

The rationality of retirement preservation decisions: A conceptual model

*Michelle Reyers, Cornelis Hendrik Van Schalkwyk, Daniël Gerhardus Gouws
University of Pretoria, South Africa
michelle.reyers@up.ac.za

Abstract: Low retirement savings rates, coupled with a lack of preservation of retirement funds when individuals move jobs, could have adverse repercussions on a person's ability to retire with sufficient funds. The traditional response to low preservation levels has been to impose taxes on cash withdrawals and in some cases to mandate preservation. However, without a complete understanding of the factors that drive low levels of preservation, these policy interventions might do more harm than good. This study carries out a critical, interdisciplinary literature review to construct a conceptual model of the factors which potentially lead to low preservation levels and outlines proposed interventions. The resultant model highlights the distinct differences in the drivers of rational and irrational behaviour and therefore, the distinctly different interventions required. Little is known about the rationality or otherwise of the decision making process of individuals in the retirement preservation context, however current interventions only assist if individuals display bounded willpower. It is essential that a better understanding of the decision making process is obtained to determine whether existing solutions address the problem adequately.

Keywords: *Pre-retirement cash outs; life-cycle hypothesis; behavioural life-cycle hypothesis; bounded willpower; bounded rationality*

1. Introduction

There is widespread concern that individuals are not saving sufficiently for retirement. Some of the reasons could include delaying the decision to save, not saving enough, or not preserving saved funds when moving jobs. The focus of many studies and reform programs has been on the first two issues (Gough & Niza, 2011). However, pre-retirement cash-outs are increasingly recognised as a key issue that may result in insufficient savings at retirement (South Africa, National Treasury, 2011; United States, Working Group on Retirement Plan Leakage, 1998). Australia, Germany, Switzerland, Canada and the United Kingdom already strictly regulate pension withdrawals prior to retirement. In other jurisdictions, such as the United States and South Africa, pension withdrawals prior to retirement are discouraged through the use of taxes and penalties (South Africa, National Treasury, 2012). Despite these disincentives, many individuals still access funds when changing jobs. Studies in the United States have found that more than half of employees do not preserve retirement savings when they move jobs (Bassett, Fleming & Rodrigues, 1998; Engelhardt, 2002; Munnell, Golub-Sass & Muldoon, 2009). Research in South Africa has also found that the majority of individuals take a cash payout when switching employers (Old Mutual, 2010; Sanlam Employee Benefits, 2013; South Africa, National Treasury, 2007).

In light of the growing concerns about low savings levels and the lack of preservation of retirement savings, governments in both the United States and South Africa, are considering ways to decrease withdrawals through further policy intervention (John & Iwry, 2008; South Africa, National Treasury, 2012). Given the low level of preservation in South Africa, the National Treasury has stated that: "The challenge with the current tax system is that the tax clearly does not serve as a strong disincentive since people are willing to pay it and withdraw their savings" (South Africa, National Treasury, 2011, p. 52). Therefore the South African government's current focus is on implementing mandatory preservation (South Africa, National Treasury, 2013). However, without a complete understanding of the factors that drive low levels of preservation, the introduction of various interventions might potentially do more harm than good. The purpose of this study is to build a conceptual model of the factors which potentially play a role in retirement preservation decisions. The model will also detail which interventions are suitable to address the various causes of low levels of preservation. The rationale for the creation of this model is that it will highlight which interventions are suitable in each instance. This will provide initial indications of the potential impact of current policy interventions. In addition it will create a

comprehensive platform to facilitate future empirical testing of factors that actually drive low preservation levels. The paper begins with an overview of the theoretical foundation for the study which focuses on the traditional and behavioural approaches to savings theory. Next, the research approach adopted in this study is outlined. Thereafter the foundation for the construction of the conceptual model is set out focussing on potential reasons for early withdrawals. Potential interventions to assist with optimal decision making in preservation decisions are then outlined. The paper concludes with the construction of a conceptual model of retirement preservation decision making and a discussion of the implications emerging from this model.

