



Investment Risk Tolerance amongst South African University Students in the Vaal Triangle Area

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ABSTRACT

Analysing students risk tolerance during the investor life cycle is imperative to students and financial planners alike, to facilitate the implementation of suitable investments and investment strategies. Students in universities do not have the required knowledge to invest and this is why an investment framework was created to assist, guide and inform students of what stage of the individual investor life cycle that they are in and suggest suitable investment strategies. The article implemented a quantitative approach, using secondary data analysis. The data used for the analysis is from a self-administered questionnaire in 2017 that was distributed to a sample of 396 students from two higher education institutions in the Vaal Triangle region. Two validated risk tolerance scales were used to analyse students risk tolerance levels. The objective of this paper was to determine the risk tolerance levels of students in the Vaal Triangle region. The two results from the 13-item scale and the single-item scale for measuring risk tolerance indicated that the students have a medium risk tolerance level.

Keywords: Investing, Students, Demographic Factors, South Africa, Risk Tolerance

JEL Classifications: D92, G11, J11

1. INTRODUCTION

Risk tolerance is one of the most comprehensive concepts used in the financial industry and a fundamental factor that needs to be taken into consideration when planning an individual's investment strategy (Rutgers, 2014). Risk is created from uncertainty and the inability to accurately predict market prices; however, risk that results from uncertainty can be managed (Crouhy et al., 2014). An individual encounters risk daily. In general investment terms, risk can be explained as the uncertainty of future returns or potential losses (van den Bergh, 2004). An individual's life experiences, to some extent, are therefore linked with his/her understanding of the relationship between risk and return (Crouhy et al., 2014). These life experiences will play an important role in an individual's income, available capital, liquidity requirements, knowledge about

investments, emotional resilience, as well as their attitude towards price volatility (Fredman, 1996; Hanna and Chen, 1997).

Financial institutions and advisors should understand individual investors' risk tolerance, in addition to their ability and willingness to take on risk as a fundamental component in the investment planning process (Larkin et al., 2013). Although risk tolerance is an important factor when determining an individual's asset composition or asset portfolio, it is not an easy process due to risk tolerance being regarded as a multidimensional attitude, that is likely to be influenced by numerous predisposing factors (Grable and Joo, 2004).

Measuring financial risk tolerance and determining the factors that affect financial risk perception has been of interest to investors

and researchers alike for many years (Adem, 2010). There are many variables that, once grouped and discussed, can interpret an individual’s risk tolerance level. These variables include age, sex, marital status, occupation and wealth. Individual financial risk tolerance is assumed to be the primary determinant of choice behaviour in a situation that the individual is facing when investing (Bailey and Kinerson, 2005; Grable and Lytton, 2001).

As such, investment managers, as well as researchers in the last decade, have renewed their interest in better comprehending risk tolerance associated with investors. One of the main reason for renewed interest is due to the advances in investment management models, as investment managers need a minimum of four factors as inputs when developing financial plans. These include the goals, time horizon, financial stability and the level of risk tolerance of the investor (Garman and Fogue, 1997; Hallman and Rosenbloom, 1987; Trone et al., 996; van den Bergh, 2018).

Risk tolerance is one of the factors that is often overlooked when potential investors or organisations are interested in investing. Risk tolerance often enables a person or organisation to trade-off some level of investment returns for a better result over a period of time. It is therefore important to identify these factors for each individual, as a well-drafted portfolio could benefit the individual in times of need (Kuhnen and Knutson, 2011). According to Mittra (1995), it is important for a financial planner to study investors risk tolerance levels using a subjective and objective measures to help identify what risk tolerance the individual investor is able to take.

