factors. In addition we will consider solutions that have been provided to encourage better retirement saving, and how the information provided to members of DC funds can be part of the solution.

4.1 Inadequate Contributions

The rate at which pension contributions are made is a primary contributory factor to benefit adequacy (Facer and Reynolds, 2010). In defined contribution funds this rate is usually fixed according to the rules of the fund for both the member and the employer. For some funds the member can choose the rate he wants to contribute at, within a specified band. These rates are, however, not reviewed as often as is optimal to ensure benefit adequacy (Groyer and Holtzhausen, 2006). The result is that members tend to contribute at the same fixed level as per the fund rules even where these rates are inadequate. Most DC funds will also allow members to make additional voluntary contributions. These can be used to supplement contributions where the rate as stated in the rules is considered inadequate. However, only 13% of members make additional voluntary contributions into their pension funds (Old Mutual, 2012).

4.2 Non-Participation and Apathy

Clearly, failing to participate in a pension fund at all is likely to be a major contributor to inadequate retirement provisioning. Internationally, the primary cause of non-participation in a pension fund has been found to be apathy (Hall and Floyd, 2009): most members had no objective reason for the fact that they did not participate in a pension fund. Other reasons for

non-participation are a lack of understanding of the information provided to employees and complexity aversion, as the pension fund arrangement was seen to be hard to visualise when compared to a savings account or property investment. In South Africa it is estimated that 80% of formally employed individuals participate in an occupational pension fund (Andrew, 2004). The reasons for non-participation in the local market are mainly unemployment, temporary employment, unavailability of employer-sponsored pension schemes for small employers, and low earners whose pension benefits would be lower than available social grants (Andrew, 2004). Employers who offer pension funds will typically make membership compulsory for all employees.

Apathy can be seen in members of pension funds who take little or no interest in their pension savings until it is too late. Byrne, Harrison and Blake (2007) describe such members as 'reluctant investors'. In a survey of employees in the United Kingdom, Byrne (2004) found that many employees had limited knowledge of, and interest in their pension funds. The situation is no better in South Africa. Masilela (2011a) found that over two-thirds of members could not identify a trustee in their pension fund, whilst 43% had no idea how their fund assets were invested.

4.3 Preservation of Pension Fund Benefits

Preservation of members' benefits during their working life-times between periods of unemployment or changes of employment is vital in ensuring retirement funding adequacy. However, the lack of an adequate social security net often results in members using up retirement savings during periods of unemployment. The proposed social security changes in South Africa included a compulsory requirement for members to preserve benefits rather than cash them out when changing employers. This possibility was mentioned in the 2011 Budget speech (Ministry of Finance, 2011). National Treasury (2012b) has also proposed new rules and options to allow members to preserve a greater proportion of their savings. These include allowing for partial withdrawals, increasing tax on withdrawals as a disincentive to take out a cash benefit, setting a default preservation fund for all withdrawals, setting a maximum income withdrawal per month for those who cannot find alternative employment and requiring full preservation of benefits on withdrawal.

Groyer and Holtzhausen (2006) suggested that a contributing factor to the lack of benefit preservation in South Africa was a lack of understanding of what one's retirement needs will be, and therefore a reduced concern over the member's ability to meet these needs. This implies that without a clear understanding of their retirement liability, members are

unable to act in their own best interests with regard to retirement savings and preservation of those savings. It was also noted that when deciding whether to preserve a benefit the decisions are increasingly linked to guidance or advice received (Old Mutual, 2012). This highlights the importance of member communication that serves to equip the individual with adequate information for decision-making.

4.4 Behavioural Biases: Effect of Default Options

Another important issue is that of default options in pension funds. Bershears, Choi, Laibson and Madrian (2008) observed that whilst it would appear rational for an individual in a default option that fails to maximise his utility to move out of that option to a better option, this is not always seen in practice, as shown by the evidence of inertia among members in sub-optimal default options in their pension funds.

Choi, Laibson, Madrian and Metrick (2001) found that pension fund members tend to make choices that require the least effort on their part. This is mainly seen where a pension fund offers choice for members but has a default option which is automatic for those who do not make a choice. For example, where a default contribution rate exists, members are more likely to choose this rather than tailor their contribution rates to suit their needs. Members are also less likely to vary these rates with changing circumstances as this requires them to make an active decision.

Brown and Weisbenner (2007) suggest that the default option given to members is sometimes seen as advice on the best or most appropriate option for the average member and taken on by members even though it may be unsuitable.

4.5 Other Behavioural Biases

Hedesstron, Svedsater and Garling (2006) found evidence to suggest that there is a negative correlation between member involvement in a pension fund and the tendency to choose the default option. This would suggest that the choice of a default option is linked to member apathy. Their study also found that the members who were more actively involved in their pension funds were the older or wealthier members. This seems to suggest that members only consider the decisions regarding their retirement when they are older, by which time it may be too late, or when they have accumulated a fair amount of money to have a reason to worry about its safety and growth.

Individuals in pension funds are also known to suffer from the effects of heuristics⁷. Brown and Weisbenner (2007) found that members do not always choose the pension structure that gives them the best long-term benefit. In their study of the pension fund choice in the State Universities Retirement System (SURS) in the USA, in which members can choose between a DB and DC structure, it was found that academic staff mainly chose a DC arrangement even though it did not give them the highest expected return. This was partly due to overconfidence in their ability to achieve higher than average returns in the market. Brown and Weisbenner (2007) also found that the prevailing economic climate affects the decisions made by members. This shows the short-term view taken by members in making long-term decisions. In bull runs new employees tend to choose the DC option as they assume returns currently being experienced will always be achieved. Similarly, in bear markets members tend to opt for the DB fund that reduces their exposure to investment risk.

Van Dalen, Henkens, Koedjik and Slager (2010) studied the effect of behavioural biases on trustees of a pension fund. They presented vignettes, or short stories that model real-life situations, to trustees and asked them to make a decision for the fund. The vignettes were drawn from situations that were normally encountered by trustees and included increasing or decreasing pension benefits and contributions given differing macroeconomic conditions, or solvency positions. The trustees were found to suffer from loss aversion (when a person is more sensitive to losses rather than gains of the same magnitude) (Sun, 2009) and make decisions based on the actions of peers rather than what is required for the fund's unique situation.

Brown and Weisbenner (2007) suggest that a form of bounded rationality could be the reason behind the sub-optimal choices made by members with regard to their retirement saving. Todd and Gigerenzer (2003:144) define bounded rationality as “the notion of optimization under constraint or the sub-optimal outcome of our limited cognitive system”. Examples of the constraints that can act on a pension fund member are:

1. The member may be unable to correctly assign risk to the different options he has. In the example of investment choice, a member may fail to understand how holding a significant proportion of his company's stock will lead to high losses in the event of the company becoming bankrupt, as he loses both his job, and a significant proportion of his savings as the value of the stock held decreases.

⁷ A heuristic is a “strategy that ignores part of the information, with the goal of making decisions more quickly, frugally, and/or accurately than more complex methods” (Gigerenzer and Gaissmaier, 2011).

2. The member may also have incomplete information about the choices available to him or the consequences of these choices.
3. The choices given or structure of the pension fund may be so complex that the member cannot understand them. An example is where complex derivatives are held by a fund. A member who cannot estimate the expected pay-off of these derivatives may make sub-optimal choices based on his incorrect valuation of what the derivative asset is really worth. Equally likely is the possibility of members sticking to the most basic asset classes that they understand well even when they are not likely to give the best return (Simon, 1972).

The effect of naive diversification⁸ was discussed by Benartzi and Thaler (2001). It was further expanded by Choi *et al.* (2001) who showed that members on average held asset allocations which were similar to the average asset allocation of all the choice funds, e.g. if two-thirds of the funds are equities most individuals would also hold two-thirds of their individual share of the fund in equities.