2. Theoretical Foundation

In order to determine what factors potentially impact on retirement preservation decisions, the theoretical basis for various savings theories must first be investigated. The distinction between the traditional and behavioural approaches to savings and the relative importance of psychological factors in savings decision-making needs to be explored. When investigating the historical development of savings theories a number of authors highlight a common theme. This theme is the rise and fall, and rise again, of the importance of psychological factors in explaining savings behaviour (Frederick, Loewenstein & O'Donoghue, 2002; Warneryd, 1999). In many cases the original contributors to theory development were acutely aware of the role that psychology played in the decision making process of individuals as it related to savings (Thaler, 1997). However the pressure to convert economics into a mathematical science resulted in the removal of psychological considerations from savings theories. This in turn led to the development of theories, such as the life-cycle hypothesis (LCH) (Modigliani & Brumberg, 2005). These theories are normative in nature, and describe how rational individuals should behave, rather than describing how they might actually behave. The LCH is based on the idea that the consumer is able to solve complex computations to determine the optimum saving and consumption levels over their lifetime (Graham & Isaac, 2002). This would imply that individuals are able to determine how much of their income they need to save for retirement, implement the appropriate saving plan and not deviate from the plan (Monahan, 2004). If individuals act according to traditional models, there would be no requirement for taxes, penalties, regulation or any intervention to influence behaviour. They would make rational decisions that result in optimal consumption and saving levels.

However, in the latter part of the 20th century, a renewed focus on the influence of psychological considerations in economic decision making led to the development of descriptive theories of savings behaviour. One such theory is the behavioural life-cycle hypothesis (BLCH) (Shefrin & Thaler, 1988) which explicitly considers the impact of behavioural and psychological factors on savings behaviour. According to the BLCH the decisions made by individuals may not result in optimal savings levels. This appears to imply that there is a need for some form of intervention in the savings decisions of individuals to ensure that sufficient funds are available for retirement. The different approaches adopted by the LCH versus the BLCH are not merely theoretical debates. They have important implications for whether policy makers should intervene in individual decision making regarding savings. Adding to the importance of establishing the validity of the above hypotheses is the renewed focus on the individual as decision maker. This has occurred as the shift from defined benefit to defined contribution retirement plans puts the responsibility for retiring with adequate funds in the hands of the individual (Monahan, 2004). Considering the many decisions that individuals have to make regarding saving for retirement, a number of authors have highlighted those behavioural factors have the potential to result in sub-optimal retirement savings decisions. These factors are broadly classified as stemming from either bounded rationality or bounded willpower (Desai, 2011; Jolls, Sunstein & Thaler, 1998; Monahan, 2004; Thaler, 1994). Bounded rationality generally refers to computational limitations facing the decision maker. This is defined as "rational choice that takes into account the cognitive limitations of the decision-maker. These limitations can be both knowledge and computational capacity" (Simon, 1987). Therefore individuals may make sub-optimal choices as a result of the computational complexity of retirement savings decisions.

Bounded willpower, on the other hand, results in individuals knowingly taking actions that are not in their best interests in the long term (Jolls et al., 1998). This is linked to self-control and procrastination (Diamond & Vartiainen, 2007). It manifests itself in individuals exhibiting a lack of self-control by consuming rather than saving and procrastinating by putting off the decision to start saving. Self-control problems are generally associated with individuals who display situational inconsistencies. They plan to

act in a specific way, but change their minds when presented with a situation where they are tempted to act impulsively. Procrastination on the other hand appears to result from intertemporal inconsistencies. This is as a result of the fact that an individual places much greater value on current consumption compared to future consumption needs. The latter is also referred to as hyperbolic discounting (Monahan, 2004). In the context of preservation decisions the same biases that influence general retirement savings decisions have the potential to impact on preservation decision making. Therefore, the risk exists that individuals fail to preserve funds when it is optimal to do so. This being as a result of bounded willpower related to self-control problems or bounded rationality arising from computational complexity. However, rational reasons, linked to the LCH and consumption smoothing behaviour may also explain preservation decisions. The research approach to explore these concepts more fully, in the context of a conceptual model, is set out in the next section.

3. Research Approach

The approach adopted in this study is explained in terms of the problem solving model developed by Mitroff, Betz, Pondy and Sagasti (1974). The particular focus of this study is on the part of the model which moves from a problem situation, through a process of conceptualisation, to the development of a conceptual model. The study commences with the identification of the research problem. This problem is the lack of understanding of all potential factors driving low levels of preservation of retirement funds, when employees move jobs. A critical, interdisciplinary literature review is carried out to determine the factors which potentially lead to low preservation levels and what interventions, if any, are appropriate to address these low levels of preservation. These factors and interventions are then combined to create a conceptual model of the retirement preservation decision making environment. The following two sections, 4 and 5, focus on the conceptualisation and model building process. Section 6 outlines the final conceptual model.

4. Conceptual model building: potential reasons for early withdrawals

As outlined in section 2, when leaving a job, the reasons for choosing to take a cash payout rather than preserving retirement funds can be either rational or irrational. Rational reasons would focus on the predictions of the LCH linked to consumption smoothing. Irrational reasons would be related to bounded rationality and bounded willpower. Specific individual characteristics or circumstances would need to be associated with behaviour which is considered rational or irrational. Each aspect is considered in more detail below.

