

# A Taxing Incentive? A comparison of retirement saving using discretionary investment and Regulation 28 in a Life-Cycle Model.

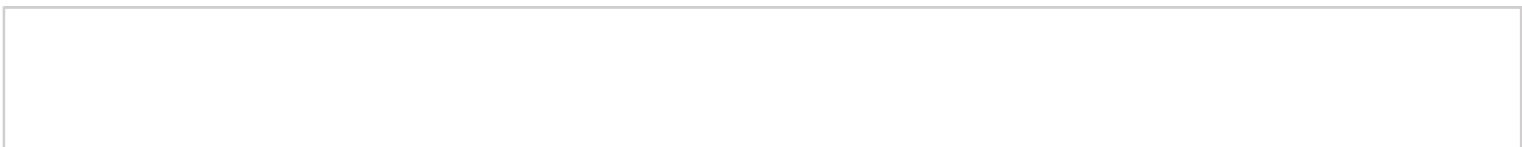
By

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## Abstract

The purpose of this study is to investigate whether the limitations, imposed by Regulation 28 of the Pension Funds Act, encourage optimal asset allocation and reduce investment risk for retirement savings when contrasted to discretionary investment.

A quantitative risk and return analysis was performed using available data for Regulation 28 compliant funds and the Johannesburg Stock Exchange indices. The analysis considers two hypothetical investors who are identical in all regards other than their choice of investments. The model used a 40 year working and saving horizon, whereby the investors contribute a portion of their income to a retirement savings vehicle of their choice. The savings in these vehicles accumulate and earn real returns until retirement. The analysis uses a life-cycle model (Modigliani & Brumberg, 1954) which accumulates capital to the retirement date and retirement withdrawals that result in zero capital at the date of death, which is assumed to be 20 years post-retirement. The model is used to analyse the differential return required in order to make investors indifferent between investing in a regulated product which is incentivised through tax credits.

The findings indicate that Regulation 28 is effective in reducing the investment risk of retirement savings, however may also force the investor to sacrifice wealth. Discretionary investment may be preferential to an investor depending on the tax bracket the investor is in. Further, the complex calculations required to smooth consumption over the life cycle may contain too many variables for the ordinary individual to compute.

This study is limited by assumptions regarding changes in future tax legislation, the time frame of investment returns for discretionary investment and retirement funds, inflation, investor career length and life expectancy.

The research is novel as it determines a quantifiable excess return required from discretionary investment in order to make discretionary investment the preferred choice for retirement saving. It provides a number of areas for future research that

would aid in understanding the impact of each variable in a retirement saving and/or planning. The research has practical value to investment houses who offer both Regulation 28 compliant products and non-Regulation 28 compliant products; playing a role in offering financial advice.

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## 1. Introduction

Individual preferences may dictate the manner in which individuals choose to save for retirement. Previous studies have focussed on how individuals should save for retirement (Bodie & Treussard, 2007b; Pfau, 2010, 2011; Scholz, Seshadri, & Khitatrakun, 2006) and contrasted these to empirical evidence (Benartzi & Thaler, 2007; Browning & Crossley, 2001; Gomes & Michaelides, 2005). To date, no literature exists that indicates whether the incentives provided in South African taxation legislation coupled with regulation for retirement savings vehicles make sense from an economic and risk perspective. The purpose of this study is to determine whether or not the economic incentives provided in tax legislation encourage effective retirement saving.

Relevant literature will be reviewed in chapter two, beginning with a review of theories of saving. This area will be furthered by investigation into human behaviour and optimal asset allocation. An understanding of the regulatory framework surrounding retirement saving in South Africa, and the relevant taxation legislation will be obtained.

The findings from the literature review will inform the research questions stated in chapter 3, with the dual objective of determining whether Regulation 28 provides an effective tool for managing investment risk in retirement savings, and whether the coupled with the provisions of South African tax legislation create a strong incentive to save in Regulation 28 compliant vehicles. The method for determining these answers will also be explained.

The results of the application of the method to the relevant data will be presented in Chapter 4. These results will be explained and discussed in detail. Chapter 5 will then set out the conclusions based on the results of chapter 4 and areas offering scope further research, together with recommendations will be detailed.

## 2. Literature Review

### Introduction

Saving for retirement is an area that has been thoroughly researched in more recent periods (Behrman, Mitchell, Soo, & Bravo, 2012; Benartzi & Thaler, 2013; Gale, John, & Smith, 2012; Lusardi & Mitchell, 2011; Poterba & Wise, 2013). The primary reason for this is that most societies do not save enough and their citizens run out of money during retirement (Gokhale, 2000; Scholz et al., 2006; Skinner, 2007). This has caused growing uncertainty amongst the global society with regard to how retirement savings should be approached (Bernheim, Forni, Gokhale, & Kotlikoff, 2000; Bernheim, 2000); as it combines economics, finance and taxation into one area of life. This area is clearly one that has generated significant interest, with the Organisation for Economic Co-Operation and Development ('OECD') undertaking a study of economic policy regarding retirement saving and incentives in 2015.

Areas that have been investigated include asset allocation, behavioural finance, retirement planning and financial literacy as well as the effectiveness of incentives in boosting retirement saving (Bernartzi & Thaler 2007; Costrell & McGee 2010; Buetler et al. 2005; Disney et al. 2008; Thaler & Benartzi 2007). In the South African context, there is limited research on retirement saving in any of these areas. The current proposed method for retirement saving is to invest in a pension, provident or retirement annuity fund. These funds are regulated investment vehicles which have specific rules and investment universes governed by Regulation 28 of the Pension Funds Act 24 of 1956. The goal of this research is to determine whether the current proposals to invest in Regulation 28 retirement funds are the best option or not. To do this it is necessary to present an illustration of the global understanding of the retirement saving puzzle whilst considering the South African regulatory environment and incentive structure.

The relevant literature on savings, beginning with the Keynesian consumption function (Keynes, 1936), will be reviewed. Thereafter, behavioural biases present in retirement saving will be considered. The paper will then provide an overview of the

South African regulatory framework surrounding retirement savings, with a specific focus on regulation 28 and its limitations based on academic research of asset allocation. Lastly, the effectiveness of savings incentives will be reviewed in detail.

## Theories of Saving

In order to address the issue of saving for retirement, it is necessary to first discuss the major theories of saving. Under this section the original savings and consumption function (Keynes, 1936) will be contrasted to the life cycle hypothesis (Modigliani & Brumberg, 1954), and the permanent income hypothesis (Friedman, 1957). These theories have arisen out of contentions on how individuals allocate their resources between saving and consumption, with each theory having its own merits and pitfalls.

The original savings and consumption function was proposed by Keynes (1936); a theory where households' consumption was driven by real income, but an increase in real income would not result in the same increase in consumption (Keynes, 1936). This is known as the Keynesian consumption function. It implies that households have a marginal propensity to consume (and accordingly a propensity to save too); that a 1% increase in income would not necessarily result in a 1% increase in consumption, but rather a smaller than 1% increase in consumption (the marginal propensity to consume multiplied by the increase in income). Accordingly, saving would increase by the portion of that 1% that is not used on consumption.

Modigliani and Brumberg (1954) then proposed the life-cycle hypothesis ('LCH') of saving. Under this theory, consumers were assumed to be rational, utility-maximizing beings, and would therefore allocate their resources in order to achieve an optimal consumption pattern over the course of their life, which can be divided into several stages. The most basic models are the two- or three stage models. However, it is not necessary to confine the number of stages, as in reality there are often several stages in a life-cycle (Augusztinovics, 2000). This model thus asserts that the individual is aware of a lifetime budget constraint, and will use assets as a tool to shift consumption from one stage to another (Bodie, Treussard, & Willen, 2008). It is further proposed that a major drawback of life-cycle theory is that individuals are unable to predict

when random outcomes will occur, and thus, often, will not always be able to match their actual consumption with the planned consumption for that life-cycle stage (Bodie, Treussard, et al., 2008). An example of this would be unexpected health expenses (Hsu, 2011).

The life-cycle theory is not without detractors (Altig, Auerbach, Kotlikoff, & Smetters, 2001; Baranzini, 2005; Gourinchas, Parker, & Jan, 2007). It was the first theory of consumption that followed the Keynesian consumption function (Keynes, 1936). The criticisms include the absence of utility from a bequest motive, the fact that wealthier households tend to save more and the presence of data showing that younger people save more than is predicted by the life cycle hypothesis. This is not to say that the model under-predicts saving as a whole, but that in the earlier life-cycles individuals save more than the model predicts. The presence of this characteristic in empirical data is one of the major sources for criticism of the life cycle hypothesis (Baranzini, 2005) .

Modigliani (1986) argued that the bequest motive was overstated; as precautionary saving coupled with an earlier than expected death would result in a bequest that was not necessarily intentional. This is due because death is an uncertain event which cannot be accurately foreseen. The potential reasons that younger households tend to save more could be better-educated individuals who command higher income than their predecessors (Baranzini, 2005). These types of individuals also tend to delay having offspring until later in life and are able to increasingly rely on their parents during their younger years (Baranzini, 2005). Whilst these detractors challenge issues with life cycle theory, none of them are able to offer sufficient evidence to entirely disprove the theory.

If the Keynesian consumption function were adopted, rather than the life-cycle theory – as wealth increased - the value of savings would increase due to an increasing propensity to save; whereas under life-cycle theory, the individual's would adjust their forward looking consumption and savings functions to account for this change.

The savings behavior predicted by the life-cycle theory can be contrasted to the permanent income hypothesis (Friedman, 1957). Under the permanent income

hypothesis theory, consumption is a function of permanent income (anticipated income) and thus saving is a residual. This is to say that any short-term ('transitory') changes in income are unlikely to result in large changes in consumption, but rather additions to assets. Friedman (1957) furthers the argument by considering that it is unlikely that an individual would save all unexpected increases in income, but would perhaps engage in "riotous living" with at least a portion of this transitory income. It should be noted that whilst not significantly different from the original life-cycle hypothesis, the permanent income hypothesis raises the point that saving is a function of consumption – that is to say that the individual determines what they will consume with no regard to how much of their income they need to save. Carroll (1997) interprets data collected by the Federal Reserve Board, which supports this in the sense that only 15% of households believed that preparing for retirement was the most important reason for saving; far surpassed by the 43% who would save for emergencies ('precautionary saving').

Whilst all of these theories provide some degree of explanation as to how individuals save for retirement, none of the theories appear to be able to explain all factors. Thaler and Shefrin (1981) present an alternative economic theory, which encompasses behavioural aspects. Thaler and Shefrin (1981) propose that in each individual there are two personalities; a myopic doer and a farsighted planner. Individuals' actions will thus result in a compromise between the interests of the doer and planner. Thus any utility the planner achieves from future consumption needs to equal the disutility experienced by the doer from deferring consumption. This could explain some of the anomalies in the life-cycle hypothesis, as an element of human behaviour can result in sub-optimal allocation of consumption. A furtherance of the life-cycle model is provided by Shefrin and Thaler (1988) and is discussed in the section to follow.

Despite its detractors, the life-cycle hypothesis of saving has received considerable support. Davies (1981) finds that because death is uncertain, it is not possible for an individual to perfectly predict the amount of dissaving that can take place in retirement. Attanasio and Browning (1993, p. 22) state " The evidence presented

shows that the life cycle model cannot be easily dismissed. Indeed, we believe that the model does a good job of representing consumption behavior over the life cycle". Gomes and Michaeledis (2005) show that a life-cycle model calibrated with realistic labour income risk is feasible. Adding to this support, Japelli (2005, p. 173) finds that the life-cycle hypothesis "is still the reference framework for analyzing individual and aggregate saving" and concludes that "Fifty years after the publication of LCH, no single theory can explain the vast body of evidence on saving behavior, and no comparable theory has replace the LCH."(Jappelli, 2005, p. 184).

The preceding hypotheses – proposed by Modigliani and Brumberg (1954), Friedman (1957) and Keynes (1936) - all ignore important elements of human behavior in the sense that they assume that human beings will always act rationally. Therefore it is not possible to conclude that either one of these theories is entirely valid<sup>1</sup>. For the purposes of this paper, it is accepted that the method individuals use to accumulate capital is in line with the life-cycle hypothesis on the basis that recent empirical evidence has shown retirement fund asset allocation to be consistent with this hypothesis (Bikker, Broeders, Hollanders, & Ponds, 2012)although there are inherent limitations, which are discussed in the next section.

## Human Behaviour

Whilst the aforementioned theories of saving are relevant for understanding the economics involved in savings choices, they ignore elements of human behaviour. It is therefore necessary to obtain an understanding of the behavioural factors that influence how individuals save. This section will discuss issues regarding self-control (Thaler & Shefrin, 1981), poor financial education (Duflo & Saez, 2002) and risk aversion (Bodie & Crane, 1997; Bodie, Treussard, et al., 2008), all of which are likely to influence savings behaviour in some manner.

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<sup>1</sup> This is shown in Hall's (1978) creation of a life cycle- permanent income hypothesis, which takes into account parts of either theory.

## Self-Control

In the paper titled “Life Cycle, Individual Thrift, and the Wealth of Nations”, Modigliani (1986) discusses the idea that saving for retirement requires a degree of rationality and self-control. This asserts that households are forward looking and are able to plan adequately over both the short term and long term. Diamond and Hausman (1984) contend that sometimes households may be unable to convert income into consumption through some liquidity problem, or are not forward looking, but rather backward looking and base their future expectations on past experience. This behaviour is a result of dealing with significant uncertainty regarding retirement.