According to McLendon (2016), there are a few students that have the financial reserves to engage in financing investment opportunities. McLendon (2016) found that students follow either their peers or their own instinct when it comes to investing their money. This increases the likelihood that students could make a bad investment decision, which might lead to a negative investment experience (Kuhnen and Knutson, 2011). Individuals’ perception of investments can be manipulated by individuals who have experienced financial losses, which can result in potential investors not investing and losing out on their potential earnings. There are nine countries with less than two-thirds (±62%) of the youth actually investing their money; these countries are Singapore, Philippines, Indonesia, Hong Kong, Taiwan, Korea, India the United Arab Emirates and South Africa. (Charlett et al., 1995; Baker and Ricciardi, 2015).

Therefore, this study constructs an investment framework for students, established on their risk tolerance level. The study reviewed the current market-related investment products that might be suitable for students and analysed student risk tolerance levels. The study also proposes investment solutions based on the investor life cycle and the level and extent to which students are willing to take risk. The investment framework will serve as a benchmark framework for students, where they are able to choose the correct investment option according to their risk tolerance.

2. LITERATURE REVIEW

The section focuses on investment decisions and how that is influenced by the investor life cycle theory. Individual investor

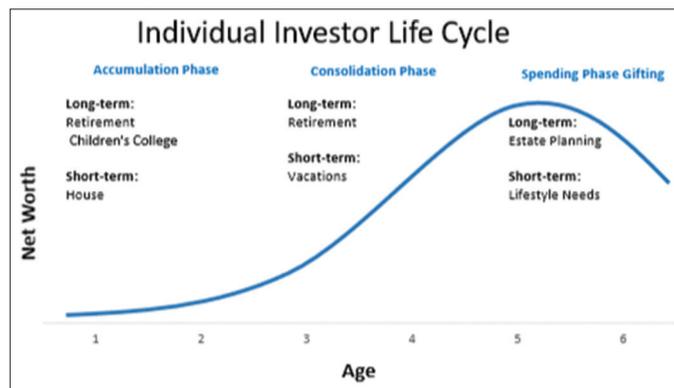
choices vary throughout the different phases of their life cycle since the investors will experience a change in their circumstances in each of the different phases. In order to construct an effective investment policy for the different needs and circumstances in an individual’s life, it is crucial to determine individual investors objectives and their constraints, which is called an investment portfolio (Coronation Fund Managers, 2017:105). It is also important to determine an investors risk tolerance level before compiling an investment portfolio (Goodall, 2005:4). This section will, therefore, establish the foundation for creating an investment framework for student investors.

2.1. Investor Life Cycle Theory

According to Bodie et al. (2010:698), the investor life cycle theory and what phase of the cycle the individual investor is in contributes as one of the main factors that influence the risk objectives of the investor. It is, therefore, imperative that the individual investor comprehends how essential it is to know where they are in the investor life cycle, as it can help manage the effectiveness of the investment portfolio to provide the best results (Goodall, 2005:3; Harty, 2014:1).

The individual investor life cycle is defined as the several phases of owning an investment from the start of the transaction to the actual investment (Harty, 2014). As seen in Figure 1, during the different phases of the investor life cycle, each individual’s needs are different. As the individual investor’s life starts changing and net worth increases, the investment tactics are also altered to make sure that their goals and objectives have been met (Reilly and Brown, 2012). Within the investor life cycle, the assignment

Figure 1: Four phases of the investor life cycle



Source: (van den Bergh, 2018)

Table 1: Assumed relationship between risk tolerance and demographics

Demographic	Low-risk tolerance	High-risk tolerance
Gender	Female	Male
Age	Older	Younger
Marital status	Married	Single
Occupation	Workers and labourers	Professionals
Self-employment	Non-Self employed	Self-employed
Income	Low	High
Race	Non-Whites	Whites
Education	Less	More

Source: Author’s own compilation

of assets shifts as the investor's circumstances change. According to Marx (2009:226), the investor life cycle theory is affected by demographics such as age and health of the investor as they become less risk-tolerant.