Rational decision makers: Rational reasons for taking cash payment would relate to individuals who are exhibiting consumption smoothing behaviour as predicted by the LCH. Therefore young adults who are in the consumption phase of their life cycle would be expected to make use of funds which they have access to when they move jobs to pay for immediate consumption needs, or to start paying back debt incurred in the consumption phase. These individuals would ultimately be maximising their utility by choosing to use funds for immediate consumption, or the payment of existing debts. Such behaviour would be observed among young adults, with a move to higher levels of preservation among older adults (Love, 2007). Liquidity constraints would also result in rational decision makers choosing to take a cash payment rather than preserving when leaving an employer. This reflects consumption smoothing behaviour (Amromin & Smith, 2003). In this respect, a factor which would play a role in determining rationality would be related to the reason for leaving a job. In general, if the person has been fired or retrenched, then funds might provide consumption smoothing over the unemployed time period. Alternatively, individuals might be in a position where they require the funds to meet immediate survival needs. This is another potentially rational reason for accessing funds.

Irrational decision makers

Individuals displaying bounded rationality: The decision as to whether it is optimal to preserve retirement funds is by its very nature complex. It has the potential to be an area where individuals who display bounded rationality would be predisposed to make sub-optimal choices. The computational complexity of the preservation decision requires, in the first instance, that an individual has the ability to understand and apply the impact of compounding over a future time period. This appears to be beyond the ability of many individuals (Lusardi & Mitchell, 2007). In addition, numerous uncertain factors that

need to be taken into account include future investment returns, inflation rates, length of working life and retirement. These add to the complexity of the decision making process. One conceptual model of retirement savings decisions highlights thirty seven different elements that needed to be considered (Hershey, Walsh, Brougham, Carter & Farrell, 1998). Given the complexity of the retirement decision making environment, it has been suggested that those with better education and financial knowledge might be better equipped to make retirement savings decisions (Bernheim, 2002; John & Iwry, 2008; Thaler, 1994). Studies have also found positive relationships between financial knowledge and savings (Bernheim, Garrett & Maki, 2001; Peng, Bartholomae, Fox, & Cravener, 2007) and particularly retirement savings decisions (Klapper & Panos, 2011; Lusardi & Mitchell, 2011). Therefore, it is expected that the potential factors which might indicate that an individual displays bounded rationality would be linked to lower education levels and low levels of financial literacy.

Individuals displaying bounded willpower

Overview of the influence of impulse control and time perspective: Behavioural biases associated with bounded willpower are thought to result from a lack of self-control and procrastination. The latter result from situational and temporal inconsistencies in decision making (Monahan, 2004). These inconsistencies are associated with two specific individual characteristics, namely impulsivity and time perspective (Ferrari & Díaz-Morales, 2007; Loewenstein, 1996; Mischel, Shoda, & Rodriguez, 1989). Time perspective is defined as representing “an individual’s way of relating to the psychological concepts of past, present, and future” (Boniwell & Zimbardo, 2004, p. 166). Impulsivity usually refers to actions that are taken without thinking of future consequences. This is linked to poor self-control, inability to delay gratification and temporal inconsistencies (Evenden, 1999). In general, the ability to exert impulse control and a time perspective that focuses on the future are generally believed to lead to increased self-control (Loewenstein, 1996) and less procrastination (Ferrari & Díaz-Morales, 2007). A person with a high level of future orientation focuses on future goals and is able to delay gratification and resist temptation (Boniwell & Zimbardo, 2004). Therefore, time perspectives are thought to have a strong influence on financial planning and savings behaviour (Hershey & Mowen, 2000; Jacobs-Lawson & Hershey, 2005). The level of impulsivity of an individual also plays a role in savings behaviour (Monahan, 2004).

In an attempt to obtain a clearer understanding of the neurological processes that drive future orientation and impulse control, neuroimaging has provided unique insights. A study carried out by McClure, Laibson, Loewenstein & Cohen (2004) finds two distinct areas of the brain associated with future orientation and impulsivity in the context of intertemporal choice. The lateral prefrontal cortex is associated with the reasoning process linked to future orientation and the decision to defer gratification. The limbic and paralimbic systems are associated with behaviour that is impulsive and based on immediate gratification. The interaction between the two regions is reflective of the two self model proposed by Thaler and Shefrin (1981) where the “farsighted planner” competes with the “myopic doer”. Differences in levels of self-control and impulsivity have been linked to both developmental aspects related to age, as well as persistent individual differences.