Shefrin and Thaler (1988) argue that households behave too myopically to make adequate reserves for retirement. Individuals often fail to save enough for retirement, as this would require that their present standard of living be reduced in order to have a better standard of living at a later stage (Fernández-Villaverde & Krueger, 2011). This is because instant consumption appears to be a more attractive alternative to postponing consumption to retirement. Shefrin and Thaler (1988) propose that very few consumers are capable of computing the complex calculations that are implicit in life-cycle theory (Shefrin & Thaler, 1988). This echoes the findings of Johnson et al. (1987), of people generally being incapable of making coherent and consistent consumption choices. The finding is based on an experiment where individuals are hypothetically currently 35 years of age and will certainly die on their 75<sup>th</sup> birthday and have fixed earnings until retirement at age 65. These individuals are then asked to make consumption choices based on the assumption that they will have no health issues, and no future uncertainty, and no dependents to leave any accumulated wealth to upon death. Common calculation errors included the undervaluation of future earnings and a tendency to over-save resulting in large portions of wealth being left behind at a hypothetical date of death. Johnson et al. (1987) recognised the limitations of the experiment that reduced the time frame for decision-making and prohibited consultation with an expert; nonetheless more than two-thirds of the sample were left with substantial wealth at the date of death – with no bequest motive possible.

To overcome the inability to calculate the amount of saving that is necessary, most people use heuristics or rules of thumb (Thaler & Benartzi, 2007). Thaler and Benartzi (2007) recognise that self-control is an aspect that is difficult for individuals to deal with, and thus these consumers will often resort to using pension plans in order to force their own self-control. Individuals will use a form of mental accounting (Thaler, 1985) and categorise money into current spendable income, current assets and future income (Shefrin & Thaler, 1988). Individuals have the greatest propensity to consume from changes in current income and the lowest propensity to consume from future income: in essence an aversion to borrowing against future income. Shefrin and Thaler (1988) contend that whilst basic life-cycle theory suggests retirees should dis-save all of their assets i.e. there should be no substantial residual assets at the date of death; a behavioural resistance to spend from current assets and future income inhibits this assumption in reality, resulting in residual assets at death.

The difficulty with saving for retirement in a discretionary manner is often a result of a lack of willpower or self-control. This can be overcome by joining a pension plan where an employer matches the employee contributions, which is often mandated. Choi, Libson and Madrian (2011) show that even with an arbitrage opportunity, employees are not willing to sign up for these pension plans which are optional. In this situation, employees would be able to withdraw employer contributions free of charge as they have passed the legislated age for penalties. These employees give up on average 1.6% of their annual salary by not taking up the arbitrage opportunity. This results in these employees foregoing increased wealth equivalent to 1.6% of their annual salary as a result of not taking up this opportunity; behaviour which is not economically rational.

Thaler (1994) states, “ Most studies are unable to reject the hypothesis that the elasticity of personal saving with respect to the interest rate is zero” (p. 186). This indicates that a differential return is unlikely to alter the amount that an individual is willing to save. When this is coupled with Bodie’s (2003) findings it shows that individuals are unlikely to change the amount they save, even if at some decision horizons they find that their savings are inadequate. However, at the same time

evidence suggests that once people start putting savings away, they are likely to continue to do so (Thaler, 1994) . These findings may explain the above anomaly where employees forgo an additional 1.6% of their salary. Alternatively, the lack of uptake in retirement savings could also be as a result of the peer effect (Bernartzi & Thaler, 2007) where individuals consult with their spouses and friends over retirement advice rather than with experts. However, the peer effect is not only responsible for poor savings behavior as it may encourage improved saving behavior (Duflo & Saez, 2002, 2003). These effects could be for a number of reasons, including external factors such as the working environment leading to better information amongst one group of peers than in others.

### Financial Education

Duflo and Saez (2002) suggest that low participation could also be as a result of poor financial education – which may also explain the poor savings behaviour highlighted above. Similarly, Duflo and Saez (2003) found that offering an incentive for financial education increased the attendance at a seminar; both for people who were not offered the incentive, as well as those who were. This shows that people have a desire for financial education, even without the presence of a direct incentive. Having attended an informative seminar, participation in retirement plans increased amongst attendees. This lends to the idea that individuals do not seek out information effectively and are thus unlikely to have given a large amount of time and thought to the adequacy of their retirement plans, an indicator of a lack of financial education. Bernartzi and Thaler (2007) argue that increased participation in 401(k) accounts is not as a result of wilful joining, but rather as a result of mandatory enforcement by employers for new employees, resulting in a ‘joining’ bias – inflating the participation rates. This further illustrates that one cannot interpret increased participation as an indicator of increased willingness to save.

To add to this discussion; Bodie (2003) raises concerns around the current financial products that are available to the public. The reason is there is too much choice, where the additional options do not increase the welfare, as they are neither desirable nor

understandable. On this premise, Bodie (2003) argues that skilled financial intermediaries rather than retail customers should undertake retirement planning and investing. This leads to the conclusion that in saving for retirement, investment choices must be dynamic and that general citizens need advice. To support the lack of understanding, Clark, Lusardi and Mitchell (2015) performed a study in the United States which indicated that employees who completed a survey in financial literacy are more likely to start saving or less likely to stop saving post-survey.

Previously, institutional investors have been largely responsible for financial planning advice, however, it appears there has been a shift with households beginning to take a more active role and more responsibility for their retirement saving (Bodie, Treussard, et al., 2008). This could be as a result of the increasing opportunity for retirees to engage in part-time employment (Bodie, Treussard, et al., 2008), which can augment their utilization of retirement savings.

A common problem that Bodie and Treussard (2007a) point out is that, on average, an individual saving for retirement is not well-educated in the field of finance and thus has a poor understanding of asset allocation, which would result in them making poor decisions. It is also important to note that not all decisions are based on economic rationality, as individuals often retire for reasons other than economic or age related reasons; these include their health status, a desire to pursue other activities and their partner's work status (Buetler et al., 2005).

### Risk Aversion

A key behavioral bias found to be present amongst individuals who should save for retirement is risk aversion (Benartzi & Thaler 1999; Watson & McNaughton 2007). Risk aversion refers to the psychological behaviour where an individual prefers a certain outcome to a gamble, even when the gamble has a higher expected value (Kahneman & Tversky, 1984). This, applied to a retirement saving context, would be investing in a low risk low yield asset class at an early stage in their career; when they should rather be investing in a higher yielding asset class (Bodie & Crane, 1997).

Retirement saving behavior is driven by risk tolerance; an individual with low job security has high human capital risk and thus reduces overall risk by choosing low risk financial assets (Bodie, Merton, & Samuelson, 1992). Bodie and Treussard (2007a) describe human capital as the ability to earn income by utilising the skillset the individual has acquired (Bodie et al., 1992). For example, an individual with a low degree of job security (associated with high human capital risk) would achieve more satisfaction from investing in a low risk-low yield asset class; this is implicit diversification as if the individual were to lose their source of income, it is unlikely that their investment value would be significantly changed due to lower volatility (associated with low risk asset class).

Building on risk aversion, it is suggested that as human capital risk increases over the course of one's career, due partly to increased salary and partly to fewer years remaining to recover from setbacks, they should shift their asset allocation from high yielding equity instruments ('stocks') early on in their career, to safer, lower yielding instruments as they age (Bodie, Treussard, et al., 2008; Bodie, 2003). This reduces the overall volatility of their worth (being the sum of human capital and asset capital). This should result in a more certain final value for their retirement savings – as the lower yielding instrument is associated with lower volatility. Van Rooij, Lusardi and Alessie (2012) suggest that there is a relationship between financial literacy, and the decision to invest in equities. This supports the findings of Guiso and Japelli (2005) who argue that lack of awareness results in sub-optimal asset allocation. Guiso, Sapienza and Zingales (2008) contend that those who are less financially literate distrust the equity market and are therefore less likely to invest in equities, and that those who are less financially literate are less likely to diversify their asset holdings (Guiso & Jappelli, 2008). This indicates that those who are less financially literate might be more inclined to accept an investment in a low risk<sup>2</sup> fund as a consequence of the human interaction they can have with financial advisors.

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<sup>2</sup> Regulation 28 compliant funds are accepted to be lower risk funds, as will be explained in the next section *infra*.

Collectively, the behavioural influences on retirement savings behavior are significant. It is possible to conclude that whilst an economic theory such as the life-cycle hypothesis may predict economic behavior of a rational individual, the aforementioned behaviors show that individuals do not always act rationally, and are not always capable of maximizing their own utility.

This section and the preceding one provide a general understanding of retirement saving. To add context to the discussion, the next sections will discuss pension fund regulation and tax legislation in South Africa.

### Pension Fund Regulation in South Africa

Pension, Provident and Retirement Annuity funds in South Africa are governed by legislation, namely the Pensions Funds Act, 24 of 1956 as well as the regulations that are applicable to said act. The definitions of each of these funds can be found in the first section of the act. Each fund has trustees who are charged with ensuring the fund operates in an acceptable manner.

In South Africa, there are three predominant savings vehicles for retirement savings: namely Pension Funds, Provident Funds and Retirement Annuity Funds. These funds operate with the main objective to accumulate savings during one's career in order to maintain one's lifestyle after retirement, and all operate in a similar manner. The major differences between these funds previously were the deductibility of contributions, coupled with the requirements and limitations on withdrawals. Both pension fund and retirement annuity fund contributions were tax deductible under s11(k) and s11(n) of the Income Tax Act. The maximum lump sum withdrawal was limited to one third of the value saved at retirement; the remainder *must* be used for an annuity. Provident fund contributions were not tax deductible, but upon retirement the entire value of the savings may be withdrawn as a lump sum.

However, this has changed with the promulgation of the Taxation Laws Amendment Act, 31 of 2013, which becomes effective 1 March 2015. This amendment permits all contributions to pension, provident and retirement annuity funds to be tax

deductible, and will impose capital withdrawal limits on all three funds. This is explained later in the chapter.

Of particular relevance to this research is the amendment to Regulation 28 of the regulations made under section 36 of the Pensions Fund Act 24 of 1956. Regulation 28 imposes limits on the investments of retirement funds; the purpose of these limits is to protect the funds from making imprudent investments (National Treasury, 2010). The limits prescribe the maximum percentage of the fund assets that can be invested in any particular asset class, as well as per issuer or entity within that asset class. The effect is that these limits enforce diversification, and as a result are supposed to protect investors from poor investment decision and asset allocation. The need for these limits arose as the investment opportunities available to funds became significantly more complex and the presence of foreign investments had increased (Financial Services Board, 2010). This presented a problem, as the regulation did not have measures in place that provided for these investment opportunities, resulting in a grey area that could be subject to exploitation by the funds. The consequence of such exploitation could undermine the intent of the legislation - protecting the members of the funds.

In South Africa, contributors to Pension funds are known as members, as the funds are set up as non-profit. This means that the underlying earnings of the fund can only be used to settle reasonable fund expenses, and the remainder is distributed amongst the members. These members belong to predominantly defined benefit contribution funds (Financial Services Board, 2010). The global shift from defined benefit retirement funds to defined contribution funds (Broadbent, Palumbo, & Woodman, 2006; Gallery, Newton, & Palm, 2011; Zelinsky, 2004) has shifted the risk of poor investment to the member. A defined benefit fund would have promised members a benefit based on lifetime earnings. The liabilities of this type of fund are therefore subject to inflation risk. The fund had an obligation to pay the member in terms of the contract, which was based on a formula linked to lifetime earnings. If the fund's assets did not appreciate enough, this would not result in the member receiving a reduced pension, as the benefit was previously *defined* (Besley & Prat, 2003; Broadbent et al.,

2006). In order to beat this risk, the funds needed to take risk in order to earn a risk premium (Hoevenaars, Molenaar, Schotman, & Steenkamp, 2008). The defined contribution fund makes no such guarantee, as the fund's liabilities are based on the contributions into it. All defined contribution funds are conduits for investment risk (Bodie, Ruffino, & Treussard, 2008); a member contributes to the fund which then invests on their behalf; however there is no guarantee of a return of any sort. Bodie (2003) argue that the way investing for retirement has been undertaken in the past is likely to change. Generally, there has been a shift from the use of defined benefit funds toward the use of defined contribution funds. Bodie (2003) argues further that the way an individual plans their retirement is usually based on their expected age of retirement less their current age ('planning horizon') and that this can be subdivided into several smaller time periods where the individual can review and change their asset allocation ('decision horizon') and that both of these periods differ from person to person.

In addition to the tax benefit each member receives, which is explained later in this Chapter, Regulation 28 funds receive a further tax benefit, and as a result, so do its members upon withdrawal of their funds (R. H. Van Rensburg, 2014). The funds are provided with exemptions on dividends received, which are not subjected to withholdings tax; (an ordinary person would pay withholdings tax of 15% on dividend income). All receipts and accruals to the fund are exempt under s10(1)(d) of the South African Income Tax act, which results in the fund not being taxed on interest earned. Further, the fund is exempt from capital gains tax, thus is not taxed on any gains in the value of its underlying investments (R. H. Van Rensburg, 2014). These benefits taken together give the fund a substantial advantage over the ordinary citizen in terms of a reduced (non-existent) tax liability.

#### Regulation 28 and amendments thereto

Regulation 28 prescribed certain maxima per investment type based on the fair value of assets under management. These maxima (before amendment) are shown in the table below.

The maxima are broadly:

- No more than 75% may be invested in equities
- No more than 25% may be invested in property
- No more than 90% may be invested in a combination of equities and property
- No more than 5% may be invested in the sponsoring employer
- No more than 15% may be invested in a large capitalization listed equity, and 10% in any single other equity
- No more than 20% may be invested with any single bank
- No more than 15% may be invested off-shore (recent exchange control limit changes upwards have been provided for to portfolios upon their application to the Retirement fund Registrar i.e. the imposed limit is actually 20%)
- No more than 2.5% may be invested in other assets

There are no restrictions on investments into money-market or RSA government issued fixed-income instruments.

Derivative instruments are not defined, leaving them to fall within the category of "other assets". No guidance is given as to how derivatives may be employed.