2.2. Investor Risk Tolerance

Risk tolerance is an important factor that fundamentally influences an individual's personal financial decisions (Snelbecker et al., 1990:378). Many determinants, once grouped and discussed can interpret an individual's risk tolerance level. Every investor's level of risk tolerance is however different and is dependent on the demographic factors which are his/her age, gender, marital status, race, level of education, employment status and income. It is, therefore, imperative for investors that their financial planners, as well as researchers, understand what factors affect risk tolerance (Grable, 2016:25). Table 1 presents the conclusions from the literature about the relationship between risk tolerance and demographics.

Demographic characteristics are the most widely investigated determinant of financial risk tolerance. This is due to a consensus among investment managers and researchers that the demographics can be used to both differentiate among levels of investor risk tolerance and classify investors into risk tolerance categories. Each investor has his/her risk tolerance level that depends on various demographic factors, such as age, gender, race, marital status, education, employment status and income.

It was thought one of the most important demographic factors for risk tolerance is gender because it was found that men tend to be seen as 'thrill-seekers', more than what women are (Roszkowski et al., 1993). A general agreement between investment managers is that the gender of an individual is both a differentiating and classifying factor because there is a strong belief that men need to take on more risks than what women do (Slovic, 1966). Other researchers have also verified this finding that females take fewer risks than their male counterparts, making males more risk-tolerant than females (Higbee and Lafferty, 1972; Blume and Friend, 1978; Coet and McDermott, 1979; Rubin and Paul, 1979; and Yip (2000) Slovic (1966), Roszkowski et al. (1993), Hawley and Fuji (1993), Sung and Hanna (1996), Sharma (2006), van den Bergh, (2018) Dickason and Ferreira (2019) and Lawrenson (2020). In addition, a study by Dickason et al. (2017) found significant differences between the male and female perception of investment. Their findings showed that male participants were more confident in investment decisions compared to female investors. Furthermore, a study by Bayyurt and Coşkun (2013) found similar results. Stating that males are more likely to invest in higher-risk investment option compared to females, who are more incline to invest in less risky alternatives.

The demographic factor most frequently investigated is age, as it is believed to be linked to financial risk tolerance (Grable et al., 2009:4). Wallach and Kogan (1961) were the first researchers to have studied the link between age and risk tolerance. Their experiment used dilemmas of choice, indicating that individuals that were older had a lower risk tolerance than younger individuals. Irwin (1993) explains that as individuals get older, it is believed that they would rather take less financial risk, because as investors

grow older, they tend to have less time to recover from financial losses experienced from high-risk investments, compared to an individual who is younger and has more time to recover (Grable and Lytton, 1997:64; Grable and Roszkowski, 2008; Gibson et al., 2013; Dickason and Ferreira, 2018).

Furthermore, Cocco et al. (2005:526-527) supports this view and found that investors are more likely to refrain from more risky investments as they age. To determine how an investor with dubious income would react, the authors developed a quantitative model where the investor has a choice to either invest in a risky or riskless asset. The results showed that labour income – an implicit risk-free asset – becomes less important as the investor ages, and adjusts by increasing investments in risk-free assets. On the contrary, a study by Gomes and Michaelides (2005:897-898) investigated the low number of stock investments in America. The results, however, suggest that not all young investors have the majority of their portfolios invested in equities. The reason is that not all young investors accumulate enough wealth to enter the equities market during the accumulation phase due to risk-averse households with a low intertemporal substitution (EIS). Only if this barrier can be overcome, will you investors be able to invest in equities (Michaelides and Gomes, 2005).

According to Baker and Haslem (1974), individuals that are single are also associated with higher levels of risk tolerance. The over-all consensus between researchers is that individuals who are single are believed to take on more risk than married individuals. This is because individuals who are single are presumed to have less worries than married individuals, particularly with relation to dependants. They are also considered to have less social risk when taking on higher-risk investments (Roszkowski et al., 1993:225; Sung and Hanna, 1996:15; Grable, 2000:38; Grable and Lytton, 2001:44; Grable and Joo, 2004:74; Yao et al., 2004:259; Yao and Hanna, 2005:85; Grable and Roszkowski, 2007:797). Financial investment managers, therefore, assume that individuals who are single do not have as much to lose as individuals that are married, who often have responsibilities towards themselves and their dependents. On the contrary, financial investment managers assume that individuals who are married are vulnerable to social risk if an investment choice results in an increase in loss (Roszkowski et al., 1993).