Age related differences in willpower: Generally, willpower develops as part of the maturation process of the brain. Links have been found between brain maturation and future orientation (Romer, Duckworth, Sznitman, & Park, 2010) and the ability to exercise impulse control (Steinberg et al., 2008). A study of neural images across age in a temporal discounting task showed support for the view that humans develop progressive self-control as they mature from adolescence to adulthood. This is as a result of the strengthening of connections between brain areas related to foresight and self-control (Christakou, Brammer, & Rubia, 2011). Giedd (2004) highlights that one of the last brain regions to mature is the dorsal lateral prefrontal cortex. This area is associated with controlling impulses and reaches adult dimensions in the early twenties. In the context of preservation decisions an important distinction needs to be made between the actions of young individuals who do not preserve their funds because of bounded willpower (related to underdeveloped impulse control) and the actions of young individuals who take a cash pay-out to rationally smooth consumption. Therefore age as an isolated factor would provide no clear insight as to whether rational or behavioural factors drive low levels of preservation.

Individual differences in willpower: The brain maturation process explains differences between children, adolescents and adults. There are still individual differences that exist in terms of impulse

control and time perspective which are unique to each individual (Peters & Büchel, 2011; Romer et al., 2010). Time perspective is influenced by a number of factors. These are culture, religion, upbringing, education and specific societal influences (Boniwell & Zimbardo, 2004). It is also recognised that an individual's time perspective is a relatively stable trait, particularly if an individual is influenced predominantly by one specific time frame (Zimbardo & Boyd, 1999). Impulse control is also considered to be a fairly stable personality trait. This is demonstrated in a 40 year longitudinal study. This study finds that the ability to delay gratification in childhood is a predictor for how well people are able to resist temptation in favour of long term goals throughout adolescence and adulthood (Casey et al., 2011). Therefore there are key individual differences in these particular personality traits which persist over time. This would imply that one would expect to see that impulsive individuals, or those with a low level of future orientation, would be less likely to preserve retirement funds if bounded willpower is the key driver of low preservation levels.

Summarised impact of factors: Table 1 contains a summary of the factors that could potentially explain low preservation levels. These factors are specifically related to the assumed level of rationality of the decision maker as well as the underlying cause of irrationality.

Table 1: Potential factors which could drive low preservation levels

Decision maker	Potential causes	Potential Factors	What would predict low levels of preservation
Rational	Consumption smoothing	Age; Liquidity constraints	Young Low levels of liquidity
Irrational	Bounded rationality	Education; Financial literacy	Low levels of education / financial literacy
	Bounded willpower	Time perspective Level of impulsivity	Low level of future orientation High levels of impulsivity

It appears that if we observe low levels of preservation among young individuals, or individuals who are facing liquidity constraints then these individuals are acting rationally. This is provided that these individuals are not also demonstrating characteristics of bounded willpower associated with age related differences in willpower. From the perspective of bounded rationality, it is anticipated that low levels of education and financial literacy would result in low preservation levels. When considering bounded willpower, individuals with high levels of impulsivity and low levels of future orientation would also be expected to cash out retirement savings. While the distinction between those displaying bounded rationality and bounded willpower is not clear cut, and by no means mutually exclusive, it provides a useful categorisation for considering the impact of various interventions. The following section continues the process of developing the conceptual model by focusing on the potential interventions that are suitable to address the various causes of low levels of preservation.

5. Conceptual model building: potential interventions

Overview: Desai (2011) provides an outline of the general solutions available to policy makers in an attempt to solve cognitive biases in individual decision making. These interventions range from pure libertarianism to libertarian paternalism to paternalism. Each approach has specific implications for the interventions which are available to the policy maker. The following sections set out these options in more detail and highlight the specific interventions available in each approach. The resultant impact for both rational and irrational decision makers is also discussed.

Libertarianism: Freedom of choice is a key tenet of a libertarian approach (Thaler & Sunstein, 2003). The approach of pure libertarianism is appealing to those who believe that individuals act rationally. In this instance, policy makers choose to do nothing suggesting that individuals know what is best for them, and intervention is not required. This approach requires that individuals are left to make their own decisions without any interference and assumes that individuals are able to determine optimal choices.

Impact on rational decision makers: Without any form of intervention a rational decision maker would be able to make the choice to preserve or not preserve retirement funds. The choice made would result in the maximisation of their utility over their lifespan as predicted by the LCH.