4.6 Social Factors

Peer group pressure (Brown and Weisbenner, 2007) and other social factors (Duflo and Saez, 2003) were also found to influence the choices made by members. J P Morgan (2010) suggested that social norms can affect behaviour to the extent that if people knew that their counterparts were saving, or saving more, they would be more inclined to do the same. The same argument, however, would exist where the norm is not to save. Individuals are psychologically comforted by being part of a majority in the same situation. Byrne, Harrison and Blake (2007), however, suggested that peer group comparisons, when given to members or trustees of a pension fund, can help those making erroneous decisions to revise them as they try to fall more in line with the industry average. When members are given information on what their peers are doing it can result in them aligning themselves with what most members are doing. Where most members are making decisions that result in better retirement provisioning then peer group comparisons may lead to better decisions by other members too. However, where most members are making poor choices peer group comparisons could result in members who would have made better choices without the comparison actually making poor choices in line with their peers. The effect of peer group comparisons where most members are making better decisions did not result in a significant

⁸ Naïve diversification is the allocation of $1/n$ of the total wealth to each of the n available portfolios (Benartzi and Thaler, 2001).

increase in retirement provisioning in study by Duflo and Saez (2003). This suggests that peer group comparisons are not very effective when used to try and influence member decisions regarding their retirement provisioning.

4.7 Recommendations to improve benefit adequacy

The recommendations made in the literature can be split into three specific areas:

1. Recommendations that seek to encourage active decision-making, and where decisions are currently being made, to improve these.
2. Recommendations that seek to improve benefit adequacy by reducing the number of decisions that the member has to make or structuring the fund and its options such that member actions have a less negative effect.
3. Recommendations that are a combination of the above.

These are further discussed below.

4.7.1 Recommendations encouraging active decision-making

Brown and Weisbenner (2007) suggested that members may have difficulty processing the information given to them in the required time-frame leading to sub-optimal choices being made. In particular, this occurs where a member has to choose an investment option on joining a pension fund. Here a limited amount of time is given for member choices to be made. If the member has never had to make a similar decision, or if the information or choices presented are not easily understood, a decision will be taken based on what everyone else is doing, or on the little that has been understood. Such a decision can be inappropriate. The effects of such poor decision-making will then be further worsened by the inertia exhibited by most members when it comes to making any changes to their pension arrangements. In this case allowing adequate time and providing clearer information could improve decision-making.

Groyer and Holtzhausen (2006) suggested that DC funds should be presented in relation to the member's liability to put the benefits into the proper perspective. An example could be showing the annuity that can be purchased with the current value of the assets the member holds. DC funds often present their benefit statements in an assets framework whereby the members are told what assets they hold, but not what proportion of the liability they cover (e.g. as a replacement ratio of current salary or projected salary at retirement), and what the shortfall relative to their total required retirement benefit is. This paper builds on the observations of Groyer and Holtzhausen (2006), who agreed that there is a need for further

research into what constitutes adequate communication to the members of a pension fund. They also noted that the move to DC funds has left a communication gap that has yet to be filled.

Lusardi and Mitchell (2005) agreed that individuals fail to plan for retirement and to save adequately due to financial illiteracy. They suggested financial education as a tool to cause increased planning and saving for retirement.

4.7.2 Recommendations that reduce the negative effects of member decisions

Choi *et al.* (2001) found that members of a pension fund will choose the path or decision-making process that requires the least effort from them. They suggested that to limit the negative effect of members choosing this path of least resistance, pension funds should be structured such that the easy path is a suitable and appropriate option for most. This is particularly relevant where the fund has options. Here the default option should represent the most suitable option.

Choi *et al.* (2001) identified six institutional features in 401(K) plans (a type of DC plan commonly used in the USA) that could be used to ensure that the default option for members would be the most optimal. These are:

1. Automatic enrolment into the fund/plan: this ensures that there is reduced apathy with regard to the decision to actually save for retirement or with regard to the time when one chooses to start saving for retirement.
2. Automatic preservation: this would require a change in the policy for when a member leaves a fund. The option to preserve a benefit would be the default for members even where the benefit is not that large. The possibility of compulsory preservation is currently under consideration in South Africa.
3. Automatic contribution increases, such as the Save More Tomorrow (SMaRT) plan introduced by Thaler and Benartzi (2004), which is further discussed in section 4.7.3.
4. Company matching contributions to encourage increased saving: this is done in some funds in South Africa, but may be removed in light of the changing tax legislation.
5. Presentation of asset allocation options to encourage optimal choice, including the use of reasonable defaults.
6. Financial education at the work-place.

Facer and Reynolds (2010) reiterated some of the suggestions above, but also included the setting of minimum contribution levels and the regular review of the DC

structure, including the contribution structure and default options, to ensure the fund remains relevant over time.

Byrne, Harrison and Blake (2007) suggested the use of target dates of retirement to determine an investment horizon that then inform investment objectives. This is where a member chooses a target date to retire and the investment manager makes the appropriate investment decisions with that target date in mind. This helps remove the effect of inertia in apathetic members who would fail to make the appropriate asset allocations at the relevant points in time. It would also help to ensure that the member does not make inappropriate asset allocations based on short-term market movements. A similar approach, more common to South African pension funds is life-cycle investing, whereby members' assets are moved into less volatile portfolios as they approach retirement age.

Benartzi and Thaler (2007) criticised the assumption that individuals are able to choose the optimal savings or retirement plan, and have the will-power to act on this optimal plan. The authors argue that the passive and naive decisions made by pension fund members are as a result of insufficient knowledge to make the best decision. They suggested changes to the design of funds and the use of sensible default options. Furthermore, the authors suggested choice architecture, which is structuring of choices to members that is designed to influence members' choices to the optimal ones.

JP Morgan (2010) agreed with this stance. They argued that the design of DC pension funds assumes that pension fund members are able to make the choices that maximise their benefit at retirement, which is not always true. They further stated that low participation and contribution rates and inappropriate asset allocations prove this. They concluded that when given total freedom of choice, members may fail to make the best decision, and may regret their choice later. They proposed using behavioural theories in the communication and training of members to guide them in making more rational choices regarding their retirement saving.

Byrne, Harrison and Blake (2007) suggested what they call 'targeted communication' where members are given the information that is relevant to their specific situation, e.g. members approaching retirement are given literature highlighting the need to move to less volatile asset classes as they near retirement.

4.7.3 Recommendations that combine the two methods

Thaler and Benartzi (2004) suggest that members are more inclined to make a decision about future savings that will reduce their disposable income in the future rather than the present.

They found that members who agreed to save proportions of their salary increases in the future ended up contributing more towards retirement. They called this approach “Save More Tomorrow” (SMaRT). This can be compared with the findings of Choi *et al.* (2001) that whilst increasing the level of member education increased the resolution to save more, it did not cause a significant increase in saving as members were still quite reluctant to make active choices with regard to their pension investing.

Further study by Thaler and Benartzi (2004) proved this over a three-year period where members enrolled in the SMaRT programme increased contributions from 3.5% to 11.6% compared to those who only received education, whose contribution rate only increased to 8.7% of salary from 4.4% over the same period. This suggests that the active and recorded decision to increase contribution levels at a future date, without further consultation, resulted in an increased contribution. Members would passively not change their earlier decision to save more towards retirement when their salary increases came through. This is an example of a solution that encourages decision-making when the immediate impact to the member will not be felt, then takes advantage of the passive nature of pension fund members to effect the earlier decisions made.

5 Methodology and design

This research considers whether the problem of a lack of adequate retirement saving could be alleviated by changing the quality and quantity of information provided to pension fund members. The following research methodologies were considered:

1. Use of past data. This approach was used by Brown and Weisbenner (2007). It involves considering past decisions made given varying circumstances, and drawing conclusions based on these. This method is limited by the amount of past information that is available, and is unsuitable for this study, as very little has been gathered regarding pension fund members' decision-making, given different levels of information in South Africa.
2. Case study. This approach was used by Thaler and Benartzi (2004) when they researched the SMaRT programme. If used in this research, this would require the members of pension funds to be observed over a period and the decisions that they make recorded. A control group would be set that would be given the basic information. The decisions made by the control would then be compared to those made by members with additional information. This method, however, is unsuitable due to the long nature of the experimental process. In addition, it may be considered intrusive by trustees or members, as actual member choices are analysed. The members in the control group would also be disadvantaged by the limited information provided to them.
3. Surveys. This method is the most common one used in the literature cited. It allows the research to be conducted in a reasonable time frame. In addition, it allows for a control group to be set without disadvantaging any of the participants. Trustees are also more likely to agree to this method of research as it does not analyse actual decisions being made in the pension fund. This is the method of collecting data that was chosen for this research.