Other important factors that determine an individual's investment risk tolerance are income and wealth. This is because it is assumed that an individual's risk tolerance level rises as his/her income rises. The reason for this is that individuals that have money or are wealthy are usually able to recover more easily from a financial loss due to a risky investment (Grable and Lytton, 1999). A study by MacCrimmon and Wehrung (1986) found that individuals that earn a higher salary usually take on more risk than lower-income individuals. In addition, a study by Irwin (1993) found that individuals with predictable and stable income are inclined to be more risk-tolerant than individuals with unpredictable and unstable income. These results were confirmed in the South African context by Van Schalkwyk (2012); Mabalane (2015:106); Dickason (2017:217); van den Bergh (2018:177); Ferreira and Dickason-Koekemoer (2019:15).

Not many studies have been conducted pertaining to link between risk and race. The first researcher that explored risk-taking differences between black and white adults was Lefcourt (1965:765). The risk-taking experiment by Lefcourt (1965:765), consisted of 30 African and 30 white participants, the results of which presented that the African participants take fewer risks, makes fewer bet shifts and opts to choose fewer low probability bets than the white demographic does. Observational measures such as asset ownership and the proportion of overall wealth allocation to risky investment assets such as stocks or small business are used in most studies.

In addition, a study by Leigh (1986), found that non-white individuals, in comparison to white individuals, were more risk-tolerant. Using a combination of econometric models, as well as correlation techniques, Leigh concluded that there was a higher probability of non-white participants taking on more risk than white participants. In general, there is an acceptance by researchers and investment managers that there is a relationship between race and risk tolerance. Subjective or objective measures of financial risk tolerance have been utilised by a number of studies. Sung and Hanna (1996:11), using the 1992 SCF, studied factors relating to SCF financial risk tolerance variable, coded as inclined to take a risk or reluctant to take any risk. They concluded that white individuals have higher financial risk tolerance than any other race.

In South Africa, a similar study was conducted between race and risk tolerance. In his study, Metherell (2011) found, that a significant difference exists between the White and Indian population groups. However, Van Schalkwyk (2012), on the other hand, concluded in his study on the relationship between race and risk tolerance, that African participants tend to take higher risks than White participants do, thus making the African participants more risk-tolerant. These results were confirmed by Dickason and Ferreira (2018b:5).

Another factor that encourages individuals to take financial risk is their level of education. The assumption is that there exists a correlation between higher education levels and increased risk tolerance. In a study by Ramudzuli (2016), the results show a statistical difference in the risk tolerance level of students who study

towards different degrees. Students who study towards a business commerce in an accounting degree or an economics degree are considered to be more risk tolerant than those students who do not. Furthermore, the study shows that students studying towards social sciences (humanities), law and education are more likely to be less risk tolerant. These findings are similar to previous international studies by Barsky et al. (1997:570) and Chang et al. (2004:60).