Impact on irrational decision makers: Irrational decision makers, both those displaying bounded rationality and bounded willpower, would be disadvantaged by an approach that leaves them to make their own decisions. From the perspective of an individual displaying bounded rationality, they will be unable to work out the optimal choice. Those suffering from a lack of self-control will probably take the cash payment as will those who are procrastinators as they will believe that they can start saving towards retirement again at a later date (Monahan, 2004).

Paternalism: regulatory intervention: A purely paternalistic policy uses policy tools such as regulatory intervention to dictate how individuals must behave on the assumption that individuals are acting irrationally. As discussed in section 1, the traditional response to promote retirement savings and preservation of retirement funds has taken the form of regulatory intervention. In this respect, the most common measures implemented include tax incentives to save, and taxes and penalties to dissuade withdrawals. A more stringent approach to stop withdrawals from pension funds prior to retirement is to mandate preservation of funds through regulation.

Impact on rational decision makers: The use of penalties and restrictions on withdrawal may have a negative impact on those who act rationally as part of consumption smoothing behaviour over their life span. One study which makes use of a stochastic life cycle model to determine the potential impact of various retirement plan features found the following. The model predicts that a system which allows for un-penalised withdrawals would increase the participation of younger college graduates by up to 30%. This would allow access to rational savers who participate in consumption smoothing behaviour as predicted by the LCH (Love, 2007). This simulation model draws attention to the fact that any penalties imposed on withdrawals have a potentially negative impact on rational individuals participating in consumption smoothing behaviour. If it is only optimal to begin saving later in life, then job moves give rational individuals the opportunity to cash out retirement savings which they do not yet require.

In addition, the most vulnerable in society are those who suffer the most from penalties imposed on withdrawals which have to be made to meet pressing liquidity constraints. One study of the impact of the introduction of a penalty on early withdrawals in the United States found that among high income groups an increase in the tax raised the probability of preservation of benefits far more than it did among low income groups (Chang, 1996). The study found that those in the low income bracket were probably liquidity constrained and as such were willing to incur the penalty to access their funds. According to the authors, the insignificant impact of the penalty on those in low income brackets meant that penalties would be an ineffective policy tool for curbing the withdrawal of funds among low income earners. Investigations in the United States aimed at understanding how to reduce leakage from pension plans have reached similar conclusions in terms of the use of penalties. In general they have cautioned against the use of penalties, and the idea that increased penalties provide solutions to leakage. The key reason for this is the impact that such penalties have on the most vulnerable, who, due to pressing liquidity needs, will access cash irrespective of the level of penalty imposed (John & Iwry, 2008). Overall, taxes, penalties and mandatory preservation produce sub-optimal results for rational decision makers. The latter may require access to their savings to facilitate consumption smoothing or to meet urgent liquidity needs.

Impact on irrational decision makers: From the perspective of individuals displaying bounded willpower, it has been suggested that limitation and penalties on withdrawals provide individuals with a way to exercise self-control and therefore act as a pre-commitment device (Venti & Wise, 1990). As one author explains "Anticipating a possible future loss of self-control, an individual may actually be more likely to contribute to a tax-favored account that provides a credible mechanism for precommitment" (Bernheim, 2002, p. 1205). The use of rules, both external and internal, as a means to overcome self-control issues is a key component of the behavioural approach to savings (Shefrin & Thaler, 1988). In this regard, Thaler (1990, p. 200) discusses the impact of considering retirement funds as "off limits" as the taxes and penalties associated with accessing these funds prior to retirement provide a useful self-control mechanism. From the perspective of individuals who display bounded rationality, taxes and penalties do not necessarily assist them, unless the optimal choice is to save funds. This arises from the fact that taxes and penalties could be perceived to be an external cue regarding the optimal choice (Akerlof & Shiller, 2009), leading the individual to preserve funds. However, if the individual is better off using the funds for other purposes (e.g. to pay off debt), a decision to preserve funds would be sub-optimal.

Conclusion regarding paternalistic interventions

While paternalistic interventions can dissuade irrational behaviour, they end up punishing those who may be acting rationally. They can even discourage saving in the first place. The above discussion would seem to suggest that the best interests of all participants are not optimally met by Paternalistic Interventions. While the system might assist irrational individuals in exercising self-control, those acting rationally run the risk of being penalised.