5.1 Surveys

Surveys can be conducted through various methods, including questionnaires and interviews. Interviews can be conducted face to face or telephonically, whilst questionnaires are usually done via post, email or web-based methods.

Pinsonneault and Kraemer (1993) observed that surveys may give less reliable information than is assumed by the researcher. The reasons for this are poor response rates,

inappropriate sampling, a survey design that uses one method where another would have been more accurate and the purpose for which the survey is to be used, which will determine a particular method's suitability.

Alexander and Becker (1978) gave similar opinions with regard to questionnaires and interviews. They attributed the poor reliability of responses to the nature of most questionnaires, which is quite abstract and sometimes vague. This results in different interpretations and biased or inappropriate responses. Pinsonneault and Kramer (1993) suggested ways to improve the quality of data obtained through surveys by choosing a survey method that best suits the particular research being done. Vignettes are one such method.

5.2 Vignettes

Hughes (1998) described vignettes as stories that can be used to point to a particular factor in the attitude and thinking of individuals. A survey that uses vignettes in its methodology will present participants with one or more scenarios based on a fictional character. The respondents may then be asked to predict the likely behaviour of the character given his or her particular circumstances. Some studies may go further, and ask the respondents to state how they would behave if they found themselves in a similar situation. The stories can be actual situations respondents typically experience, the findings of earlier research, or alternatively they can be generated by professionals in the particular field of study. The distinguishing feature of vignettes is that they offer detachment or a personal distance from the situation at hand, allowing participants to respond freely and without fear (Johnson, Newton, Jiwa and Goyder, 2005).

Alexander and Becker (1978) noted that vignettes contain references to the factors that are most important or being researched, leading to more standard questions that are similarly interpreted by the respondents. As a result, vignettes tend to reduce ambiguity in survey questions and provide better focus on the particular factor being investigated. Vignettes can be used in interviews and questionnaires to reduce the negative effects of the chosen method on the quality of data obtained.

Vignette responses can give more reliable results than direct surveys that ask a "what would you do" type question, where the responses include choices that are not considered socially responsible. McKegany, Abel, Taylor, Frischer, Goldberg, and Green (1995) observed that among a group of drug users, vignette responses show that respondents may be more inclined to borrow needles from other users as compared to what they reported to be their actual behaviour. The character presented in the vignette was reported to borrow needles

more frequently than the respondents reported themselves as doing. This characteristic of vignette responses is however limited as unacceptable behaviour is still under-reported. In another study of violence in dating relationships, Carlson (1996) found that when using vignettes, respondents tend to under-report violence compared with the actual statistics. The two studies can be interpreted to mean respondents are more likely to report socially unacceptable behaviour in vignettes than direct surveys, but that the responses will still not fully mirror actual occurrence of the unacceptable behaviour which may remain under-reported. Vignettes therefore are likely to be a better survey tool than direct surveys; however they do not remove all bias due to under-reporting of socially unacceptable behaviour.

Saving adequately for retirement may be viewed as a socially responsible ideal. As a result, reporting one's personal financial mismanagement may be seen to portray a negative self-image. When asked to answer survey questions regarding contributing more or increasing activism in one's pension fund so as to meet retirement needs most members will report a willingness to do so. This reported behaviour is, however, not seen over time. This is consistent with the findings of Choi *et al.* (2001) that showed member education and resolution to save more did not result in a significant increase in contributions.

This suggests that respondents may subconsciously seek to portray themselves in the best light when directly answering surveys, which can lead to the results of a survey being inconsistent with observed behaviour. Vignettes offer respondents a way out of this dilemma by introducing a fictitious character whose behaviour is not connected to theirs. However, some self-preservation is still retained by the respondent even in a vignette survey. Further personal interaction with the respondent would be required to get more truthful responses (Barter and Renold, 1999). This follow-up post survey was not done in this study.

Vignettes are better suited to research where the behaviour of a group of individuals under different scenarios is being investigated (Alexander and Becker, 1978). This allows them to be used to predict the behaviour of a group of people in a particular situation (Newsted, Huff and Munro, 1998).

Vignettes will usually offer an individual a very specific situation, devoid of other extenuating circumstances that can and do appear in real life. The researcher can then limit the response to the particular factor being investigated. Newsted, Huff and Munro (1998) stated that surveys allow the researcher to see the effect of different factors in the decision-making process. This was successfully shown by Rettinger, Jordan and Peschiera (2004) in their research of the factors that cause cheating in students. Through the use of vignettes they were able to show that the level of motivation and the competency in a particular subject will

affect the likelihood of cheating differently. Whilst this particular trait of vignettes may be favourable, their specific nature can cause other negative issues to arise. Parkinson and Manstead (1993) argued that the emotion that is generated when responding to a vignette is not representative of how the individual would feel should the situation be real. This is because each person will have many other factors affecting their emotions and behaviour that can lead to a different decision than that reported in the vignette.

5.2.1 Limitations of Vignettes

Though highly praised as an effective research tool, vignettes, like any other research method, are subject to certain limitations and biases. Poor response rates are one of the greatest limitations of survey research (Pinsonneault and Kraemer, 1993), including the vignette method. This is usually due to lack of motivation of the respondents (Phipps, Butani and Chun, 1995) and can result in inaccurate data due to a small sample being used. There is a significant risk with this research as members of pension funds are generally seen to show a low level of participation and interest (Old Mutual 2012). Many researchers have sought to reduce this effect by incentivising respondents through lotteries or other free gifts on participation. Porter and Whitcomb (2003), however, argued that the research and literature suggest that lottery and other incentives have little or no impact on response rates.

Vignettes will only measure the reported action of the respondent and not the actual action that will be taken should a similar situation arise (Eifler, 2007). It is then difficult to measure how the reported actions compare with the actual actions. In this research, members of pension funds may report increased positive behaviour like saving from the improved level of information that is provided, but this does not necessarily mean they would act similarly when the information is finally given. To gain further knowledge into how intentions relate to actual actions further research would be required, in particular through the use of case studies (Eifler, 2007).

In light of the above, it is important to consider how reliable vignettes are as a research tool. Peabody, Luck, Glassman, Dresselhaus and Lee (2000) researched the difference between responses obtained using vignettes and other survey sources to determine the quality of healthcare offered by a group of doctors. They found that vignette responses from physicians were very similar to the results obtained from using the actual experience of trained actors who posed as patients and measured the quality of care provided. The authors concluded that vignettes were a valid and inexpensive research tool.

In a study involving vignettes, it is important that the questions asked be neutral and not designed to sway members towards a particular result. The questions and the study must not induce panic or other undesirable effects on members, especially those who will be close to retirement with clearly inadequate savings. These matters were given adequate consideration in the design and implementation of the study.

5.2.2 Design of the vignettes and analysis of results

In order to see the effect of a particular factor on decision-making using vignettes, the questions or scenarios must be structured appropriately. Barter and Renold (1999) offer issues to consider in the design of vignettes. These include ensuring that the stories used are likely to occur in real life and should not include disastrous events or eccentric characters that can take the respondents' concentration away from the factor being considered. The stories should also be readily understood without being complex. Another important consideration will be the sample to be used. This must be representative of the population. In addition, the data to be collected should also be sufficient to allow meaningful statistical analysis.

This research was conducted through surveys of members. A vignette study, similar to that used by Van Dalen *et al.* (2010) was applied. Email invitations were sent to members of pension funds through the human resource departments of targeted companies or through personal contacts. The email contained a link to an online survey.