*Source: South African Government Gazette (National Treasury, 2010)*

The amendments to Regulation 28 (National Treasury, 2011) updated the fiduciary responsibility of the fund. A number of terms are re-defined, and a number of new definitions were introduced, including one for derivative instruments. The changes to Regulation 28 have resulted in a stricter implicit investment mandate for the trustees of pension funds. New limits have been imposed in order to reduce the investment risk that members are exposed to and provide guidance to trustees on how to fulfil their fiduciary duty.

Funds are now required to have an investment policy that is reviewed annually and new limits are imposed on investment types and opportunities (s3(a), s3(d) of the

Regulations). These limits are summarised in Appendix A. More importantly, the amendment introduces a look-through principle (s4(a)) which is tasked with preventing funds from using structured assets to circumvent limits, and will require that the fund accounts for the underlying assets of any such asset. The last major change to the regulations was the introduction of a prohibition on borrowing other than for bridging purposes; in order to meet liquidity requirements (s5(a), s5(b)) (National Treasury, 2011).

The maxima, after the amendment to Regulation 28 are as follows:

The new maxima:
<ul style="list-style-type: none"><li>• No more than 10% of total assets may be invested in hedge funds</li><li>• No more than 10% of total assets may be invested in private equity funds</li><li>• No more than 10% may be invested in unlisted companies</li><li>• No more than 10% may be invested in any single listed company with a market capitalization of between R2bn and R20bn</li><li>• No more than 30% of South African Liabilities plus 100% of foreign liabilities may be invested in foreign equity</li></ul>

*Source: South African Government Gazette (National Treasury, 2011)*

A detailed comparison between the new and old Regulation 28 is provided in Appendix B.

The rationale behind the change to the regulations was a result of the investment landscape changing significantly, which resulted in more complex investment opportunities in addition to a variety of structured products. Furthermore, some of the products that had become available, were not defined in the original Regulation 28 and therefore there was uncertainty as to investment limits (Financial Services Board, 2010).

The regulations provided little guidance on how the trustees of pension funds should adopt an investment strategy for the fund. This meant that an inappropriate strategy could be utilised, provided it remained within the statutory limits (Financial Services Board, 2010). For example, the provisions of the act allowed up to 100% investment

in fixed income instruments resulting in maturity mismatches. Furthermore the regulations did not define derivative instruments. As a consequence, the original regulation was not meeting the objective of protecting retirement fund members from poor investment decisions which could result in the fund not meeting the objectives of retirement saving. Studies have shown that statutory regulation does not necessarily have a positive impact on the performance of retirement funds (Bohl, Lischewski, & Voronkova, 2011; Senderski, 2014). Further to this argument, Lee (2011) suggests that there is little evidence to indicate that a risk-based approach to portfolio construction will outperform a mean-variance portfolio.

### Tax implications of investing in Regulation 28 funds

The Income Tax Act, 58 of 1962 provides tax benefits as it legislates that taxpayers may deduct any contributions to pension funds (s11(k)) and to retirement annuity funds (s11(n)), subject to certain limits, from their income in the determination of taxable income, resulting in a lower tax liability. These funds are the same funds that are subject to the Pension Funds Act. The benefits are summarised below (all references to the Income Tax Act, 58 of 1962):

- Contributions to pension funds are limited to the greater of R1750 or 7.5% of retirement -funding employment as defined– s11(k)
- Contributions to retirement annuity funds are limited to 15% of income excluding retirement-funding employment – s11(n)
- Withdrawals from these funds are taxed in terms of the Second Schedule of the Income Tax act. The result is a lower effective tax rate than if the funds were to constitute normal income.

These benefits are meant to provide an incentive to save for retirement; but the incentive is only provided if saving takes place in a fund that is subject to the constraints imposed by Regulation 28 ('Regulation 28 compliant'). Despite these benefits, if investments in these funds are accessed before the date of retirement in terms of the fund rules (often 55, 60 or 65 years of age) the contributor is taxed

heavily<sup>3</sup>, up to a maximum marginal rate of 36% - only 5% less than the maximum marginal tax rate of 41%. These penalty provisions support the findings of Beshers et al. (2015) who suggest that individuals have strong present-bias, and that illiquid commitment accounts are more likely to result in greater savings.

The Taxation Laws Amendment Act, 31 of 2013 simplifies the above by replacing the above limits under s11(k) and s11(n) with 27.5%, effective as of 01 March 2016. The amendment also imposes a contribution limit of R350 000 per annum (National Treasury, 2015).

The manner in which these incentives work is to moderately increase the size of the initial investment as a result of the tax relief (Attanasio, Banks, & Wakefield, 2004)<sup>4</sup>. In the next section, the importance of asset allocation will be discussed, with a specific view to investment for retirement purposes.

### Asset Allocation, Volatility and Offshore Exposure

The above section explains Regulation 28, and its limitations. This section will address the two major weaknesses of Regulation 28; being asset allocation and offshore exposure. Research suggests that as much as 90% of return variability can be explained by asset allocation (Brinson, Hood, & Beebower, 1995; Hariharan, 2000; Ibbotson & Kaplan, 2000). It is therefore paramount that investors spend time considering the asset allocation of their portfolios. Generally, investors are advised to reduce their exposure to risky assets as they age. This is in agreement with the arguments provided by Bodie and Treussard (2008). In this section, the 'optimal' manner to allocate assets will be discussed. This discussion will follow the line of asset allocation relative to risk, thereafter considering volatility of the underlying instruments. The discussion will then be furthered with the consideration of offshore diversification. This will then be contrasted to the way Regulation 28 compliant funds allocate assets.

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<sup>3</sup> The major penalty is that an early withdrawal incurs tax for any amounts over R22500, whereas with normal retirement taxation only begins at amounts over R315000.

<sup>4</sup> An Illustrative example will be provided in the appendices.

In saving for retirement, the optimal asset allocation is person specific, as it needs to consider labour income levels, and the risk of change to labour income (human capital risk). Labour income is the income individuals are able to earn by employing their human capital. The presence of labour income allows an individual to have an age-varying investment strategy (Cocco, Gomes, & Maenhout, 2005). This means that the investment can be changed over the course of one's life, to allocate assets to suit one's risk profile at a given point in time. Cocco et al (2005) postulate the idea that labour income is an asset, as it can be capitalised and insured against risk. This makes it a substitute for a risk free asset, as labour income is not correlated with equity returns. If the equity market experiences negative returns, it does not correlate to immediate changes in labour income. At the start of the individual's career, his human capital risk is lower than near the end, as he has more time to recover from a setback. Over the duration of their career, individuals utilise this human capital to earn labour income, and their human capital risk increases as they move toward the end of their career. As one participates in the work force, one's total human capital diminishes with one's remaining work life, and it is necessary for the individual to purchase more risk free assets such that their total capital risk profile remains constant. This strategy can be summarised into a high proportion of equity savings at the start of a career, which is slowly reduced, by selling equities to purchase less risky assets over the course of the individual's career. This investment strategy is supported by numerous studies (Cocco et al., 2005; Horneff, Maurer, & Stamos, 2008). It is also important to note that individuals with increased labour risk would benefit more from optimal asset allocation, as optimal asset allocation would reduce their investment risk and lower their total capital risk profile.

Upon investment in a Regulation 28 fund, individuals cede the responsibility of their own asset allocation in retirement savings to that of a fund manager, within the Regulation 28 mandated limits. Notwithstanding this cession, it would be naïve to hold the view that the individual is unaware of these limits; specifically the limitation placed on equity. Wepener (2014) finds that the limits of Regulation 28 do not encourage optimal asset allocation in a portfolio.

A question that must be borne in mind is, in the long-term, are equity instruments and the stock market really as risky as finance theory would have us believe (Ibbotson & Chen, 2003; Pastor & Stambaugh, 2012; Siegel, 1998)? This question is central to asset allocation within pension funds (Brinson, Hood, & Beebower, 1986, 1991; Sharpe, 1992). Below, we will examine whether equity instruments reflect increased risk when a longer investment horizon, such as that of a pension investment programme.

It is widely accepted that in the short-term, equity instruments need to offer some sort of risk premium when compared to fixed income instruments (Mehra & Prescott, 1985). It is on this premise that the models such as the Capital Asset Pricing Model (Fama & French, 2004; Sharpe, 1964) and Arbitrage Pricing Theory (Ross, 1976) are built.

Connolly et al. (2005) showed that in the long term, bonds and equity returns exhibit a modest positive correlation over the long term. It was noted that bond returns tend to be higher relative to equity in periods of increased market uncertainty. This is due to the preferential treatment bondholders would receive if a company were to go bankrupt (Connolly et al., 2005). These findings support the initial views of Fama and French (1989) who found strong positive correlation between equity and bond returns, but noted that the equity premium would be reduced in times of economic uncertainty.

Equity has been shown to be more volatile than debt instruments (Mehra, 2003), with equity instruments exhibiting a 20% standard deviation, in contrast to debt instruments with a 4% standard deviation. However, over a period of 110 years (1889 – 2000), equity returned a premium of 6.9% over fixed income (debt) instruments (Mehra, 2003). Upon consideration of the holding period of a Regulation 28 fund, where members join at the beginning of their working career and withdraw upon retirement, Mehra's (2003) findings imply a case for greater equity exposure.

Bodie (1995) argues that the view to have higher equity exposure as a younger investor is fallacious. The argument is promulgated on the premise that most measures of equity volatility ignore the magnitude of the potential shortfall, so whilst equity might only have a 4% chance of not reaching a desired value over a 25-year

horizon, this chance does not account for the difference between actual values and expected values. Whilst this is a valid argument, Bodie (1995) does not account for any excess return over and above the expected value. This is substantiated by the findings of Barberis (2000), who contributes evidence that, when estimation uncertainty is included, there is still sufficient evidence to allocate more of a portfolio to equities when the investment horizon is lengthened.

Lettau and Wachter (2007) showed that value equities, (equities defined as paying a dividend) are not as risky as perceived due to having lower duration, whereas growth equities (those without a dividend) have a higher duration. Duration in this context refers to the price sensitivity of the equity instrument relative to changes in the company's future growth prospects<sup>5</sup>, and acts as a measure of risk of variability in returns. Essentially, the dividends paid on these equities reduce the proportion of cash flows that occur later in the asset holding lifetime. This is a factor that would contribute to equity (particularly value equities) being less risky over a longer holding period. The duration-based argument further enhances the argument for the inclusion of greater proportions of equity, as dividend-paying equities can be used to reduce the volatility of the portfolio as a whole.

Similarly, Wachter (2010) finds that as the length of the investment horizon increases, so should the allocation to equities, yet Regulation 28 retirement funds – which operate, as long-term investment vehicles for their members - are restricted from maintaining equity exposure of more than 75%. Wachter's (2010) finding is supported by the findings of Blanchett, Finke and Pfau (2013) – who find that long-term investors should hold proportionately more equity than short-term investors. Furthermore, there are restrictions placed on foreign investments, which are discussed under the next sub-heading.

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<sup>5</sup> For example, consider equity A and equity B, both costing R100. Equity B pays a regular dividend of R10, whereas equity A pays none. If both companies have a reduction of 1% in their growth prospects, we would expect equity A's price to decrease by relatively more than equity B. This illustrates equity A's higher duration.

## Offshore Exposure

French and Poterba (1991) make the case that whilst the benefits of international diversification are widely accepted, most investors hold most of their wealth in domestic assets, a phenomenon known as home bias. Tesar and Werner (1995) find strong evidence to support home bias, and note that differential international transaction costs are unlikely to explain home bias.

There is evidence to suggest that local investors in emerging markets benefit more from international diversification (Chiou, 2009). This is likely due to the lack of diversification available in an emerging market. For example, consider that the JSE is heavily exposed to movements in the resources sector (P. Van Rensburg, 2002), so much so that the use of the Resources Index can effectively form part of a two factor arbitrage pricing model. Eun et al. (2008) show that international diversification provides economically significant benefits to investors, and makes a case that diversification can be achieved with both large-cap and small-cap foreign equities. This is supported by Chiou et al. (2009) who show significant benefits from international diversification.

Despite the proven benefits of diversification, both historically and more recently, Regulation 28 still imposes limits on fund exposure to foreign investments. The next section will discuss whether the incentives offered are actually effective, given the shortfalls identified above with regard to asset allocation and lack of foreign diversification.

## The Effectiveness of Incentives

Generally, economists will tell you that incentives are relevant (Gneezy, Meier, & Rey-Biel, 2011a), or perhaps that “Monetary incentives are powerful tools for motivating people” (Kamenica, 2012, p. 427). However, to matter they must function to achieve the outcome they intend to (Gneezy, Meier, & Rey-Biel, 2011b). Whilst the value of incentives are shown in the above information, a common question in academia has been regarding the effectiveness of these incentives in inducing individuals to save (Börsch-Supan, 2004; Costrell & McGee, 2010; Disney et al., 2008; Holt & Laury, 2002;

Thaler, Sunstein, & Balz, 2010). The functioning of these incentives should either increase participation in such plans or increase the amount saved in such plans; as both of these functions would result in increased saving. This section will examine the literature that discusses whether incentives are indeed effective.

In the United States, an individual retirement account ('IRA') operates in much the same manner as a pension fund would in South Africa, in the sense that an individual is permitted to deduct the contributions to an IRA from their taxable income (subject to certain limits), which has the effect of reducing the tax liability, thereby increasing disposable income or the amount that can be invested in the fund. The money saved in an IRA can grow tax-free and is only taxed upon withdrawal, as is the case with Regulation 28 funds. These accounts defer taxes until retirement, yet despite approximately 50% of the United States workforce being eligible for them, only 1% of the workforce actually participate in them (Hubbard & Skinner, 1996) due to the fact that contributing to them is voluntary. This is evidence that the presence of the incentive has not necessarily increased participation.