Libertarian paternalism: behavioural intervention: The shortcomings and potential for unintended consequences of a system that relies on regulatory incentives and disincentives has led to a move to find an approach that assists those acting irrationally, without imposing constraints and restrictions on those who act rationally. As one author explains it, “In short, we must search for essentially noncoercive ways of guiding individuals' retirement decisions, nudging them over any cognitive hurdles without succumbing to the temptation of overbearing paternalism” (Zelinsky, 2004, p. 524). In a similar vein, O'Donoghue & Rabin (1999) call for the adoption of policies that do little harm to those acting rationally, while at the same time help those acting in an irrational manner. Libertarian paternalism appears to meet this mandate. It combines a paternalistic element by directing individuals to a specific choice, with a libertarian aspect in which it is relatively easy to opt out of the suggested choice (Sunstein & Thaler, 2003). This can be achieved through the use of behavioural tools. These tools include choice architecture, which influences individuals to act in a specific way, or education and debiasing to overcome specific biases. These interventions are discussed in more detail in the following sections.

Choice architecture: One of the key methods of integrating behavioural insights into retirement savings decisions is through the use of choice architecture. This makes use of specific presentation and framing to direct individuals to an optimal choice (Thaler & Sunstein, 2008). This approach makes use of “nudges”. These are described as “any aspect of choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid.” (Thaler & Sunstein, 2008, p. 6) The use of defaults is one of the key tools of a choice architect. Provided that there is an option to opt out of the default choice, and that due consideration has been given to what the optimal default should be, it meets the criteria for libertarian paternalism. Defaults are very powerful. Many individuals end up in the default condition as a result of inertia and procrastination or because they see the default as a recommended choice (Thaler & Sunstein, 2008). The use of choice architecture in the form of defaults is widely used to increase enrolment in pension plans (Munnell et al., 2009). Defaults assist individuals to overcome the tendency to procrastinate and delay decision making. In addition, in many instances, defaults are seen as a recommendation from an authority figure or as the “correct” choice to make (Choi, Laibson, Madrian, & Metrick, 2004; Madrian & Shea, 2001; Thaler & Sunstein, 2008). They therefore influence individuals displaying bounded rationality who are looking for some indication of what the “correct” choice is. Given the ability of defaults to dictate behaviour, their use in preservation decisions has received increasing attention (Choi et al., 2004; Poterba, Venti, & Wise, 1998). Following investigations regarding the level of plan leakages, and recommendations from various committees (see for example United States, Working Group on Retirement Plan Leakage, 1998), the United States government has recognised the positive impact that default choices can potentially have on savings behaviour. Policies have been implemented that take account of this (Choi et al., 2004).

Impact on rational decision makers: The key benefit of using defaults rather than taxes and regulations to influence decision making, is that individuals have the ability to opt out of a default. Therefore if individuals are acting rationally when they choose to withdraw funds from their pension, they can opt-out of a default choice without incurring penalties.

Impact on irrational decision makers: If individuals are acting irrationally when taking a cash withdrawal, the default option to preserve might lead to higher preservation levels. Issues such as inertia and procrastination, or the fact that the default option carries an endorsement, can influence behaviour. However, critics raise the issue that while defaults are useful in solving the cognitive biases of procrastinators and those who are subject to status quo bias, they fail to address the issues of bounded rationality or self-control problems (Desai, 2011). Therefore an individual who has self-control problems will merely opt out of the default of preservation. In addition, if individuals, due to bounded rationality,

are not able to work out whether they should preserve or not, the default of preservation might result in a sub-optimal decision.

Debiasing: Choice architecture has some drawbacks. Another approach suggested a way to overcome various biases associated with irrational decision making is to make use of a debiasing process (Fischhoff, 1982). Debiasing is defined as “a procedure for reducing or eliminating biases from the cognitive strategies of the decision maker” (Bazerman, 1990, p. 170). The practical implementation of debiasing strategies generally focuses on two different approaches. These are cognitive interventions, based on education and training, or technological interventions. The latter include the use of intelligent software and decision aids (Evans, 1989; Larrick, 2004).

Impact on rational decision makers: The use of educational and technological interventions to assist decision making will have a neutral impact on rational decision makers. However, if decision makers are rational then the costs of these interventions would be wasted. Depending on who bears the costs, rational individuals could end up being negatively impacted by these interventions.

Impact on irrational decision makers: Whether debiasing can be successful is open to debate. Some believe that cognitive limitations will stand in the way of any educational or training efforts to overcome bias (Larrick, 2004; Stanovich, 1999). Others are of the opinion that technological interventions don't promote the learning required to overcome bias. This leads to weakened decision making (Glover, Prawitt, & Spilker, 1997). In addition, there are a number of other obstacles that can prevent debiasing. These could result from the nature of the individual decision maker (Fischhoff, 1982; Larrick, 2004), the psychological processes that produce the bias (Epley & Gilovich, 2005) or the specific decision making environment (Willis, 2008).