The research presented three vignettes to participants. These vignettes offered participants choices relating to contribution rates and the option to preserve savings on retirement. These are two of the issues that were seen to affect benefit adequacy at retirement (Facer and Reynolds, 2010; Groyer and Holtzhausen, 2006). Each vignette had three treatments with different information in each. One treatment had standard information and the others provided additional information. The participants were presented with randomly selected vignettes, but did not have the same vignette in two or more forms (i.e. they only answered one out of the three treatments of each vignette and did not see the other two treatments). Each treatment contained incremental information, but gave the same answer options. The responses obtained showed how the decisions made differ when members are provided with additional information. The data obtained from the vignettes were analysed and conclusions drawn.

5.3 Target sample and survey distribution methodology

The survey was conducted on the members of pension funds via the employer, and also through personal contacts who are members of defined contribution pension funds. An email, which contained a brief explanation of the research and a link to the web-based survey, was sent to the participants. The survey was voluntary and permission was sought from the employer where the survey was sent company-wide. A lottery for 4 Pick'n Pay vouchers of R500 was conducted to offer incentive for participating in the survey. Participants were drawn from manufacturing, construction, financial services, retail and marine services companies. The survey participation per employer is summarised in the table below.

Table 5.1: Breakdown of participants

| Employer | Respondents | Response rate |
|-------------------|--------------------|----------------------|
| CSC | 35 | 15% |
| Nova Group | 6 | 4% |
| NMG | 28 | 47% |
| Power Group | 23 | 6% |
| Distell | 38 | n/a |
| V & A Waterfront | 15 | n/a |
| AGS Movers | 6 | n/a |
| Personal contacts | 25 | n/a |
| Total | 176 | |

Response rates have been calculated where the total numbers of invitations to participate in the survey are known. It can be seen that response rates are quite low for most companies. There were 176 respondents who finished the survey to the end, though not all questions were answered. For the purposes of this research we have excluded those responses which were not completed in full to avoid double counting if a member attempts the survey again.

6 Survey Findings: Description, Analysis and Synthesis

This research seeks to consider whether improving the quality and quantity of information provided to members of pension funds is likely to positively affect the quality of decisions they make with regard to their retirement funding, and consequently result in improved retirement benefit adequacy. The research surveyed members of defined contribution pension funds. The full set of survey questions used can be found in Appendix A of this report.

The survey was run over a period of six months. A total of 165 participants completed the survey, although not all answered the questions in full. An initial pilot survey was run prior to this period using the exact same method and survey questions on eleven individuals. No changes were made to the survey after this pilot. The results have been analysed showing the responses from the survey including the pilot study. We have chosen to use the combined results as they introduce no bias to the results but increase the sample size for more reliable statistical inference. A summary of the demographic information of the respondents is provided in Appendix B.

All statistical tests have been done at the 5% level of significance for strong evidence to reject the null hypothesis, and at the 10% level for weak evidence to reject the null hypothesis. The analysis for each question has been conducted and presented separately below.

6.1 Results for question 1

This question asks members how much a 25 year old woman would choose to contribute into the pension fund. Treatment A gives information on the employer contribution rate of 5% and the allowable range of choices of 5%, 7% or 10%. Treatment B gives the same information as treatment A, but also adds that most members contribute 7% into their pension fund. Treatment C gives the same information as in Treatment B, but also informs the respondent that the typical member needs to contribute between 7% and 10% of salary to adequately provide for retirement. The respondents were randomly assigned either treatment A, B or C, and had the option to choose between a 5%, 7% or 10% contribution rate, based on the information given in their treatment. The table overleaf shows the responses received for question 1.

Table 6.1 – Responses to question 1.

| Contribution rate | Number of Responses | | | % responses | | |
|-------------------|---------------------|----|----|-------------|------|------|
| | Treatment | | | Treatment | | |
| | A | B | C | A | B | C |
| 5% | 32 | 11 | 12 | 47% | 24% | 19% |
| 7% | 19 | 28 | 32 | 28% | 62% | 51% |
| 10% | 17 | 6 | 19 | 25% | 13% | 30% |
| Total | 68 | 45 | 63 | 100% | 100% | 100% |

The table above shows the number of responses for each of the treatments under question 1 and the proportions selecting each rate. The treatments were randomly assigned to the participants. There were, however, fewer allocations of responses to treatment B, which was not expected.

It can be seen that a greater proportion of respondents chose the 5% contribution rate in treatment A than in treatment B, and in treatment B than in treatment C. This would suggest that the additional information led to fewer respondents selecting the lower contribution rate. The proportion who selected a 7% contribution rate was lower in treatment A than in treatment B, but higher in treatment B than in treatment C. This suggests that the additional information in treatment B results in more members selecting the typical rate of 7%. The information in treatment C, however, resulted in an even higher contribution rate of 10% being selected more often. We then used statistical methods to test the significance of these results. A one-way z-test to measure the difference in proportions was used. Yates continuity correction was considered but not used as an adequate number of responses were available in each cell. The null hypothesis is that there is no significant difference in members' decisions given different amounts of information. The alternative hypothesis is that the additional information causes decision-making which results in improved retirement provisioning. This is shown in Appendix C⁹.

We first tested whether there was a significant difference in the proportions of members who choose the 5% contribution rate in each treatment. The z-test for each pair of treatments shows that we can reject the null hypothesis at the 5% level for each comparison where one of the treatments is A. There is no significant difference, however, in the proportion who select the 5% rate in the comparison between treatment B and C. This suggests that additional information above that provided in treatment A results in a significant decrease in members who select the lowest contribution rate. Additional

⁹ Appendix C shows the full detail of all statistical tests carried out.

information for those who already had more than the basic information in treatment A does not result in a significant decrease in those selecting the 5% contribution rate.

The results show that the proportion that select a 10% contribution rate actually decreases as additional information is provided from treatment A to treatment B. This illustrates the power of conformity with peers which results in an increased proportion selecting the 7% contribution rate in line with their peers' actions. This suggests that providing information on the actions of peers is useful where peers are making better decisions than the member would have made on their own. Where peers are making worse decisions, the information could lead to a member selecting a lower rate than they would have chosen without this additional information. The reduction in those selecting the higher rate of 10% is however more than offset by the reduction in the proportion that select the 5% contribution rate in treatment B compared to treatment A.

A third test was carried out to see whether the proportion of participants who chose the 7% contribution rate increased with increasing information. The results show that we have strong evidence to reject the null hypothesis for comparisons between treatments A and B and treatment A and C. There is insufficient evidence to reject the null hypothesis for comparisons between treatments B and C. Any additional information provided from that in treatment A results in a significant increase in members who choose the 7% contribution rate.

6.2 Results for question 2

This question presents a 50 year old male earning R100,000 a year and with R170,000 saved up in his retirement fund who is currently contributing 6% of his salary to the pension fund. Treatment A provides information on the allowable range of contribution rates, the current average contribution rate of peers and the required contribution rate to retire with adequate savings for a typical member. Treatment B provides additional information on the member's required replacement ratio, and the projected replacement ratio at the member's current contribution rate. Treatment C provides additional information on the contribution rate that would be required to allow the member to retire with his required replacement ratio.

The respondents were randomly assigned either a treatment A, B or C, and had the option to choose a 5%, 6%, 9% or 12% contribution rate, based on the information given in their treatment.

Table 6.2 – Results for question 2

| Contribution rate | Number of Responses | | | % responses | | |
|-------------------|---------------------|-----------|-----------|-------------|------|------|
| | Treatment | | | Treatment | | |
| | A | B | C | A | B | C |
| 5% | 3 | 1 | 1 | 5% | 2% | 2% |
| 6% | 15 | 12 | 10 | 25% | 22% | 17% |
| 9% | 19 | 20 | 15 | 32% | 37% | 25% |
| 12% | 22 | 21 | 33 | 37% | 39% | 56% |
| | 59 | 54 | 59 | 100% | 100% | 100% |

The table above shows that few members chose to reduce their contribution rate to 5% in any of the treatments. The proportion of respondents choosing to maintain the 6% contribution rate were higher in treatment A than in treatment B. Treatment C had the lowest proportion of respondents maintaining the same contribution rate of 6%. Treatment B has the highest proportion of members selecting the 9% contribution rate, and treatment C has the highest proportion selecting the 12% contribution rate.