Venti and Wise (1991) find that IRA's are effective in encouraging new saving. This finding was contested by Gale and Scholz (1994) on the basis that empirical estimates indicated that IRA's contributed to very little new saving, but instead resulted in a shift of taxable forms of savings into IRA's. Poterba, Venti and Wise (1996) responded to these findings, noting that different forms of analyses can yield different results even when the same data is used; however it was stressed that their analyses and findings present strong evidence that IRA's are effective in encouraging new net saving (Poterba et al., 1996). Gale and Scholz (1996) contend the Poterba-Venti-Wise (1996) claim that incentives increase saving on the basis that the increase in private saving is offset by the reduction in public saving through reduced tax revenue. Engen, Gale and Scholz (1996) also introduced the concept that there is an inherent bias in the Venti-Wise framework (Venti & Wise, 1991) in that people who are going to save, will save regardless of whether an IRA exists or not, and that this is not controlled. Another problem with the Venti-Wise (1991) argument was that the IRA balances were pre-tax, and would still need to be taxed upon withdrawal which resulted in an

overstatement of these assets relative to non-IRA assets. Engen, Gale and Scholz (1996) conclude that the presence of investment opportunities outside of IRA's with lower effective tax rates reduce the effectiveness of savings plans; stating that incentives may be poorly structured in this regard, as was first proposed by Bernheim and Scholz (1993).

The argument of public saving and private saving is re-visited by Axel Börsch-Supan (2004) using European data. Börsch-Supan (2004) states that the presence of public pension replacement rates reduces private saving. This is a direct result of individuals being aware that a percentage of their pre-retirement income will be replaced by a public pension. Whilst the incentives strengthen the attractiveness of pension plans, there is little evidence to add to "the core question, whether tax relief creates new additional savings" (Börsch-Supan, 2004, p. 31). Börsch-Supan (2004) finds that tax relief is most effective in the upper two-thirds of the income distribution, a consequence of having increased disposable income and the ability to forego consumption in light of saving and reducing the tax liability. Even so, it is not all too effective due to societies inherent misunderstanding of the power of compound interest. Börsch-Supan (2004) concludes that boosting saving needs more than just tax relief but emphasises that there may be non-economic reasons that these plans and incentives are effective, such as overcoming behavioural biases against saving. In the South African context, Ting and Kollamparambil (2015) find that the presence and possibility of government grants in retirement disincentivise saving in the early working years.

Attanasio and Banks (2004) contribute to the Venti-Wise (1991) and Gale-Scholz (1994) debate with the view that effectiveness cannot be measured by the size and uptake of these savings plans, but must be measured by the increase in saving over what would have been saved without them. Attanasio and Banks (2004) use data from both the United States and the United Kingdom. Two tests are used to determine whether these saving plans and incentives increase saving, relative to if no plan had existed. This is done by contrasting regression results between data prior to the introduction of such plans to data from after the introduction; both tests returned

results that consumers are not reducing consumption (the alternative to saving) and thus the plans encourage very little new saving. However, Attanasio and Banks (2004) are quick to point out that the effectiveness of incentives does not only depend on economic outcomes, but that these incentives can address other behavioural issues as highlighted throughout this review.

The effectiveness of the tax incentives in the United States was further challenged on the premise that there is no marginal incentive to save beyond the tax-deductible limit (Gravelle, 1991). The annual limit for contributions in 2015 was \$5500 for citizens under 50 and \$6500 otherwise (Internal Revenue Service, 2015). Hubbard and Skinner (1996) refute this in the sense that the limit should not be viewed as a short-term annual limit, but rather as a lifetime limit. Gale and Scholz (1994) support this view by showing that only thirty percent of contributors to IRA's contribute to the limit for each of three years, insinuating that the remainder would face an incentive in one or more years.

Poterba et al. (1996) argue that there is no noticeable reduction in the levels of other assets of contributors to IRA's and 401(k) accounts, a view that is supported by Hubbard (1984). This leads Hubbard (1984) and Poterba et al. (1996) to conclude that it is unlikely that retirement plan assets are funded through a reduction in other saving; and that incentive plans do work to increase saving. The premise of this conclusion is that the contributors are not reducing saving elsewhere, therefore they must be reducing consumption to save in the IRA, and therefore this is new saving. This argument (Poterba et al., 1996) is enhanced when the assumptions and sample size of the Gale and Scholz (1994) study are challenged. Recently, the effectiveness of tax incentives have been challenged on the basis that they are expensive to the state, inefficient and inequitable as those who receive the greatest benefit are those who are least in need thereof (Marr, Frentz, & Huang, 2013).

Savings plans with incentives are shown to be useful in the sense that they encourage information spreading and economic literacy as well as offering a method for individuals to overcome the irrational behaviour of deferring saving in preference of current consumption (Attanasio et al., 2004). However, there are several decades of

academic research showing findings that individuals are not rational, are not perfectly self-interested and may make choices or hold preferences that are not entirely consistent (Congdon & Kling, 2009). Whilst the presence of these savings plans is consistent with public policy, there is substantial evidence that they are not working effectively.

## Conclusion

The literature reviewed has shown that there is no one single model of consumption and savings that is entirely valid. Despite minor drawbacks, the life-cycle hypothesis (Modigliani & Brumberg, 1954) was found to best explain savings behaviour. Despite these findings, literature acknowledges that human beings do not always behave as economic models predict, due to inherent behavioural biases, which result in irrational behaviour.

Thereafter, an analysis of Regulation 28 showed strong arguments to invest in Regulation 28 retirement funds, as these funds provide relatively simple investment vehicles for their members to save for retirement. The members do not have to make any investment decisions regarding the underlying investments and the administration for tax purposes is performed for the members. There are tax benefits, which have the effect of increasing the rate of return as well as the simplicity of drawing down on the savings in the form of an annuity when retirement age is reached. However, it has been shown that regulation does not necessarily result in increased returns, and that the active management required can be detrimental to the investors involved (Basu & Andrews, 2014)<sup>6</sup>.

The alternative to investing in Regulation 28 funds is for an individual to make their own investment choices, discretionary investment, where the individual can choose their own asset allocation, and invest directly in the underlying instruments that a Regulation 28 fund would. This would result in a loss of the tax benefit, but would also

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<sup>6</sup> Note: This study focuses on Australian superannuation funds, which permit members to make pre-tax contributions at lower effective tax rates and any returns within these funds are taxed at lower rates. In this manner they function similarly to Regulation 28 compliant funds.

not limit the underlying investments that an individual could select. The potential advantage of discretionary investments include higher returns, easily accessible capital and lower tax rates upon disposal<sup>7</sup>.

In light of the aforementioned tax benefits, the effectiveness of incentives was considered. The relevant literature demonstrated that the presence of such incentives does not encourage as significant change in behaviour as would be expected. The literature further showed that the asset allocation restrictions imposed on Regulation 28 funds might result in sub-optimal investments, which may result in members receiving significantly lower returns than if they were to invest in a discretionary manner.

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<sup>7</sup> Certain discretionary investments are deemed to be capital in nature in terms of s9C of the Income Tax Act, subject to a holding period of 3 years. Consequently, upon disposal any gains in value are taxed at a maximum effective rate of 13.653%.

## 3. Method

### Research Questions

As may be seen, the preceding review of the literature has highlighted a contrast between the optimal manner in which individuals should save for retirement, as well as the statutory limits imposed on, and the structure of, Regulation 28 limits imposed on retirement funds in South Africa.

As a result, the research questions for this study are as follows:

1. What is the differential nominal return that is required from discretionary, non-Regulation 28 compliant investments over a career<sup>8</sup> in order to account for the tax incentives received by Regulation 28 compliant funds?
2. Is this return feasible given the historical performance of the South African stock market<sup>9</sup>?
3. Is Regulation 28 an appropriate tool for managing investment risk, considering the correlation of Regulation 28 compliant fund returns with the JSE and the variability of returns as measured by standard deviation?

### Research Method

These research questions are novel. The research will be undertaken by constructing a quantitative model ('the model') which contrasts the results of discretionary investment into an index tracking investment fund and investment in Regulation 28 compliant funds. For the purposes of this study, it is assumed that employers do not give employees the option to contribute to pension funds or provident funds. Rather, for the purposes of this study, the Regulation 28 fund is assumed to be a retirement

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<sup>8</sup> For the purposes of this study, a career has been defined as the period from the first day of employment at age 25 to the last day of employment, at age 65. During this period, the individual is remunerated for providing services to a company.

<sup>9</sup> This question will be answered using the performance of the Johannesburg Stock Exchange ('JSE') as noted in the assumptions section below.

annuity fund. This assumption results in a comparison between discretionary investment through a regulated product and true discretionary investment.

In this study a model is created with two hypothetical individuals. These individuals are identical in terms of earnings capability, health, career length and life expectancy. The first individual will save for retirement in a Regulation 28 compliant retirement annuity fund and will be termed the *regulatory investor*. The second individual will save in a discretionary manner, in assets that do not comply with Regulation 28 and will therefore forego the tax deduction of contributions to retirement savings. The second individual will be termed the *discretionary investor*. Both individuals saving behaviour will follow that of the life-cycle hypothesis whereby they accumulate capital over their working career and then dis-save from retirement until death.

The effect of the South African Tax legislation is that there is an incentive to save in a Regulation 28 compliant fund. The manner in which these incentives work is to moderately increase the size of the initial investment as a result of the tax relief they afford the individual (Attanasio et al., 2004). For an illustrative example refer to Appendix C.

The model functions based on the input assumptions below. The regulatory investor contributes the maximum permissible 27.5% of their income to a Regulation 28 compliant fund, each year from their first working year, until the year of retirement. During each of these years, the investor earns a nominal return, on the balance of their retirement savings equal to that of their selected investment vehicle.

The model incorporates the tax liability of each hypothetical individual and is constructed in a manner such that the size of the contributions which are made by the discretionary investor are calculated, and will be less than those of the regulatory investor (i.e. the discretionary investor's contributions are "after tax"), so that both individuals have the same disposable income after settling their tax liabilities and contributing to their respective investments. The purpose of this is to ensure comparability of the standard of living of the two hypothetical individuals. An example is included in Appendix C, Example 2.

Upon retirement, both investors know with certainty that they will live a further 20 years, and therefore will draw down the maximum annuity possible that will ensure that their retirement savings last until death.

For the purposes of research question 3, a test of correlation of monthly returns to the JSE J203 will be undertaken. The annual standard deviation of the fund returns will be calculated and contrasted with that of the J203.

## Assumptions

Given the nature of the model, it is necessary for a variety of input assumptions to be made. These assumptions may be subject to challenges that are highlighted as areas for further research in the limitations section below.

### Career and Life Expectancy

The individual will have a working (and saving) career of 40 years, and will live a further 20 years after retirement. The retirement age has been set at 65 years of age, this being the general retirement age in terms of South African generally accepted labour practice for formal employment.

### Earnings Capacity and Taxation

In the initial base case, the individual does not experience any real salary growth and begins his/her working career in the lowest tax bracket. This initial case is then modified several times by placing the individual at the beginning of his/her career in each of the current distinct tax brackets. This results in seven base cases. The tax brackets and annual rebates are assumed to grow with inflation such that the study eliminates the effect of “bracket creep” or fiscal drag<sup>10</sup>. Based on the data provided in Appendix D, it is apparent that the South African Revenue Service (“SARS”) does not

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<sup>10</sup> “The process whereby an income tax structure with marginal rate progression generates revenue growth faster than income growth, due to individuals crossing into higher marginal rate tax brackets if thresholds are adjusted at less than the rate of increase of nominal incomes” (Creedy & Gemmell, 2014, p. 184)

have a consistent basis for the changes to tax brackets and annual rebates, hence a modicum of uncertainty exists within this particular variable, which would need to be addressed with further research as detailed *infra* in the discussion section.

The Taxation Laws Amendment Act, 31 of 2013 imposes a deduction cap of R350 000 on contributions. Any contributions above this R350 000 will not result in a tax deduction. This implies that the salary cap for contributing 27.5% of one's salary is R1272 727 in 2016. For the purposes of this study, it is assumed that the salary cap, and consequently, the deduction cap will also grow at the inflation rate. The comments above in regard to bracket creep are also apposite with this variable.

### Contributions and savings behaviour

The regulatory investor will contribute the maximum deductible amount, being 27.5% of the retirement funding income, subject to the annual limit of R350 000. These limits are imposed as of 01 March 2016 in terms of the Taxation Laws Amendment Act, 31 of 2013. The discretionary investor will contribute the amount that will result in his after-tax, post-contribution disposable income being equal to that of the regulatory investor.

### Inflation, Investment timing and returns

Inflation is assumed to be 6% per annum, the upper bound of the South African Reserve Bank's inflationary target band (South African Reserve Bank, 2015).

The critical assumption is that investments will earn a consistent nominal annual return equal to the historic return on the selected investment vehicle, that being a Regulation 28 compliant fund for the regulatory investor and a JSE index tracking fund for the discretionary investor. Refer to appendix E for an illustrative example.

The discretionary investor is assumed to incur additional tax on 10% of his annual investment return<sup>11</sup>; as a portion of this is likely to be in the form of dividends, which

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<sup>11</sup> Assume the investor has a savings balance of R100 000 and his marginal tax rate is 38%. Assume further his selected investment vehicle earns 15% in the current year. His pre-tax return would be

are subject to withholdings tax, thereby modifying his overall tax liability. Dividends withholding tax is levied at 15% on South African resident tax payers in terms of s64 of the Income Tax Act. Historically, the dividend yield on the JSE All Share index has been between 2.5% -3% (Johannesburg Stock Exchange, 2015). This equates to tax of approximately 0.045%<sup>12</sup>. Therefore, the 10% used is overly prudent and prejudices the discretionary investor, as it has the effect of overstating his tax liability and thus understating possible real investment returns. The additional tax is calculated using 10% of the annual investment return, multiplied by his applicable marginal tax rate.