That being said, there are studies that have found that educational debiasing can be effective (Larrick, Morgan, & Nisbett, 1993; Mann, Beswick, Allouache, & Ivey, 1989; Nisbett, Fong, Lehman, & Cheng, 1987) and that technological interventions can also assist in debiasing (Bhandari, Hassanein, & Deaves, 2008; Lim, Benbasat, & Ward, 2000; Looney & Hardin, 2009). While the research in this area is limited, preliminary debiasing studies, using decision support systems in the investment and retirement decision making fields, have produced positive results (Bhandari et al., 2008; Looney & Hardin, 2009). It would therefore appear that the complexity of preservation decisions, along with biases resulting from lack of self-control and procrastination, might be susceptible to debiasing interventions. Decision support systems and decision aids can assist with computations that assist individuals who suffer from bounded rationality. From the perspective of overcoming bounded willpower, various studies have shown that there are methods to debias both impulsivity (Odum, 2011; Peters & Büchel, 2011) and a lack of future orientation (Hall & Fong, 2003; Hershfield et al., 2011). Whether the techniques can successfully be implemented in a retirement preservation decision making context has not been established.

Conclusions regarding behavioural intervention: Interventions that use the insights from behavioural economics to provide solutions to the problem of low preservation levels have the potential to assist individuals in specific circumstances. Choice architecture and the use of defaults will generally only assist those individuals suffering from procrastination. At the same time rational individuals are able to opt out of such defaults ensuring they are not negatively impacted. As mentioned above, individuals suffering from bounded rationality and self-control problems are potentially not assisted by choice architecture. Debiasing has the potential to provide assistance to individuals displaying both bounded rationality and bounded willpower. However, depending on the costs incurred in setting up a debiasing process, rational individuals may end up bearing costs they do not need to incur.

Table 2: Potential impact (positive or negative) of interventions on various types of decision makers

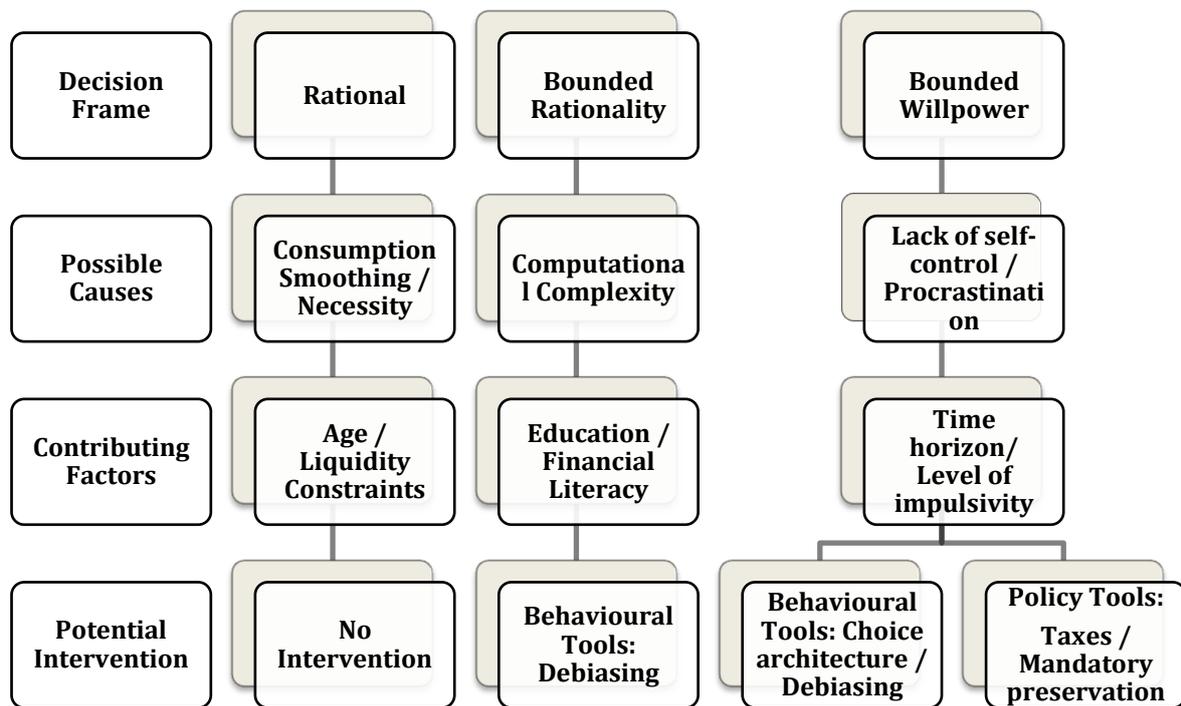
Approach	Intervention	Impact on Rational decision maker	Impact on Irrational decision maker		
			Bounded rationality	Bounded willpower	Self-control
Libertarianism	None	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Taxes and mandatory preservation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Libertarian paternalism	Choice architecture	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Debiasing	<input checked="" type="checkbox"/> ^a	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