The effect of increasing the information can be seen more clearly when we group the contribution rates into the 5% and 6% group representing those who choose to decrease the rate of contribution or make no change, and the 9% and 12% rate, representing those who choose to increase their contribution rate. The adjusted table showing this alternative split is shown below.

Table 6.3 – Condensed results for question 2

| Contribution rate | Number of Responses | | | % responses | | |
|-------------------|---------------------|-----------|-----------|-------------|------|------|
| | Treatment | | | Treatment | | |
| | A | B | C | A | B | C |
| 5% + 6% | 18 | 13 | 11 | 31% | 24% | 19% |
| 9% + 12% | 41 | 41 | 48 | 69% | 76% | 81% |
| | 59 | 54 | 59 | 100% | 100% | 100% |

The adjusted table above suggests that the additional information provided in treatment B results in an increase in the proportion choosing a higher contribution rate. The additional information in treatment C results in a decrease in the proportion that choose to lower or maintain their contribution rate, and an increase in those who choose to increase their contribution rate. Similar hypothesis tests to question 1 were run to test whether the differences in proportion were significant to base conclusions on. Appendix C shows a summary of the tests and results obtained. The results show that there is weak evidence to reject the null hypothesis when comparing treatments A and C.

A hypothesis test was run on the data to see whether the proportion that chooses to increase their contribution to 12% is significantly higher, given additional information. There is strong evidence to reject the null hypothesis when comparing treatments A and C as well as B and C. This suggests that once we inform a member of how much they have saved and how far it falls short of their requirements, and also provide information regarding the steps that they can take to achieve their desired target benefit the result is a significant proportion of members choosing to contribute at a higher rate. This implies that we need to provide information that informs a member if they are not on track to meeting their retirement goals, and also information on any remedial actions that can be taken to approach their target benefits.

6.3 Results for question 3

This scenario presented a member who is changing employers and has R75,000 saved in his pension fund. He has the option of receiving this benefit as a transfer to his new employer's pension fund, a partial transfer to the new fund and the remainder in cash, or the full benefit paid out to him in cash. Treatment A gives information on the options available to the member. Treatment B gives additional information on the effect of failing to preserve the benefit at retirement as compared to peers who do. Treatment C gives all the information in treatment B and also provides the member with the additional contribution rate to be made for the rest of his working life-time to make up for failing to preserve the benefit. In addition, the member is informed of the additional contributory service he would need to allow him to catch up with his counterparts who would have preserved their benefit. The latter is presented as a late retirement age.

The respondents were randomly assigned either treatment A, B or C, and had the option of receiving their benefit as a full transfer, a partial transfer or a cash benefit. A decision was made based on the information given in the treatment. The table below shows the responses received for question 3.

Table 6.4 – Results for question 3

| Choice of Benefit on exit | Number of Responses | | | % responses | | |
|---------------------------|---------------------|----|----|-------------|------|------|
| | Treatment | | | Treatment | | |
| | A | B | C | A | B | C |
| Cash | 18 | 3 | 5 | 30% | 5% | 9% |
| Partial | 12 | 25 | 11 | 20% | 42% | 21% |
| Full | 30 | 31 | 38 | 50% | 53% | 70% |
| | 60 | 59 | 54 | 100% | 100% | 100% |

The responses tabulated above show that there is a decrease in the proportion of respondents who choose to take a cash benefit as additional information is provided from treatment A to treatment B. Information on the reduced benefit due to non-preservation results in a higher proportion of members choosing a partial transfer. There is therefore an increased proportion that preserves their benefit in treatment B compared to treatment A, although this is mainly in partial rather than full transfers. The similar response is seen when comparing treatment A and C. Any additional information from that provided in treatment B does not result in reduced proportion selecting cash. When more information is given on the actions that a member would need to take in order to make up for not taking a full transfer a higher proportion of respondents chose to transfer the full benefit to the new employer. This is seen from the higher proportion who choose to make a full transfer of their benefit in treatment C than in treatment B.

The statistical tests show that the proportion of respondents who choose to take a cash benefit decreased significantly as information was added from treatment A to treatment B. This would also suggest that minimal information on the consequence of taking a cash benefit is adequate to reduce the proportion who take out a cash benefit. This, however, may not prove to be so in real life situations, especially where the option to take out a partial benefit is not provided.

A more informative analysis would be to consider the total amount that is paid out as cash, and how this changes with the additional information. If we assume that a partial transfer will be 50% in cash and 50% transferred to the new fund, we can determine whether the additional information affects the proportion of those who choose to transfer their benefit rather than taking it in cash. The table below shows the condensed result allowing for an equal split between cash and full transfers in the partial transfers option.

Table 6.5 – Condensed results for question 3

| Choice of Benefit on exit | Number of Responses | | | % responses | | |
|---------------------------|---------------------|------|------|-------------|------|------|
| | Treatment | | | Treatment | | |
| | A | B | C | A | B | C |
| Cash | 24 | 15.5 | 10.5 | 40% | 26% | 18% |
| Transfer | 36 | 43.5 | 43.5 | 60% | 74% | 74% |
| | 60 | 59 | 54 | 100% | 100% | 100% |

The proportion that chooses to take their benefit in cash decreases as more information is provided. The z-test for the difference in proportions show that there is strong

evidence to reject the null hypothesis of no significant difference when comparing the proportion who choose to take a cash benefit between treatments A and B, as well as A and C. We, however, cannot reject the null hypothesis when comparing treatments B and C. This suggests that the information provided in treatment B is adequate to reduce those who choose a cash benefit and additional information may not be useful in deterring the remaining members who take a cash benefit.

The statistical tests also show that there is strong evidence to reject the null hypothesis for those that take the full transfer benefit when comparing treatments A and C as well as B and C. This suggests that the information provided in treatment C results in a greater proportion of members selecting to make a full transfer.

6.4 Synthesis of results

The results suggest that additional information provided to members of pension funds is likely to affect their decision-making. The following conclusions can be drawn from the results, subject to the constraints identified and discussed in section 6.5.

Information relating to the decisions of peers alters the decisions made regarding the contribution rate. Where a member would have selected a lower contribution rate, the information on peers' decisions led to a significantly higher proportion selecting the higher contribution in line with their peers. Where a member would have selected a higher contribution rate a significant proportion also chose to lower their contribution rate in line with the popular decision of their peers. This is in line with the findings of J P Morgan (2010), which indicate that when considering providing additional information to members of pension funds relating to their peers' decisions, the benefit may only be derived if most peers make better than average decisions.

Information relating to generally required contribution rates for benefit adequacy significantly changes the decisions made by members of pension funds. When provided with this information a greater proportion of participants choose a higher contribution than when this information is not provided. The proportion is also higher than when information on peer group actions is provided. This shows that it is better to provide data that guides the average member to make a better contribution rate decision than to provide the peer decisions. Choi *et al.* (2001) found that members choose options that require the least effort on their part. When a recommendation is provided regarding the optimal contribution rate members are likely to choose the recommendation as they would resist the effort of tailoring their contribution rates to their specific needs.

Question 1 provided general information to the members. The results of question 2 show what happens when the information provided is specific to the particular individual. The first treatment in question 2 gives general information, and the responses show that even when given general information some members will still choose to reduce their contribution rates or maintain their current inadequate rate. However, once members were provided with specific information relating to the current status of their savings fewer members choose to reduce their contribution rates. This suggests that poor decisions may be due to members not realising how far they are from their retirement goals, and that once this is communicated members are capable of making better decisions resulting in improved benefit adequacy.

When specific information is provided regarding the remedial actions that a member can take to better meet their retirement goals, the member is likely to make decisions that improve his retirement saving position. This shows that specific information that goes beyond how far a member has gone towards meeting their retirement goals, but actually gives positive actions that can be taken to improve their situation prompts more members to select the more optimal options.