Post-retirement, both investors will earn inflationary returns on their remaining investment such that additional wealth is not created in the years of retirement. As these savings are growing at inflation, there will not be any effect on tax, as the tax brackets have been assumed to move at inflationary rates too, consequently, no real wealth is created nor no additional taxes paid in real terms. Succinctly put, both investors real wealth measured as their entire retirement savings remains constant and is only diminished by their withdrawals (“drawdowns”) over their remaining lifespan.

### Retirement behaviour

Upon retirement, neither investor will withdraw one third of their investment. The new legislation in the Taxation Laws Amendment Act, 31 of 2013 legislates that should an individual have more than R150 000 saved in a fund regulated by Regulation 28, two thirds of these savings must be used to purchase an annuity, or be paid out as an annuity. Therefore, the amount remaining in the respective savings vehicle will be drawn down as an annuity over 20 years. This assumption is simplifying, in order to remove the complexity and variability of the amount that could be withdrawn. The individual is assumed to have no bequest motive and to know that they will live, with

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R15 000. Using the above restriction, 10% (R1 500) of the R15 000 would be subject to tax at 38%. The result is that tax of R570 would be paid, and only R14 430 would be accumulated to the savings balance

<sup>12</sup> A tax rate of 15% multiplied by the dividend yield of 3% results in an effective tax of 0.0045% on the total return in a given year.

certainty, for exactly 20 years post-retirement. This is an assumption requiring further research to substantiate, with particular reference to actuarial calculations and the myriad of variables that are taken into account in calculating an actuarially valid age of death/life-expectancy.

## Data

The nominal returns for Regulation 28 investments are based on the best performing of 14 compliant funds<sup>13</sup>. The funds were selected from the two lists of the Top 10 Regulation 28 funds over both a 5 year period to 31 January 2015, and 10 year period to 31 December 2013. The ranking of these funds was performed by Morningstar and Profile Data.

The data for fund returns used in the model reflects a nominal return from October 1995 to October 2015, if available. Where the data available represented a shorter time period, the data for that period was used.

The returns for discretionary investment are based upon indices of the Johannesburg Stock Exchange ('JSE'), over the same period ending in October 2015. The primary results will be based on the JSE All Share index (JSE: ALSI), The results will also include a comparison to the JSE Shareholder Weighted All Share index ('J403') which controls for the lack of free-float<sup>14</sup> amongst some instruments and the JSE Capped All Share index ('J303').The J303 limits the percentage per instrument to 10%<sup>15</sup>. The use of the JSE all-share index is a simplified approach; as indicated in the literature review section, asset allocation is an important variable. In reality, the investment universe available to the discretionary investor is far greater than a pure equity fund, however in the interest of simplicity a pure equity fund was used.

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<sup>13</sup> These funds were selected from a two lists, comprising 10 funds over a 5 year period and 10 year period; however, not all funds on the shorter time period were present on the longer time period, as some had limited returns history of less than 10 years.

<sup>14</sup> Free-float methodology refers to the process of taking into account how many shares are available on the exchange. This accounts for tightly held shares which do not, and likely will not, trade on the exchange due to strategic ownership.

<sup>15</sup> The All Share Capped Index limits the holding of any given stock to 10% by value, such that the full index must always comprise of a minimum of ten different stocks.

## Ethics

None of the information obtained is confidential and is readily available from the sources as cited. No ethical clearances were required as this study has no interest in gender, nor racial differences and no human participants were used in undertaking this research.

## Limitations

This study does not take into account the transaction costs that would be involved in investing. Both Regulation 28 funds and discretionary investors would incur these on different scales, it is assumed that the difference in the fees charged to the discretionary and regulatory investors would be minimal. This assumption is simplifying and is noted as an area for further research.

Further, the length of the working career, and life expectancy after retirement are important, yet sensitive, variables as these will influence the amount saved, as well as the number of periods over which savings can compound.

The assumption that the individual will experience zero-real earnings growth is simplifying. The deductibility of contributions to Regulation 28 compliant funds would assist individuals who have higher earnings growth earlier in their career<sup>16</sup>. Quarterly employment statistics (P0277) from Statistics South Africa exist that would assist in determining the effect that earnings growth should have on the retirement saving behaviour. Consideration thereof, is however beyond the scope of this research.

The assumption that tax brackets and rebates will increase in line with inflation is unrealistic based on the data provided in Appendix D. In reality, individuals would need to adjust their savings behaviour to adapt to the variations in, and changes to, the tax legislation as and when these are made, as taxation may have a significant effect on retirement savings value. Furthermore, the assumption regarding the

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<sup>16</sup> For example, an individual who moves toward the top tax bracket in the early years of employment would receive a bigger tax deduction, resulting in a significantly larger contribution to their regulation 28 fund, which would result in more time for this capital to grow.

increase in the contribution deduction cap is simplifying. The first-time introduction of this limit in 2016 means there is no data or evidence to substantiate future increases in this limit, which may result in fiscal drag.

The asset allocation of the discretionary investor is likely to change as that investor approaches retirement and begins to diversify his asset allocation to adjust to a lower overall risk profile. It is noteworthy that Regulation 28 attempts to mimic this posited behaviour by limiting the risk exposure of Regulation 28 compliant funds to attain a more moderate risk profile. The exact time point that this takes place will vary from investor to investor based on their individual risk appetite. Further, there will come a point where the present value of additional nominal returns earned by the discretionary investment, compounded over the period remaining until retirement will be eclipsed by the present value of the additional contribution as a result of the tax benefit received for contributing to the Regulation 28 compliant fund compounded over the same period.

## 4. Results

In this section, the results to the research questions will be presented. After results for all three research questions have been presented, the results will be discussed.

### Research Question 1

What is the differential nominal return that is required from discretionary, non-Regulation 28 compliant investments over a career in order to account for the tax incentives received by Regulation 28 compliant funds?

The table below displays the differential returns required by discretionary investment over the course of a career. It must be highlighted that the assumptions made in these scenarios reflect those described in the method section. Table 1 included on the next page reflects the answer to research question 1.

Table 1 only reflects the variation of one input variable, being the starting annual salary. Table 1 reflects the variation of the starting salary, which results in the result cells labelled B, C and D. The Goal Seek function in Excel<sup>17</sup> was used to determine the variable E, such that the result variable labelled G to be equal to that labelled D. Each of these labelled variables is explained below table one.

The best performing Regulation 28 compliant fund had returned an average nominal return of 18.49% per annum over a period of 10 years and 10 months. The best performing Regulation 28 compliant fund with a total return history of over 12 years returned 17.58% per annum over 16 years. Notwithstanding these facts, 18.49% has been used in order to impose the least possible prejudice on Regulation 28 compliant funds.

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<sup>17</sup> Goal Seek is a function offered in Microsoft Excel. The functioning of Goal seek is such that it performs multiple iterations of a formula by adjusting a selected input value until the target result of the formula is met.

The results indicate that depending on the tax bracket that the individuals find themselves in; the additional return required by the discretionary investor varies. This is a result of the provisions of South African Tax legislation, which will result in the discretionary investor being taxed on withdrawals as if these are capital gains<sup>18</sup>, which are currently taxed at a maximum effective tax rate of 13.653%<sup>19</sup>.

Although the results above provide a satisfactory answer to the research question posed, it was deemed prudent to conduct sensitivity analyses using the same model. The results of these analyses are contained in Appendix F.

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<sup>18</sup> s9C of the South African Income tax act provides that equity instruments held for a period of more than 3 years are deemed to be capital in nature.

<sup>19</sup> Capital gains are included in taxable income at 33.3%, with the maximum marginal tax rate of 41%. This results in an effective tax rate of 13.653%.

Scenario	1 2 3 4 5 6 7							
	Description	Lowest Tax Bracket	2nd Bracket	3rd Bracket	4th Bracket	5th Bracket	Top Bracket	Salary Cap
Starting Annual Salary	150 000	260 000	380 000	520 000	680 000	1 000 000	1 300 000	
% Saving in Reg 28	27.50%	27.50%	27.50%	27.50%	27.50%	27.50%	27.50%	27.50%
Inflation	6%	6%	6%	6%	6%	6%	6%	6%
Real Salary Growth	0%	0%	0%	0%	0%	0%	0%	0%
Length Of Career (Years)	40	40	40	40	40	40	40	40
Reg 28 Return (working career)	18.49%	18.49%	18.49%	18.49%	18.49%	18.49%	18.49%	18.49%
Post Retirement Return	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
Terminal Salary	1 455 526	2 522 912	3 687 333	5 045 824	6 598 385	9 703 507	12 614 560	
Retirement Savings Value	289 588 902	501 954 096	733 625 218	1 003 908 193	1 312 803 021	1 930 592 678	2 457 119 933	
Retirement Fund Drawdown	9 420 447	16 061 113	23 305 477	31 757 234	41 446 384	60 734 686	77 199 210	
<b>Discretionary Investments</b>								
Required Return of Discretionary Investment	17.64%	18.14%	19.18%	19.26%	19.49%	19.05%	19.05%	
Discretionary Saving Value	189 853 164	338 565 165	499 848 640	684 065 390	895 369 389	1 315 319 786	1 674 069 128	
Discretionary Fund Draw Down	9 420 447	16 061 113	23 305 477	31 757 234	41 446 384	60 734 686	77 199 210	
Difference (Drawdown)	-	-	-	-	-	-	-	-
Difference in Return	-0.848%	-0.343%	0.691%	0.779%	1.003%	-	0.562%	0.562%

Table 1: Differential Return required.

Label	Explanation
A	The annual nominal return earned by the Regulation 28 compliant fund, each year over the course of the regulatory investor's career, 18.49% per annum.
B	The terminal salary is the salary that the individual earned in the year immediately preceding retirement
C	The value (closing balance) of total regulatory retirement savings at the date of retirement. This is calculated using the opening balance of the savings, plus investment return for the annum, plus additional savings. This is performed annually until retirement, with prior year opening balance, plus investment returns and additional savings for the annum forming the current year opening balance.
D	The retirement fund draw down refers to the total amount that the regulatory investor can withdraw in their first year of retirement. This amount increases by inflation each year until retirement resulting in a zero balance at the end of the 20 years of retirement. The amount is calculated as a constant growing annuity with the starting value equal to that of variable D, the growth rate equal to inflation, the ending value equal to zero and the time period equal to 20 years.
E	The variable representing the required nominal annual return required by the discretionary investment in order for the discretionary investor to be able to withdraw the same as the regulatory investor in retirement.
F	The value (closing balance) of total discretionary retirement savings at the date of retirement. This is calculated using the opening balance of the savings, plus investment return for the annum, less taxes on the investment return plus additional savings. This is performed annually until retirement, with prior year opening balance, plus investment returns and additional savings for the annum forming the current year opening balance.
G	The retirement fund draw down refers to the total amount that the discretionary investor can withdraw in their first year of retirement. This amount increases by inflation each year until retirement resulting in a zero balance at the end of the 20 years of retirement. The amount is calculated as a constant growing annuity with the starting value equal to that of variable F, the growth rate equal to inflation, the ending value equal to zero and the time period equal to 20 years.

Table 2: Explanation of terms and table 1

## Research Question 2

Is this return feasible given the historical performance of the South African stock market?

The Johannesburg Stock Exchange All Share Index ('J203') was formed in June 2002. Consequently, the total return period available is limited to June 2002 to October 2015, a period of 13 years and 5 months. Data also exist for the Johannesburg Stock Exchange All Share Capped Index<sup>20</sup> ('J303'), and the Johannesburg Stock Exchange Shareholder Weighted All Share Index<sup>21</sup> ('J403').

When considering this 13-year period, the annual nominal return on the J203 is 16.23% per annum<sup>22</sup>. When compared to the best performing Regulation 28 compliant fund over the same time period, the Regulation 28 fund returned 15.63% per annum. The J303 returned 16.76% per annum and the J403 returned 17.75% per annum over the same period.

Therefore, depending on the tax bracket that an individual is in, it is feasible for an individual to achieve annual returns which would make discretionary investment beneficial to them. This is the case for individuals in the first two tax brackets if the J203 is used, and all individuals if the J303 or J403 are used as discretionary investment vehicles.

## Research Question 3

Is Regulation 28 an appropriate tool for managing investment risk, considering the correlation of Regulation 28 compliant fund returns with the JSE and the variability of returns as measured by standard deviation?

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<sup>20</sup> The All share Capped Index follows the same construction methodology as the all share index and only differs with regards to the capping of stock weightings to 10% per stock.

<sup>21</sup> Shareholder Weighted (SWIX) Indices have the same constituents as an existing market capitalisation weighted Index. However, all constituents are weighted in the SWIX indices by applying an alternate free float, called the SWIX free float. The SWIX free float represents the proportion of a constituent's share capital that is held in dematerialised form and registered on the South African share register, maintained by STRATE. The SWIX free float will not exceed the company free float.

<sup>22</sup> Based on a compound annual growth rate.

Considering the limitation of the top performing fund identified above<sup>23</sup>, the top three Regulation 28 compliant funds (“funds”) over the 13 year and 5 month period were compared to the Johannesburg Stock Exchange All Share Index. The comparison considered the mean annual return over the 13 year period, the standard deviation and the correlation between movements in the monthly fund values and the JSE.

Table 3 shows that discretionary investment surpasses the investments of the 3 best performing Regulation 28 funds, as measured by mean annual return, whereas the results *supra* show the same on a compound annual growth basis. Table 3 further indicates that the standard deviation of the J203, and thus its return variability, is higher than those of the Regulation 28 compliant funds.