^adepending on who bears costs of debiasing intervention could have a negative impact

Summary of the impact of proposed interventions on various decision makers: Table 2 summarises the potential impact of various types of intervention. A libertarian approach is only successful if decision makers are rational. The interventions proposed by paternalism in the form of taxes, penalties and regulation may assist irrational decision makers. Those proposed by libertarian paternalism in the form of choice architecture and debiasing may assist irrational decision makers, but may not be appropriate for all decision makers. In general paternalism is most effective in assisting irrational individuals who display self-control and procrastination problems. The penalties and regulations which encourage preservation are most likely to change the behaviour of these individuals. Libertarian paternalism, through choice architecture in the form of defaults, is most useful in directing the actions of irrational individuals who display procrastination. Debiasing has the potential to positively impact on both individuals suffering from bounded rationality, and those who display bounded willpower. However, the ideas in the debiasing framework are currently untested in a preservation context. A number of critics have pointed out that any interventions in individual decision making must help those who require assistance, without penalising those who do not need assistance (Camerer, Issacharoff, O'Donoghue, Rabin, & Loewenstein, 2003; Desai, 2011; Klick & Mitchell, 2006; O'Donoghue & Rabin, 1999). As the above discussion illustrates, interventions are only successful in specific instances. A one size fits all approach has the potential to do more harm than good. Deciding which of the above strategies is optimal requires an understanding of the inherent level of rationality of decision makers in a retirement preservation context.

6. Conceptual Model: The insights provided by existing literature into the possible causes and contributing factors which may lead to inadequate savings as a result of sub-optimal retirement preservation decisions and the overview of the various interventions available to address this problem are summarised in the conceptual model displayed in Figure 1.

Figure 1: Conceptual model of retirement preservation decision making



A rational model of preservation decision making would predict that those who are young or liquidity constrained would be least likely to preserve funds. This would arise as a result consumption smoothing as predicted by the LCH or would be driven by necessity where an individual requires access to funds to survive on a day to day basis. If rational factors drive low levels of preservation no intervention is required. These individuals make optimal retirement preservation decisions. Individuals should be allowed access to funds to allow them to facilitate consumption smoothing behaviour, or meet liquidity requirements. A model of bounded rationality would predict that those who have low levels of education or financial literacy would display low preservation levels as they are not be able to cope with the computational complexity. The intervention required to assist decision making in this instance would focus on debiasing, either through education and training, or technological decision support. From the perspective of bounded willpower, low levels of preservation would be expected for those who have an immediate time orientation and a high level of impulsivity. These two factors would collectively point to low levels of self-control and a tendency to procrastinate. Interventions required to assist decision makers would be directed at behavioural tools using choice architecture or debiasing. Alternatively, policy tools such as taxes and mandatory preservation can be utilised.

A number of studies in the United States regarding pre-retirement cash-outs appear, on face value, to lend support to the idea of consumption smoothing or bounded rationality as leading to low preservation levels. These studies find that the propensity to withdraw funds prior to retirement is higher for younger employees, lower income employees and those with lower education levels (Bassett et al., 1998; Engelhardt, 2002; Hurd & Panis, 2006; Moore & Muller, 2002; Munnell et al., 2009; Poterba, Venti, & Wise, 2000). However as these studies have not explicitly included a comprehensive assessment of potential behavioural factors, no definitive conclusions can be drawn regarding the rationality of behaviour observed in these studies. More significantly, current policy interventions only assist those who display bounded willpower. Once again no specific testing of this assumption, of lack of self-control as a driver of low preservation levels, has taken place. This conceptual model therefore creates the opportunity to develop a more comprehensive approach to testing factors which impact on preservation decisions. The ultimate goal would be to ensure that policy makers implement appropriate interventions.

7. Conclusion

The conceptual model developed in terms of this study highlights the distinct differences in the drivers of rational and irrational behaviour and the distinctly different solutions which ultimately depend on the level of rationality. Little is known about the rationality or otherwise of the preservation decision making process. However, current solutions only assist if individuals display bounded willpower. It is therefore essential that a better understanding of decision making in this context is obtained. This will ensure that the solutions put in place are properly aligned with the underlying factors which actually play a role in retirement preservation decisions.

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