The results of the survey also show that members are more likely to preserve their benefits if they are provided with information that shows them the results of their non-preservation. This suggests that members will assume they can make up any non-preserved benefits over a shorter time than would be required. This is consistent with the findings of Groyer and Holtzhausen (2006) who suggested that a lack of understanding of one's retirement needs does result in reduced benefit preservation. Brown and Weisbenner (2007) also suggest that bounded rationality can result in members making sub-optimal choices regarding their retirement savings. A constraint could be limited information on the consequences of certain decisions. Old Mutual (2012) found that advice and guidance were significant determinants in whether individuals chose to preserve their benefits or take it out as cash. The results show that when members are given information both on the choices available to them, and the consequences of these choices, fewer members chose to take out a cash benefit.

The results can, however, not be taken to mean that more information will necessarily result in better decision-making. In some scenarios the additional information led to no significant difference, depending on the information already available to the member. Question 2, which had a high level of information in its treatment A, showed the least significance in the other treatments. As an example, the additional information in treatment B of question 2 led to no significantly higher contribution rate than treatment A. In this case the

cost of providing the additional information may outweigh any benefit received by the members.

Old Mutual (2012) found that 50% of members who receive benefit statements do not read them. This suggests that even when additional information could be useful unless members actually read their benefit statements or information provided by trustees the additional information will benefit even less members. The results of this survey are therefore useful in determining what must be provided to members to help them make optimal decisions regarding their contribution rates and preservation of benefits where members actually read and understand the information provided to them.

6.5 Research Constraints and Limitations

This research is informative and could be useful in determining the level of information that members of pension funds must be provided with. However, there are constraints and limitations that must be noted and considered when applying these results.

The greatest limitation is that the participants may not be representative of the population to which the results are to be applied. The survey was designed to reduce this effect by targeting respondents from different companies and sectors of the economy. They included those who work in financial services, manufacturing, construction, retail and marine services. Whilst this measure was useful in ensuring the sample responses were more representative of the population, other factors could still have introduced an unrepresentative sample, and are discussed further below.

The individuals who chose to answer the survey may not be a true representation of the broader pension fund population. Individuals who would answer a retirement survey are generally more likely to be those who are actively involved in their pension funds and make conscious decisions to improve their retirement savings position. Those who already exhibit apathy may be unwilling or unmotivated to participate. Hence results may show the typical response of members whose interest in their retirement saving is higher than that of the average member, and thus whose reported decisions are not likely to be typical of the average member. This would mean the sample used may not be the best representation of the broader population, and inference of the results on the population at large is inaccurate. This effect may have been reduced by the prize which offered an incentive to participate for the average member who might otherwise have been uninterested.

Another reason that could make the sample a poor representation of the population is the method of distribution. The survey was online based, and therefore could only be sent out

to members of pension funds who have internet access in their workplace. This limited the demography of respondents to those who have internet access and whose jobs offer more opportunity to be online. As an example, members whose jobs do not include regular computer based work are less likely to participate in the survey.

Another constraint may be the way the questions were presented. The survey used vignettes and not actual member actions. Whilst vignettes aid in allowing participants to freely show poor decision-making, they also remove the emotion and individual circumstances that a member would experience when making a decision. As an example, a respondent may be certain that on providing additional information, the character presented will choose to preserve their benefit on withdrawal from the fund. However, when presented with the same information the respondent may act differently as other factors may need to be considered. The temptation to take a cash benefit may be greater than assumed when answering the vignette. This is identified as the major obstacle relating to vignette studies, and its effect on this research must be considered.

The research only looks at the effect of additional information and excludes other factors like the cost of providing this information, and the method by which such information would be communicated to the members. The cost of providing additional information may also include possible litigation if members' benefits fall short of projections at retirement. The administrative cost of providing the information over the members' working life-times may be significant, and reduce the retirement benefit further.

The effectiveness of the information will also depend on the communication method. This will likely differ in different funds. There may also be a need for increased education of members in order for them to understand the different terms used in the communication, which would be an additional expense. An ineffective communication method may not yield the same result.

7 Conclusions and Recommendations

7.1 Conclusions

In conclusion, this research suggests that improving the quality and quantity of information provided to members of pension funds may result in better decision-making, and consequently improved retirement provisioning. The improvement, however, is dependent on the additional information provided. The results of the research may be useful for service providers of pension funds as well as trustees as they seek to find the optimal level of information that will result in better decision-making by members.

The research leads us to tentatively conclude the following:

1. The lack of adequate information likely leads to poor decision-making by pension fund members regarding their retirement saving.
2. The provision of additional information may lead to better decision-making by members of pension funds. Information specific to the member's situation is likely to result in better decision-making than general information.

In our research problem we suggested that there are two questions that a member must be able to answer in order to close the gap between what the member has saved and what they expect to receive at retirement. These are:

1. How much do I need to fund my retirement? – The research shows tentative evidence that when members are given contribution rate options that are linked to a particular benefit level they are more likely to choose the rate that provides a benefit in line with their needs. This is not seen when they are only given the contribution rate choices with no information on how each choice helps meet their benefit expectation.
2. How much have I saved so far? – The research shows tentatively that when members are given information which shows whether their savings can meet retirement needs they make decisions that ensure they are on track to meet these goals.

7.2 Recommendations

The following recommendations can be made from the results of this research.

Pension fund members should be provided with information that allows them to make the best decision for their retirement saving. Information on the actions of peers is useful

when the member is likely to make worse decisions than peers, but may also result in those who would want to choose a higher contribution rate deciding to select a lower one in line with the actions of their peers. Information on peer decisions must, therefore, be tailored to suit the audience and provide appropriate knowledge or it may lead to worse decisions.

General information relating to the retirement needs of a typical member is useful for better decision-making. Information specific to the member may result in a higher proportion of members making better decisions, and reduce significantly those that make poor decisions. Information, therefore, should be tailored to the particular individual's needs, subject to reasonable cost. Specific information tends to be more technical and may require educating members to ensure they understand it. It may also produce expectations of greater benefits for members and lead to increased litigation when benefits do not meet the projected values. It is therefore important that when specific information is provided members are clearly warned that it is subject to certain assumptions and can change. Sensitivity analysis can be used to show the effect of small changes in assumptions, although this will become even more expensive when provided on an individual basis.

Members benefit from knowing the consequences of the options provided to them. This can be provided as a reduced or increased replacement ratio or other form that clearly shows the adverse or positive result of a decision.

The regulator should consider providing clearer and more specific guidance on what constitutes adequate member information to guide trustees and service providers in addition to what is provided in Circular PF86.

7.3 Further research

The results of this research show that there is a relationship between the information provided and the decisions made by members of pension funds. There is, however, scope for further research.

The gains resulting from improved information must not be eroded by the cost of providing this information. Further research which considers the cost benefit analysis of the different information levels would be required.

A more intensive research using case studies to see how the effect of information affects decision-making in real-life situations is also required. This can be carried out over a longer period of time to see whether the behaviour reported in this survey will turn out the same way in practice.

Research that considers the effect of additional information on decision making for decisions other than contribution rates and preservation can be done. Such areas include investment choice, and the trade-off between insured benefits and retirement benefits over the members working life-time.

Research into effective communication methods is also vital as any additional information is only useful if members actually read and understand it.

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1C Sam is a 25 year old woman who is starting her first job. Her employer requires her to join the company's pension fund. Sam is allowed to choose how much to contribute within the range of 5% to 10% of her monthly salary. The employer contributes 5% of salary for each member regardless of how much the member chooses to contribute into the fund. Information is also provided that shows that most members contribute 7% of their salary into the fund. In addition, Sam is informed that a typical member will need, on average a total contribution (employer plus member) of between 12% and 15% of monthly salary over their working life-time to provide adequately for retirement, i.e. member contribution of between 7% and 10% of salary. What do you think Sam is most likely to contribute into the fund?

- a) Sam chooses to contribute 5% as it is the lowest rate, and since she still has many years on the pension fund in which she can build up her benefit.
- b) Sam chooses to contribute 7% as this is somewhere in the middle of the allowable range, is in line with most other members and is in line with the minimum recommended rate for adequate savings for a typical member.
- c) Sam selects 10% as she has no major expenses like children or a mortgage and understands the benefit of starting to save early, and in line with the top end of the recommended rate.