<b>Measure</b>	<b>JSE J203</b>	<b>Fund A</b>	<b>Fund B</b>	<b>Fund C</b>
Mean Annual Return	19.589%	17.610%	16.539%	15.892%
Standard Deviation	19.041%	12.711%	10.301%	10.677%

*Table 3: Mean Returns and Standard Deviation*

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<sup>23</sup> The top performing regulation 28 compliant fund had a return history limited to 10 years and was therefore excluded from the risk measurement due to having a shorter available return history than the J203 Index.

<b>Correlation</b>	<i>JSE J203</i>	<i>Fund A</i>	<i>Fund B</i>	<i>Fund C</i>
<i>JSE J203</i>	1			
<i>Fund A</i>	0.189184	1		
<i>Fund B</i>	0.143246	0.874563	1	
<i>Fund C</i>	0.199948	0.935405	0.864439	1

Table 4: Correlation

## Discussion

The initial observation from Table 1 is that the additional nominal return<sup>24</sup> required by a discretionary investor varies depending on the investor's particular tax bracket. The additional return varies from - 0.85% to a maximum of 1.00% per annum over the course of the individuals career.



Figure 1: Additional Returns required over Regulation 28

What is apparent from Table 1 is that saving for retirement can be an effective vehicle to accumulate wealth. Any investment that is earning a return in excess of inflation is creating real wealth for the holder. Based on the input assumptions used in the model, either individual could be in a position where he would be able to withdraw approximately six times their final salary for each of the 20 years of retirement. This is

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<sup>24</sup> The phrase additional nominal return is used loosely as in some instances investors could have reduced returns.

not an aberration, as the purpose of the model is to calculate the differential return required by discretionary investment in order to be indifferent between regulatory investment and discretionary investment. The assumptions used were based on the maximum permissible contributions to Regulation 28 compliant funds.

Whilst saving to withdraw six times the final salary is essentially unrealistic, given the human behavioural pitfalls highlighted in the literature review section of this paper, it does indicate a potential problem with the current proposals for retirement saving. By allowing an individual a tax deduction for contributions to a retirement fund during their working career, the legislation essentially defers taxation from the working career until retirement. For individuals in the lower tax brackets, this is punitive, as their retirement savings value results in a large increase in their disposable income at retirement, which results in the individual moving to higher tax brackets, resulting in these individuals paying more tax in retirement for behaving exactly as the legislation intended.

Referring to Figure 1, it is shown that discretionary investors in the two lowest tax brackets could select investment vehicles, which earn a lower nominal annual return, than if they were to choose a Regulation 28 compliant investment. The additional nominal return required by the discretionary investor then increases to a peak of 1% for an individual in the 5<sup>th</sup> tax bracket, before decreasing to 0.56% per annum for those individuals in the top tax bracket.

This is troublesome for lower tax-bracket earners, who generally earn less as a result of being unskilled or semi-skilled workers (Burger & Yu, 2006; Hlekiso & Mahlo, 2006). These workers are unlikely to possess the financial literacy to understand the ramifications of their decisions (Lusardi & Alessie, 2011) and may potentially rely on the advice of financial advisors.

The largest additional nominal returns are required by discretionary investors in the fourth and fifth tax brackets respectively. These investors are the ones who fiscal drag

affects the most, with the greatest level of drag exhibited as they move from their respective tax brackets into the highest marginal tax bracket<sup>25</sup>.

Considering the historic returns of the J203, it would be possible for investors in the top tax bracket, as well as the lowest two tax brackets to achieve the required rate of return for discretionary investment to be a preferred choice on the basis of monetary value of retirement. If the investor were to invest to track the J303 or J403, an individual in any tax bracket would be able to achieve the required return to make discretionary investment the preferred choice.

Using standard deviation as a measure of risk, it becomes clearer, as shown in table 3, that the regulation has resulted in a decrease in the standard deviation of the fund returns, indicative of a reduced risk profile. Further, when using the Sharpe ratio (Sharpe, 1964) which measures additional return for per unit of risk, all three funds perform better than the J203, J303 and J403.

The purpose of Regulation 28 is to limit any particular fund's ability to make imprudent investment decisions (National Treasury, 2010). It is shown in table 4 that all three funds considered show low correlations to movements in the All Share Index. This is a good indicator that the limits imposed by Regulation 28 are effective in limiting the exposure of the Regulation 28 compliant funds to equities. Table 4 indicates that whilst the Regulation 28 compliant funds have low return correlation to the J203, these funds returns are highly correlated. A result that may, *prima facie*, lead to the conclusion that these funds are exposed to the same or similar underlying investments. A finding that was prominent, was that discretionary investors could accumulate between 65.5% and 68.2% of the retirement savings that a regulatory investor would require in order to have the same retirement savings withdrawals. This indicates that the additional taxes paid by regulatory investors in retirement account for approximately 30% to 35% of the total savings value at retirement. This can be

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<sup>25</sup> An individual in the fifth tax bracket incurs tax at a marginal rate of 39%. When moving into the top tax bracket this increases to 41%. This results in a regulatory investor paying an additional 2% tax on each of his withdrawals in retirement. This is contrasted to the effective capital gains rate which would increase from 12.987% to 13.635%.

attributed to the present value of additional tax in retirement outweighing the present value of the tax savings during the working career.

## 5. Conclusion

### Summary of Results

It is apparent from the study that smoothing consumption over the life-cycle as proposed by the Life-cycle hypothesis would be particularly difficult for the ordinary citizen. Determining the amount of wealth needed at retirement, the appropriate amount to save in the working years up to retirement and the amount that can be safely withdrawn during retirement is a complex multi-variate calculation. This, coupled with potential earnings increases, an uncertain retirement date, unexpected shocks to consumption and the manifestly uncertain date of death are variables that further complicate the matter. This supports the hypothesis proposed by Shefrin and Thaler (1988).

If an individual were to contribute the maximum permissible amount<sup>26</sup> to a Regulation 28 fund in order to save for retirement, this would result in large wealth accumulation, deferring taxes to later in the life-cycle. As demonstrated in the method chapter, there is a degree of unpredictability in the South African Revenue Services changes to the tax rates. Coupled with the South African budget deficit, this may lead one to conclude that further tax rate increases will take place in the future. Should this be the case, it would increase the quantitative attractiveness of discretionary saving<sup>27</sup>.

Whilst it is noted in that only small additional returns would be required to outperform Regulation 28 funds, not all discretionary investors would be better off had they invested in the JSE All Share Index, as the chosen discretionary investment. Had discretionary investors chosen the JSE Shareholder Weighted All Share Index, or the

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<sup>26</sup> Currently 27.5% of Retirement Funding income as per amendments to the income tax act.

<sup>27</sup> Discretionary investment incurs a lower effective tax rate, which means that the amount saved can be significantly lower.

JSE Capped all Share Index, all discretionary investors, regardless of their tax bracket, would be financially better off.

It is noted that Regulation 28 is an effective tool for regulating the risk that retirement savings are subjected to, as the top performing funds showed less volatility as measured by standard deviation, and showed a low correlation of returns to movements in the JSE All Share Index. An area of concern is the high correlation of the fund returns with each other, as this suggests that different retirement saving products<sup>28</sup> are exposed to very similar, or essentially the same<sup>29</sup> investments and consequently the same investment risks.

## Conclusion

The above study indicates that Regulation 28 may be effective at reducing the investment risk that an individual's retirement savings are exposed to; however from a quantitative returns perspective, the limits imposed by Regulation 28 may lead to sub-optimal investment choices when only quantitative returns are considered, should individuals be seeking to reduce their current tax liability by investing in a Regulation 28 compliant fund. This imposition burdens those persons who most need retirement funding without an added tax liability occasioned by the deferred tax liability traversed above.

Based on the results of this study, there is initial evidence that discretionary investment offers higher returns, which indicates that individuals should opt for discretionary investment. However, upon further evaluation of this statement, it is worth noting that on a risk-adjusted basis<sup>30</sup> there is no evidence to suggest that the discretionary investments used in this study outperform the Regulation 28 compliant counterparts.

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<sup>28</sup> Three different regulation 28 compliant funds managed by three different asset managers were used.

<sup>29</sup> The same assets but with different levels of exposure

<sup>30</sup> Measured by the Sharpe Ratio (Sharpe, 1994), a measure of excess return per unit of variability in the portfolio returns.

Accordingly, individuals should invest in order to address their investment goal, which may be solely to maximise retirement wealth, in which case discretionary investment is preferred. If investors seek to maximise retirement wealth whilst minimising possible variability in that wealth, then a Regulation 28 compliant fund may be the superior alternative.

## Recommendations and Areas for future research

As is apparent from the foregoing, there are a significant number of variables and assumptions impacting on the results obtained from this model. The result is that there are numerous areas for further research that will yield further fruitful data to guide investment saving for retirement funding. These several areas for research are set out below:

1. The data used for Regulation 28 compliant funds was limited to publically available fund returns, consequently, a number of employer pension and provident funds could not be included in the study as no data was available. The inclusion of such data may yield results which are contrary to the findings noted in this study.
2. The performance both pre- and post-retirement of discretionary investment is dependent on tax legislation surrounding the provisions for capital gains tax and dividend withholding tax. An analysis of the sensitivity of these results to changes in the tax legislation would improve the understanding of the drivers of retirement savings value.
3. As noted in the conclusion, the data for investment returns exists for a limited period, a period which is shorter than the investment period used over either investors working (and saving) career. Consequently, using investment returns over a longer time frame may yield different results and would require further analysis. The study considered a fixed time period to October 2015 and therefore it is possible that this time-frame used is not indicative of investment

returns over a different period. It is recommended that varying time-frames are used to evaluate whether this is the case.

4. The discretionary investments used in this study are indices on the JSE; these indices are not directly investable, however can be accessed via a number of index-tracking exchange traded funds. These funds may experience a degree of tracking error. An analysis of whether tracking error materially impacts the results of this study is needed.
5. The investment universe available to discretionary investors is not limited to index tracking exchange traded funds. Investors would be able to access a variety of investments such as multi-asset flexible unit trusts, hedge funds as well as offshore investments. It is recommended that this study is replicated using returns from these investment products as the returns earned by - and return variability of these products may differ significantly from JSE indices used.
6. This study used a fixed period for the individuals working career and retirement. The time period over which retirement savings accumulate, returns are able to compound and retirement savings are utilised will affect the results of the study. It is recommended that further analysis of the impact these variables have on the results is undertaken.
7. Inflation was assumed to be a constant rate, at the upper bound of the South African Reserve bank target range. From the date of retirement, it was assumed that the retirement savings would earn a nominal inflationary return. Both sensitivity to changes in the rate of inflation, and the returns earned by accumulated savings post retirement will impact the results of the study and are recommended as areas of future research.
8. Transaction costs were excluded from the study. Transaction costs are disclosed for both exchange traded funds and Regulation 28 compliant funds

which would assist in determining the effect of transaction costs on retirement savings decisions. This is recommended as an area for further investigation.

9. The study assumed that individuals experienced zero real earnings growth over the course of their career<sup>31</sup>. This simplifying assumption can be removed using quarterly employment statistics available from StatsSA<sup>32</sup>. These statistics would make it possible to determine average earnings growth in various sectors and make it possible to replicate the study using real earnings growth.

Conducting the further research recommended above would provide data for a meta-analysis of the manner in which South Africans should save for retirement such that they are able to save the required amount with limited investment risk and the ability to smooth consumption over their life-cycle, thereby minimising the risk that insufficient retirement savings could place an added fiscal burden on the state owing to premature exhaustion of retirement savings.

Based on the findings of this study, individuals should take time to understand their risk preferences and set retirement savings goals or objectives. These goals/objectives would allow them to make more informed decisions regarding the investment vehicle that would enable them to obtain these goals. Individuals should consider variables such as life expectancy as well as their potential earnings growth.

Non-Regulation 28 investment managers and advisers should seek to understand their clients' needs and objectives when providing investment advice; and should actively compete with Regulation 28 managers on the basis that they are able to achieve

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<sup>31</sup> This implies that the only manner an individual would change tax brackets was through the value accumulated in their retirement saving vehicle of choice.

<sup>32</sup> StatsSA publish a quarterly report (P0277) which includes employment and earnings data.

potentially higher returns, possibly on a risk adjusted basis<sup>33</sup>. These managers should seek to educate their potential clients on the tax consequences of investing in a Regulation 28 compliant retirement fund, particularly as to the *post*-retirement tax implications which could be life-changing for the individual. Whilst this study looked at a passive index tracking investment as a discretionary alternative, research indicates that it is possible for active managers to outperform the index (Petajisto, 2013).

Retirement fund trustees and investment managers should engage with regulators to better understand the changes in the tax legislation promulgated by the Taxation Laws Amendment Act, as these changes do not appear to create any benefit for members, other than increased present tax deductions, which are outweighed by the present value of future additional taxes. In addition to the foregoing, these trustees and managers should investigate, retrospectively, the impact of using an index tracking fund as their equity exposure, would have on their historic returns. The results of this investigation may prove useful in providing retirement saving advice to prospective clients and will assist with investment decisions within their respective funds. Further, the improved understanding that could be provided by this research, would materially assist these stakeholders in engaging the regulatory bodies when it comes to modifying existing – or drafting new legislation.

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<sup>33</sup> This would require an analysis of the returns and risk adjusted performance of non-regulation 28 compliant investments, which was beyond the scope of this research.

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## Appendix A – Limits in terms of Regulation 28

The below table highlights the limits for Regulation 28 funds, the column on the right represents the total percentage of assets that can be invested in that asset class; the column second from the right represents the maximum percentage of that asset class that can be held with any one entity or issuer.