Question 2

2A Peter is a 50 year old member of a pension fund, who earns R100,000 a year and has R170,000 saved in his pension fund as shown in his latest benefit statement. He is expecting to retire at age 65 and currently contributes to the fund at a rate of 6% of his salary. The employer also contributes 6% of the member's salary on his behalf bringing his total contribution into the fund per month to 12% of salary. His benefit statement also advises him of the following:

- He has the option to change his member contribution to between 4% and 12% of salary i.e. total contribution of between 10% and 18% of salary.
- The average member contribution rate is 5% i.e. a total contribution of 11% of salary
- Members will on average need a total contribution (employer plus member) of between 12% and 15% to provide adequately for retirement, i.e. member contribution of between 6% and 9% of salary.

What changes do you think Peter is most likely to make to his member contribution rate?

- a) He does not change his member contribution as it is already above the average rate and within the recommended range as stated in the benefit statement.
- b) He decreases his member contribution to 5% in line with what most other members are contributing.
- c) He increases his member contribution to 9% as it is the maximum of the range specified in the benefit statement as adequate for the typical member.
- d) He increases his member contribution to 12% as he is nearing retirement and wants to ensure he has enough saved up.

2B Peter is a 50 year old member of a pension fund, who earns R100,000 a year and has R170,000 saved in his pension fund as shown in his latest benefit statement. He is expecting to retire at age 65 and currently contributes to the fund at a rate of 6% of his salary. The employer also contributes 6% of the member's salary on his behalf bringing his total contribution into the fund per month to 12% of salary. His benefit statement also advises him of the following:

- He has the option to change his member contribution to between 4% and 12% of salary i.e. total contribution of between 10% and 18% of salary.
- The average member contribution rate is 5% i.e. a total contribution of 11% of salary
- Members will on average need a total contribution (employer plus member) of between 12% and 15% to provide adequately for retirement, i.e. member contribution of between 6% and 9% of salary.
- If he continues to contribute at the current rate of 6%, Peter is projected to receive a benefit of 45% of his final salary at retirement. Ideally Peter would wish to retire on an income of at least 55% of his final salary.

What changes do you think Peter is most likely to make to his member contribution rate?

- a) He does not change his member contribution as it is already above the average rate and within the recommended range as stated in the benefit statement.
- b) He decreases his member contribution to 5% in line with what most other members are contributing.
- c) He increases his member contribution to 9% as it is the maximum of the range specified in the benefit statement as adequate for the typical member.
- d) He increases his member contribution to 12% as he is nearing retirement and wants to ensure he has as much as possible saved up.

2C Peter is a 50 year old member of a pension fund, who earns R100,000 a year and has R170,000 saved in his pension fund as shown in his latest benefit statement. He is expecting to retire at age 65 and currently contributes to the fund at a rate of 6% of his salary. The employer also contributes 6% of the member's salary on his behalf bringing his total contribution into the fund per month to 12% of salary. His benefit statement also advises him of the following:

- He has the option to change his member contribution to between 4% and 12% of salary i.e. total contribution of between 10% and 18% of salary.
- The average member contribution rate is 5% i.e. a total contribution of 11% of salary
- Members will on average need a total contribution (employer plus member) of between 12% and 15% to provide adequately for retirement, i.e. member contribution of between 6% and 9% of salary.
- If he continues to contribute at the current rate of 6%, Peter is projected to receive a benefit of 45% of his final salary at retirement. Ideally Peter would wish to retire on an income of at least 55% of his final salary.
- A member contribution rate of 12% of salary per month (i.e. total contribution rate of 18%) can bring his projected retirement benefit to 55% of salary.

What changes do you think Peter is most likely to make to his member contribution rate?

- a) He does not change his member contribution as it is already above the average rate and within the recommended range as stated in the benefit statement.
- b) He decreases his member contribution to 5% in line with what most other members are contributing.
- c) He increases his member contribution to 9% as it is the maximum of the range specified in the benefit statement as adequate for the typical member.
- d) He increases his member contribution to 12% as he is nearing retirement and this is projected to provide the desired benefit at retirement.

Question 3

3A Luke is a 35 year old member of a DC pension fund, who has worked for the same company for 10 years. His accumulated share of fund is R75,000. He has accepted a position at a different company and has withdrawn from the Pension Fund. He will receive the full value of his share of fund and the benefit is payable as:

1. A cash benefit paid into his bank account after tax is deducted.
2. A transfer to the new pension fund he will be joining with no tax deduction.
3. A transfer of a portion of his share of fund to the new pension fund and the remainder in cash.

How will Luke most likely choose to receive his benefit?

- a) A cash benefit that he can spend or invest as required
- b) A transfer to the new fund
- c) A partial transfer to the new fund and the remainder in cash.

3B Luke is a 35 year old member of a DC pension fund, who has worked for the same company for 10 years. His accumulated share of fund is R75,000. He has accepted a position at a different company and has withdrawn from the Pension Fund. He will receive the full value of his share of fund and the benefit is payable as:

1. A cash benefit paid into his bank account after tax is deducted.
2. A transfer to the new pension fund he will be joining with no tax deduction.
3. A transfer of a portion of his share of fund to the new pension fund and the remainder in cash.

The trustees of his fund, in consultation with the fund's actuary prepare a document that explains the consequences of the different actions. The following are the major points made

- Members who fail to preserve their benefits on moving between companies when between the ages of 35 and 45 on average retire with 26% less than those who do.

How will Luke most likely choose to receive his benefit?

- a) A cash benefit that he can spend or invest as required
- b) A transfer to the new fund
- c) A partial transfer to the new fund and the remainder in cash.

3C Luke is a 35 year old member of a DC pension fund, who has worked for the same company for 10 years. His accumulated share of fund is R75,000. He has accepted a position at a different company and has withdrawn from the Pension Fund. He will receive the full value of his share of fund and the benefit is payable as

1. A cash benefit paid into his bank account after tax is deducted.
2. A transfer to the new pension fund he will be joining with no tax deduction.
3. A transfer of a portion of his share of fund to the new pension fund and the remainder in cash.

The trustees of his fund, in consultation with the fund's actuary prepare a document that explains the consequences of the different actions. The following are the major points made

- Members who fail to preserve their benefits on moving between companies on average retire with 26% less than those who do.
- If the benefit is not preserved, Luke will need to contribute an additional 4.3% of his salary for the rest of his working life-time to come to the same benefit as if he had preserved his benefit.
- If he preserves just half of his current benefit, he will have to retire at 67 years rather than 65 to get the same benefit as if he had preserved the full amount, assuming he continues to contribute at the same level he has been to date.

How will Luke most likely choose to receive his benefit:

- a) A cash benefit that he can spend or invest as required
- b) A transfer to the new fund
- c) A partial transfer to the new fund and the remainder in cash.

Appendix B: Summary of Responses

The tables below illustrate the demographic data relating to the survey responses. These have been split to show the responses excluding the initial pilot and including the initial pilot.

Table B1: Respondents split according to gender

| | |
|---------|-----|
| Males | 77 |
| Females | 99 |
| Total | 176 |

Table B2: Respondents split according to age

| Age | Number of participants |
|--------------|------------------------|
| <20 | 0 |
| 21-30 | 51 |
| 31-40 | 61 |
| 41-50 | 41 |
| 51-60 | 22 |
| 61+ | 1 |
| Total | 176 |

Appendix C: Statistical tests

The following test statistic was used for all tests shown.

The statistic used for all hypothesis tests is the z-statistic defined as follows:

$$Z = \frac{p_1 - p_2}{SE}$$

Where:

Z follows a normal distribution with mean 0 and standard deviation of 1.

p_1 is the proportion in treatment 1

p_2 is the proportion in treatment 2, and

SE is the standard error evaluated as:

$$SE = \sqrt{p(1-p) \left(\frac{1}{N_1} + \frac{1}{N_2} \right)}$$

Where

$$p = \frac{N_1 p_1 + N_2 p_2}{N_1 + N_2}$$

N_1 is the number of responses in treatment 1

N_2 is the number of responses in treatment 2

Question 1

Proportion who select the 5% contribution rate.

H_0 : The proportion of participants who chose the 5% contribution rate is the same in treatment i and j .

H_1 : The proportion of participants who chose the 5% contribution rate is higher in treatment i than in j .

The table below shows the results of the difference in proportions z test applied to combinations of the treatments A, B and C.

| i | j | P_i | P_j | N_i | N_j | P | SE | Z | P-value | Decision on H_0 |
|---|---|-------|-------|-------|-------|-----|-------|--------|---------|------------------------|
| A | B | 47% | 24% | 68 | 45 | 38% | 9.33% | 2.4238 | 0.77% | Reject strong evidence |
| B | C | 24% | 19% | 45 | 63 | 21% | 7.99% | 0.6754 | 24.97% | Cannot reject |
| A | C | 47% | 19% | 68 | 63 | 34% | 8.26% | 3.3916 | 0.03% | Reject strong evidence |

Proportion who select the 7% contribution rate

H_0 : The proportion of participants who choose the 7% contribution rate is the same in treatment i and j.

H_1 : The proportion of participants who choose the 7% contribution rate is higher in treatment j than in i.

The results are illustrated in the table below.

| i | j | P_i | P_j | N_i | N_j | P | SE | Z | P-value | Decision on H_0 |
|---|---|-------|-------|-------|-------|-----|-------|---------|---------|------------------------|
| A | B | 28% | 62% | 68 | 45 | 42% | 9.47% | -3.6194 | 0.01% | Reject strong evidence |
| B | C | 62% | 51% | 45 | 63 | 56% | 9.70% | 1.1784 | 88.07% | Cannot reject |
| A | C | 28% | 51% | 68 | 63 | 39% | 8.53% | -2.6802 | 0.37% | Reject strong evidence |

Proportion who select the 10% contribution rate

H_0 : The proportion of participants who choose the 10% contribution rate is the same in treatment i and j.

H_1 : The proportion of participants who choose the 10% contribution rate is higher in treatment j than in i.

The results are illustrated in the table below.

| i | j | P_i | P_j | N_i | N_j | P | SE | Z | P-value | Decision on H_0 |
|---|---|-------|-------|-------|-------|-----|-------|---------|---------|------------------------|
| A | B | 25% | 13% | 68 | 45 | 20% | 7.74% | 1.5079 | 93.42% | Cannot reject |
| B | C | 13% | 30% | 45 | 63 | 23% | 8.23% | -2.0438 | 2.05% | Reject strong evidence |
| A | C | 25% | 30% | 68 | 63 | 27% | 7.81% | -0.6608 | 25.44% | Cannot reject |

H_0 : The proportion of participants who choose the 10% contribution rate is the same in treatment i and j.

H_1 : The proportion of participants who choose the 10% contribution rate is higher in treatment i than in j.

The results are shown in the table below.

| i | j | P_i | P_j | N_i | N_j | P | SE | Z | P-value | Decision on H_0 |
|---|---|-------|-------|-------|-------|-----|-------|------|---------|------------------------|
| A | B | 25% | 13% | 68 | 45 | 20% | 7.74% | 1.51 | 6.58% | Reject - weak evidence |

Question 2

Proportion in 5% or 6%

H_0 : The proportion of participants who choose the 5% or 6% contribution rates is the same in treatment i and j.

H₁: The proportion of participants who choose the 5% or 6% contribution rates is higher in treatment i than in j.

The results are illustrated in the table below.

| i | j | P _i | P _j | N _i | N _j | P | SE | Z | P-value | Decision on H ₀ |
|---|---|----------------|----------------|----------------|----------------|-----|-------|--------|---------|----------------------------|
| A | B | 31% | 24% | 59 | 54 | 27% | 8.40% | 0.7657 | 22.19% | Cannot reject |
| B | C | 24% | 19% | 54 | 59 | 21% | 7.70% | 0.7050 | 24.04% | Cannot reject |
| A | C | 31% | 19% | 59 | 59 | 25% | 7.93% | 1.4967 | 6.72% | Reject - weak evidence |

Proportion in 9%

H₀: The proportion of participants who choose the 9% contribution rate is the same in treatment i and j.

H₁: The proportion of participants who choose the 9% contribution rate is higher in treatment j than in i.

The results are illustrated in the table below.

| i | j | P _i | P _j | N _i | N _j | P | SE | Z | P-value | Decision on H ₀ |
|---|---|----------------|----------------|----------------|----------------|-----|-------|---------|---------|----------------------------|
| A | B | 32% | 37% | 59 | 54 | 35% | 8.95% | -0.5399 | 29.46% | Cannot reject |
| B | C | 37% | 25% | 54 | 59 | 31% | 8.71% | 1.3336 | 90.88% | Cannot reject |
| A | C | 32% | 25% | 59 | 59 | 29% | 8.34% | 0.8131 | 79.19% | Cannot reject |

Proportion in 12%

H₀: The proportion of participants who choose the 12% contribution rate is the same in treatment i and j.

H₁: The proportion of participants who choose the 12% contribution rate is higher in treatment j than in i.

The results are illustrated in the table below.

| i | j | P _i | P _j | N _i | N _j | P | SE | Z | P-value | Decision on H ₀ |
|---|---|----------------|----------------|----------------|----------------|-----|-------|---------|---------|----------------------------|
| A | B | 37% | 39% | 59 | 54 | 38% | 9.14% | -0.1751 | 43.05% | Cannot reject |
| B | C | 39% | 56% | 54 | 59 | 48% | 9.41% | -1.8117 | 3.50% | Reject strong evidence |
| A | C | 37% | 56% | 59 | 59 | 47% | 9.18% | -2.0299 | 2.12% | Reject strong evidence |

Question 3

Proportion who select a cash benefit

H₀: The proportion of participants who choose to receive their benefit as cash is the same in treatment i and j.

H₁: The proportion of participants who choose to receive their benefit as cash is higher in treatment i than in j.

The results are illustrated in the table below.

| i | j | P _i | P _j | N _i | N _j | P | SE | Z | P-value | Decision on H ₀ |
|---|---|----------------|----------------|----------------|----------------|-----|-------|---------|---------|----------------------------|
| A | B | 30% | 5% | 60 | 59 | 18% | 6.99% | 3.5647 | 0.02% | Reject strong evidence |
| B | C | 5% | 9% | 59 | 54 | 7% | 4.83% | -0.8642 | 80.63% | Cannot reject |
| A | C | 30% | 9% | 60 | 54 | 20% | 7.53% | 2.7553 | 0.29% | Reject strong evidence |

Proportion who select a partial transfer

H₀: The proportion of participants who choose to receive their benefit as a partial transfer is the same in treatment i and j.

H₁: The proportion of participants who choose to receive their benefit as a partial is higher in treatment j than in i.

The results are illustrated in the table below.

| i | j | P _i | P _j | N _i | N _j | P | SE | Z | P-value | Decision on H ₀ |
|---|---|----------------|----------------|----------------|----------------|-----|-------|---------|---------|----------------------------|
| A | B | 20% | 42% | 60 | 59 | 31% | 8.49% | -2.6363 | 0.42% | Reject strong evidence |
| B | C | 42% | 20% | 59 | 54 | 32% | 8.77% | 2.5075 | 99.39% | Cannot reject |
| A | C | 20% | 20% | 60 | 54 | 20% | 7.53% | -0.0492 | 48.04% | Cannot reject |

Proportion who select a full transfer

H₀: The proportion of participants who choose to receive their benefit as full transfer is the same in treatment i and j.

H₁: The proportion of participants who choose to receive their benefit as a full transfer is higher in treatment j than in i.

The results are illustrated in the table below.

| i | j | P _i | P _j | N _i | N _j | P | SE | Z | P-value | Decision on H ₀ |
|---|---|----------------|----------------|----------------|----------------|-----|-------|---------|---------|----------------------------|
| A | B | 50% | 53% | 60 | 59 | 51% | 9.16% | -0.2774 | 39.07% | Cannot reject |
| B | C | 53% | 70% | 59 | 54 | 61% | 9.18% | -1.9414 | 2.61% | Reject strong evidence |
| A | C | 50% | 70% | 60 | 54 | 60% | 9.20% | -2.2136 | 1.34% | Reject strong evidence |