<b>Regulation 28 Limits</b>			
<b>Item</b>	<b>Categories of assets</b>	<b>Limits being the maximum percentage of aggregate fair value of total assets of fund</b>	
		<b>Per issuer/entity, as applicable</b>	<b>For all issuers/entities</b>
1.	CASH		100%

1.1	Notes and coins; any balance or deposit in an account held with a South African bank;  A money market instrument issued by a South African bank including an Islamic liquidity management financial instrument;  Any positive net balance in a margin account with an exchange; and  Any positive net balance in a settlement account with an exchange, operated for the buying and selling of assets.	25%	100%
1.2	Any balance or deposit held with a foreign bank;  A money market instrument issued by a foreign bank including an Islamic liquidity management financial instrument;	5%	
2.	<b>DEBT INSTRUMENTS INCLUDING ISLAMIC DEBT INSTRUMENTS</b>		<b>100% for debt instruments issued by or guaranteed by the Republic, otherwise 75%</b>
2.1	Inside the Republic and foreign assets		
	(a)	Debt instruments issued by, and loans to, the government of the Republic, and any debt or loan guaranteed by the Republic	100%
	(b)	Debt instruments issued or guaranteed by the government of a foreign country	10%
	(c)	Debt instruments issued or guaranteed by a South African bank against its balance sheet: -	75%
	(i)	listed on an exchange with an issuer market capitalisation of R20 billion or more, or an amount or conditions as prescribed	25%
	(ii)	listed on an exchange with an issuer market capitalisation of between R2 billion and R20 billion, or an amount or conditions as prescribed	15%
	(iii)	listed on an exchange with an issuer market capitalisation of less than R2 billion, or an amount or conditions as prescribed	10%
	(iv)	not listed on an exchange	5%
			25%

	(d)	Debt instruments issued or guaranteed by an entity that has equity listed on an exchange, or debt instruments issued or guaranteed by a public entity under the Public Finance Management Act, 1999 (Act No. 1 of 1999) as prescribed: -	10%	50%
		(i) listed on an exchange	10%	50%
		(ii) not listed on an exchange	5%	25%
	(e)	Other debt instruments: -	5%	25%
		(i) listed on an exchange	5%	25%
		(ii) not listed on an exchange	5%	15%
<b>3.</b>	<b>EQUITIES</b>			<b>75%</b>
3.1	Inside the Republic and foreign assets			
	(a)	Preference and ordinary shares in companies, excluding shares in property companies, listed on an exchange: -		75%
		(i) issuer market capitalisation of R20 billion or more, or an amount or conditions as prescribed	15%	
		(ii) issuer market capitalisation of between R2 billion and R20 billion, or an amount or conditions as prescribed	10%	
		(iii) issuer market capitalisation of less than R2 billion, or an amount or conditions as prescribed	5%	
	(b)	Preference and ordinary shares in companies, excluding shares in property companies, not listed on an exchange	2.5%	10%
<b>4.</b>	<b>IMMOVABLE PROPERTY</b>			<b>25%</b>
4.1	Inside the Republic and foreign assets			
	(a)	Preference shares, ordinary shares and linked units comprising shares linked to debentures in property companies, or units in a Collective Investment Scheme in Property, listed on an exchange:-		25%
		(i) issuer market capitalisation of R10 billion or more, or an amount or conditions as prescribed	15%	
		(ii) issuer market capitalisation of between R3 billion and R10 billion, or an amount or conditions as prescribed	10%	

	(iii)	issuer market capitalisation of less than R3 billion, or an amount or conditions as prescribed	5%	
	(b)	Immovable property, preference and ordinary shares in property companies, and linked units comprising shares linked to debentures in property companies, not listed on an exchange	5%	15%
5.	<b>COMMODITIES</b>			<b>10%</b>
5.1	Inside the Republic and foreign assets			
	(a)	Kruger Rands and other commodities listed on an exchange, including exchange traded commodities: -		10%
	(i)	gold	10%	
	(ii)	each other commodity	5%	
6.	<b>INVESTMENTS IN THE BUSINESS OF A PARTICIPATING EMPLOYER INSIDE THE REPUBLIC IN TERMS OF: -</b>			
	(a)	section 19(4) of the Pension Funds Act		5%
	(b)	To the extent it has been allowed by an exemption in terms of section 19(4A) of the Pension Funds Act		10%
7.	<b>HOUSING LOANS GRANTED TO MEMBERS IN ACCORDANCE WITH THE PROVISIONS OF SECTION 19(5)</b>			95%
8.	<b>HEDGE FUNDS, PRIVATE EQUITY FUNDS AND ANY OTHER ASSET NOT REFERRED TO IN THIS SCHEDULE</b>			15%
8.1	Inside the Republic and foreign assets			
	(a)	Hedge funds		10%
	(i)	Funds of hedge funds	5% per fund of hedge funds	
	(ii)	Hedge funds	2.5% per hedge fund	
	(b)	Private equity funds		10%
	(i)	Funds of private equity funds	5% per fund of private equity funds	

	(ii)	Private equity funds	2.5% per private equity fund	
	(c)	Other assets not referred to in this schedule and excluding a hedge fund or private equity fund		2.5%

Source: Regulation 28 that gives effect to 36(1)(BB) of the Pension Funds Act 1956, 2010 (National Treasury, 2011)

## Appendix B – Summary of changes to Regulation 28

*Table drafted by author*

<b>Asset Class</b>	<b>Limit under 2011 Regulation 28</b>	<b>Limit under original Regulation 28</b>
<b>Equities</b>	75%	75%
<b>Immoveable Property</b>	25%	25%
<b>Equity and property collectively</b>	No explicit limit	90%
<b>Sponsoring Employer</b>	5-10%	5%
<b>Any single bank</b>	25%	20%
<b>Off-shore Investments</b>	Included per asset class	15%
<b>Other Assets (including derivatives, hedge funds, private equity)</b>	15%	2.5%
<b>Money Market Instruments</b>	100%	100%
<b>RSA Government Fixed Income Instruments</b>	100%	100%
<b>Commodities</b>	10%	Not mentioned

## Appendix C – Illustrative Examples

*Note: These are simple illustrative examples*

### Example 1 – Reduced Tax Liability

A and B are hypothetical identical individuals. Both have a pre-tax income of R1 000 000 per annum. A opts to contribute 27.5% of his pre-tax salary to a Regulation 28 compliant pension fund. B opts to invest 27.5% of his pre-tax salary in local equities. The effect of this is that A will receive a deduction against his total income, whereas B will not. The result is that person B will have less disposable income at year-end.

Assume further that the local equities have a nominal return 15% per annum, whereas the Regulation 28 fund only earns a 10% return in the same year. For the sake of this illustration, we assume that the investment was made at the beginning of the financial year for both parties. Both parties are in the same income tax bracket – thus are taxed R208 587 + 40% of any amount exceeding R701 300 per the 2015/2016 tax regulations.

At year-end we compare total assets assuming that tax has been paid in full. The result is that A has higher total assets, primarily as a result of having to pay less tax. This is illustrated below.

<u>Example 1</u>		Person A		Person B
Pre Tax Salary	<b>A</b>	R 1 000 000.00		R 1 000 000.00
<b>Savings</b>	<b>B</b>	<b>27.5%</b>		<b>27.5%</b>
Permissible Deductions	<b>A x B = C</b>	R 275 000.00		R -
Taxable Income	<b>A - C = D</b>	R 725 000.00		R 1 000 000.00
Tax liability	<b>E</b>	R 215 304.00		R 328 054.00
<b>Disposable Income</b>	<b>D - E = F</b>	<b>R 509 696.00</b>		<b>R 396 946.00</b>
Total Investment made	<b>G = A x B</b>	R 275 000.00		R 275 000.00
Annual Return	<b>H</b>	10%		15%
Year End Investments	<b>J = G x (1 + H)</b>	R 302 500.00		R 316 250.00
Total Assets (Disposable Income + Investments)	<b>F + J</b>	R 812 196.00		R 713 196.00
Total Difference		R 99 000.00		

### Calculation E

Tax range per 2016 taxable income table (South African Revenue Service, 2015)

<b>Taxable Income</b>	<b>Tax Due</b>
<i>R701 300 and above</i>	R208 587 + 41% of the amount above R701 300

Person A = R208 587 + [R23 700 x 41%] = R215 304

Person B = R208 587 + [R298 700 x 41%] = R328 054

### Example 2 – Increased Contribution

Assume the facts are the same as in example one, except that investor B reduces his investment amount such that himself and investor A have the same after tax disposable income.

<a href="#">Example 2</a>		Person A		Person B
Pre Tax Salary	<b>A</b>	R 1 000 000.00		R 1 000 000.00
<b>Savings</b>	<b>B</b>	<b>27.5%</b>		<b>16.2%</b>
Permissible Deductions	<b>A x B = C</b>	R 275 000.00		R -
Taxable Income	<b>A - C = D</b>	R 725 000.00		R 1 000 000.00
Tax liability	<b>E</b>	R 215 304.00		R 328 054.00
<b>Disposable Income</b>	<b>D - E = F</b>	<b>R 509 696.00</b>		<b>R 509 696.00</b>
Total Investment made	<b>G = A x B</b>	R 275 000.00		R 162 250.00
Annual Return	<b>H</b>	10%		15%
Year End Investments	<b>J = G x (1 + H)</b>	R 302 500.00		R 186 587.50
Total Assets (Disposable Income) + Investments)	<b>F + J</b>	R 812 196.00		R 696 283.50
Total Difference		R 115 912.50		

## Appendix D – Taxation Statistics

Source: South African Revenue Services

### Historic income tax bracket increases

The below tables 5 and 6 detail the percentage increase in the lower bound of each tax bracket from 2006 to 2016. The functioning of tax brackets is such that the upper bound of the first bracket will form the lower bound of the second bracket and therefore it is not necessary to show both.

<b>Tax Bracket Increases</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>First Bound Increase</b>	8.11%	25.00%	12.50%	8.44%	8.20%	6.06%
<b>Second Bound Increase</b>	13.04%	23.08%	12.50%	8.33%	7.69%	5.24%
<b>Third Bound Increase</b>	16.13%	22.22%	13.64%	8.00%	7.41%	5.17%
<b>Final Bound Increase</b>	17.95%	30.43%	16.67%	8.57%	7.89%	4.88%

Table 5: Tax bracket increases 2006 - 2011

<b>Tax Bracket Increases</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
<b>First Bound Increase</b>	7.14%	6.67%	3.50%	5.40%	4.21%
<b>Second Bound Increase</b>	6.33%	6.38%	3.50%	5.39%	4.18%
<b>Third Bound Increase</b>	6.56%	6.46%	3.50%	5.40%	4.17%
<b>Final Bound Increase</b>	5.81%	6.37%	3.50%	5.40%	4.19%

Table 6: Tax bracket increases 2012-2016

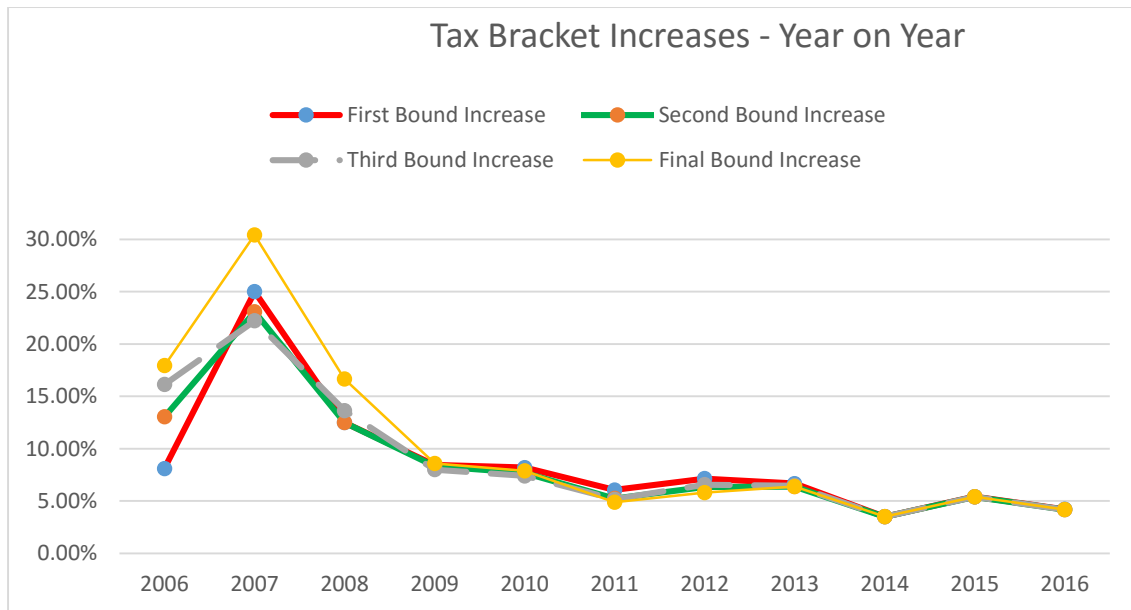


Figure 2: Tax bracket increases graphical representation

## Historic income tax rebate increases

The below tables 7, 8 detail the percentage increase in each tax rebate from 2006 to 2016. All citizens under the age of 65 are entitled to the primary rebate; those between 65 and 75 are entitled to a secondary rebate and those over 75 are entitled to the tertiary rebate. The tertiary rebate was introduced in 2012.

Tax Rebate Increases	2006	2007	2008	2009	2010	2011
Primary Rebate	8.6%	14.3%	7.5%	7.0%	17.8%	5.2%
Secondary Rebate	40.6%	0.0%	4.0%	7.7%	7.1%	5.1%
Tertiary Rebate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 7: Tax rebate increases 2006-2011

Tax Rebate Increases	2012	2013	2014	2015	2016
Primary Rebate	4.8%	6.4%	5.6%	5.3%	4.2%
Secondary Rebate	5.9%	6.3%	5.6%	5.3%	4.2%
Tertiary Rebate	0.0%	6.5%	5.6%	5.2%	4.2%

Table 8: Tax rebate increases 2012-2016

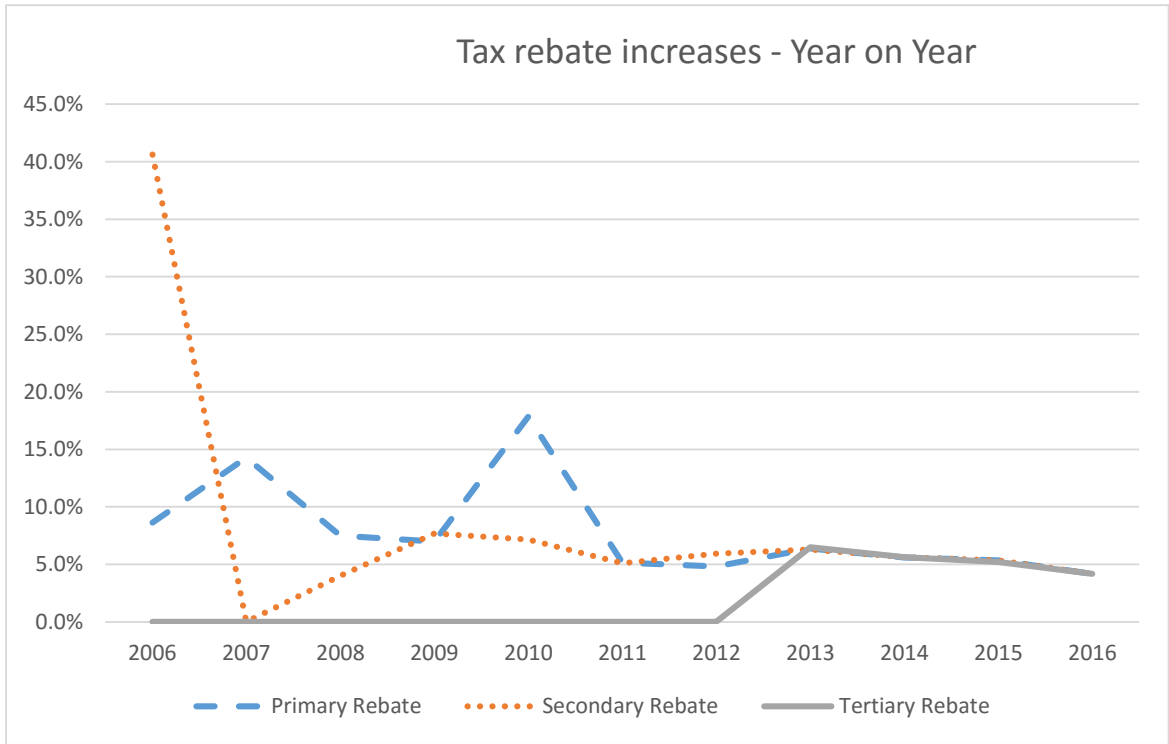


Figure 3: Tax rebate increases graphical representation

## Appendix E – Retirement Fund Returns Example

Note: This is a simple illustrative example of compounding returns.

Assume investor A earns a salary of R150 000 per annum. This salary increases by 10% in each year for 5 years. Investor A contributes 27.5% of his pre-tax salary to a Regulation 28 compliant fund, which earns a nominal return of 15% per annum. For the sake of simplicity, the investments are assumed to take place at the end of the year. The below example illustrates the value of his savings at each of the years included in this example.

Variable	Year	1	2	3	4	5
Salary		R 150 000	R 165 000	R 181 500	R 199 650	R 219 615
Contributions to Fund	27.50%	R 41 250	R 45 375	R 49 913	R 54 904	R 60 394
Savings opening value		R -	R 41 250	R 92 813	R 156 647	R 235 048
Investment Return	15.00%		R 6 188	R 13 922	R 23 497	R 35 257
Current Year Savings		R 41 250	R 45 375	R 49 913	R 54 904	R 60 394
Savings closing Value		R 41 250	R 92 813	R 156 647	R 235 048	R 330 699

Table 9: Retirement Savings compounding and value

## Appendix F – Sensitivity Analyses

### Regulation 28 Returns Increased (Case 1)

Scenario - Higher Returns	1		2		3		4		5		6		7	
	Description	Lowest Tax Bracket	2nd Bracket	3rd Bracket	4th Bracket	5th Bracket	Top Bracket	Salary Cap						
Starting Annual Salary		150 000	260 000	380 000	520 000	680 000	1 000 000	1 300 000						
% Saving in Reg 28		27.50%	27.50%	27.50%	27.50%	27.50%	27.50%	27.50%						
Inflation		6%	6%	6%	6%	6%	6%	6%						
Real Salary Growth		0%	0%	0%	0%	0%	0%	0%						
Length Of Career (Years)		40	40	40	40	40	40	40						
Reg 28 Return (working career)	A	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%						
Post Retirement Return		6.01%	6.01%	6.01%	6.01%	6.01%	6.01%	6.01%						
Terminal Salary	B	1 455 526	2 522 912	3 687 333	5 045 824	6 598 385	9 703 507	12 614 560						
Retirement Savings Value	C	955 093 952	1 655 496 183	2 419 571 344	3 310 992 365	4 329 759 247	6 367 293 010	8 103 832 750						
Retirement Fund Drawdown	D	30 260 374	52 183 653	76 099 958	104 002 313	135 890 719	199 667 531	254 022 935						
<b>Discretionary Investments</b>														
Required Return of Discretionary Investment	E	22.31%	22.70%	23.65%	23.74%	23.96%	23.55%	24%						
Discretionary Saving Value	F	651 736 180	1 129 873 532	1 651 838 916	2 260 473 079	2 956 169 916	4 346 873 245	5 532 412 116						
Discretionary Fund Draw Down	G	30 260 374	52 183 653	76 099 958	104 002 313	135 890 719	199 667 531	254 022 935						
Difference (Drawdown)	D-G	0.00	0.00	0.00	0.00	0.00	0.00	-0.00						
Difference in Return		-0.69%	-0.30%	0.65%	0.74%	0.96%	0.55%	0.55%						

Table 10: Return Differential with higher regulatory returns

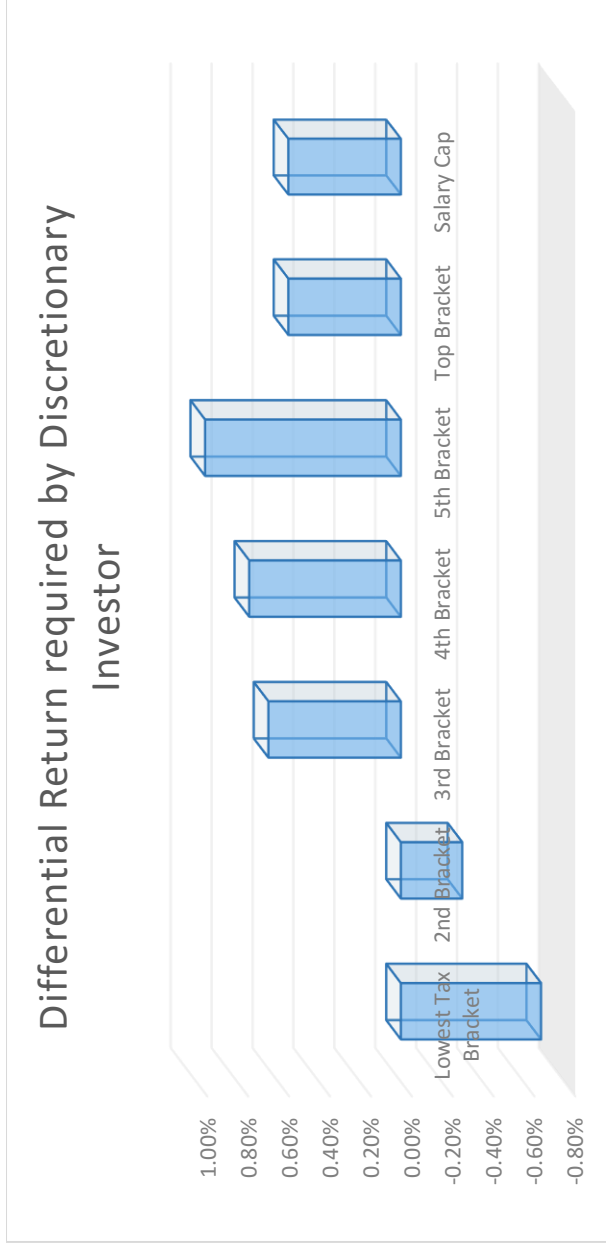


Figure 3: Graph of differential returns required

### Discussion

In the above sensitivity analysis, all variables remained constant other than the return earned by a Regulation 28 compliant fund. The return was increased to a nominal return of 23% per annum. The purpose was to test whether the differential return required by discretionary investors differs drastically based on the return earned by regulatory investors. As shown in the above figure 3, and final row of table 10 the differential returns required do not differ by a large quantum from the original results presented in the study.

## Regulation 28 Returns Decreased (Case 2)

Scenario - Lower Returns	1	2	3	4	5	6	7
Description	Lowest Tax Bracket	2nd Bracket	3rd Bracket	4th Bracket	5th Bracket	Top Bracket	Salary Cap
Starting Annual Salary	150 000	260 000	380 000	520 000	680 000	1 000 000	1 300 000
% Saving in Reg 28	27.50%	27.50%	27.50%	27.50%	27.50%	27.50%	27.50%
Inflation	6%	6%	6%	6%	6%	6%	6%
Real Salary Growth	0%	0%	0%	0%	0%	0%	0%
Length Of Career (Years)	40	40	40	40	40	40	40
Reg 28 Return (working career)	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%
Post Retirement Return	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
Terminal Salary	1 455 526	2 522 912	3 687 333	5 045 824	6 598 385	9 703 507	12 614 560
Retirement Savings Value	72 185 045	125 120 744	182 868 780	250 241 489	327 238 870	481 233 632	612 479 817
Retirement Fund Drawdown	3 009 257	4 439 633	6 088 966	8 197 798	10 607 892	15 428 080	19 536 214
<b>Discretionary Investments</b>							
Required Return of Discretionary Investment	12.82%	12.60%	13.52%	13.61%	13.92%	13.47%	14%
Discretionary Saving Value	56 722 239	84 065 654	117 151 162	160 390 380	213 576 086	318 059 738	410 166 049
Discretionary Fund Draw Down	3 009 257	4 439 633	6 088 966	8 197 798	10 607 892	15 428 080	19 536 214
Difference (Drawdown)	0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00
Difference in Return	-0.18%	-0.40%	0.52%	0.61%	0.92%	0.47%	0.52%

Table 11: Modified Case 2 Results

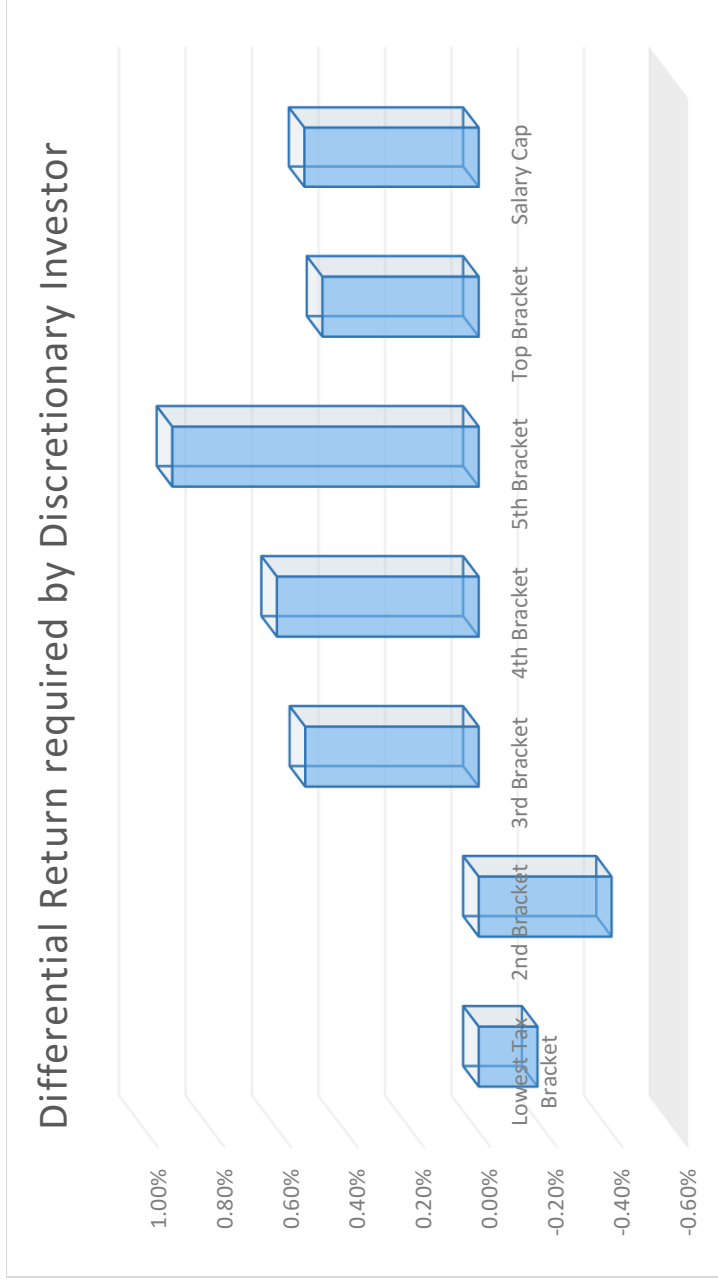


Figure 4: Graph of differential returns required

### Discussion

In the above sensitivity analysis, all variable remained constant other than the return earned by a Regulation 28 compliant fund. The return was decreased to a nominal return of 13% per annum. The purpose was to test whether the differential return required by discretionary investors differs drastically based on the return earned by regulatory investors. As shown in the above figure 4, and in the last row of table 11 the differential returns required do not differ drastically from the original results presented in the study