2.3. Risk Appetite

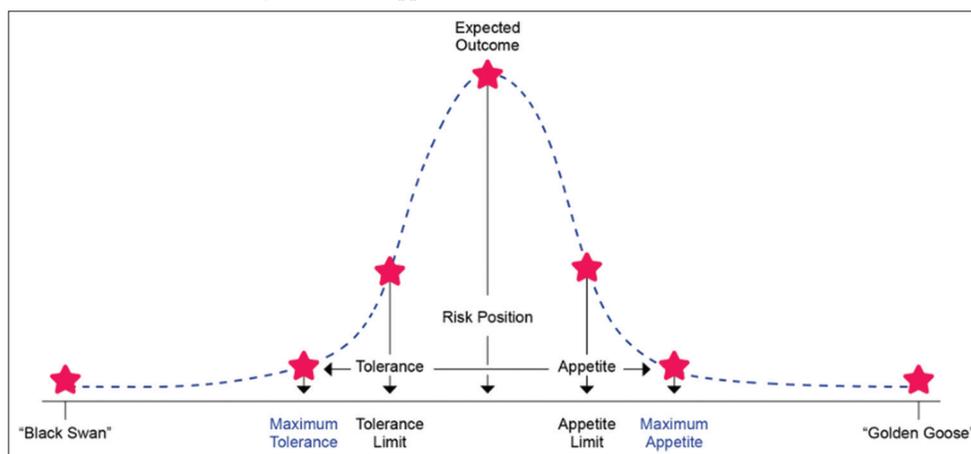
According to Lucarelli and Brighetti (2010:2), financial risk tolerance can be explained as a risk appetite and risk capacity combined. The degree of risk tolerance that individual investors can tolerate is known as the investors' risk appetite. This refers to the extent of risk an investor is willing to take. Risk capacity, on the other hand, is the extent of risk an individual investor can afford to take. These concepts are graphically presented in Figure 2 below. According to Weber et al. (2002:222), the two components of risk tolerance are fundamentally diverse. Risk appetite is referred to as a personality and psychological characteristic of an individual, whereas risk capacity refers to the financial capacity of the individual (Lucarelli and Brighetti, 2010:2). More specifically, Botha et al. (2012:541) define risk capacity as the ability to take the risk and have the financial capacity to withstand market loss. Risk appetite is defined as the total amount exposed that an investor wishes to undertake based on risk and return trade-offs for one or more desired outcomes (RIMS, 2012).

2.4. Subjective and Objective Risk Tolerance

According to Anbar and Eker (2010:505), an investor's subjective financial risk tolerance will change over time; hence, they will not have the same risk tolerance throughout their lifetime as their demographics, as well as the economic factors change. As such, risk tolerance will change. As this happens, it is imperative for investment managers to update the risk tolerance level of the client accordingly.

Subjective risk tolerance usually assesses an individual's self-perceived risk tolerance level (Chang et al., 2004:54) and is based on the economic theory of risk aversion. This refers to the unwillingness of an investor to accept a bargain that has an uncertain outcome, as opposed to one with high levels of certainty

Figure 2: Risk appetite and tolerance of an individual



Source: (Adapted from RIMS, 2012)

and lower results (Faff et al., 2011:2). As such, subjective risk tolerance is a measure of the emotional and financial ability of an individual investor to be able to incur losses (Hanna et al., 2001:53).

Objective risk tolerance looks at an individual's behaviour from past allocations of assets and is based on the notion of the financial situation of the household and the goals of the individual's investment horizon (Malkiel, 1996:401). Malkiel (1996) asserts that the risk an individual can take is dependent on the individual's financial condition, including his/her sources of income, excluding income received from investments. Objective or subjective measures of risk tolerance would partially be suitable in measuring an individual's risk tolerance levels, as it assists in gathering data. Once data has been gathered and analysed, investors need to be classified to determine their portfolio implications and record their tolerance scores.

2.5. Risk Tolerance of Students within the Investor Life Cycle

According to Bodie et al. (2010:698), the most crucial factor that influences an investor's objective depends on the stage of the investor life cycle the investor is currently in. Investors should understand the importance of the stages of their life cycle and where they are in the individual phase of the life-cycle because it is an essential for the efficient management of an investment portfolio. This is no different for student investors.

A study by Masenya (2017) found that students between the ages of 18 and 24 are in the accumulation phase of investing. Individuals in this stage of the lifecycle are gathering assets, planning for retirement and are satisfying their needs and long-term goals by purchasing or saving for houses, cars, furniture and children's college (Harty, 2014:1). Individuals in this stage usually have large debts from car loans, house deposits and university debt that they are still paying off and have a small net worth. Accordingly, Harty (2014:1) states that it is essential for investors in this stage to begin to invest and save their money regularly. In addition, Reilly and Brown (2012:33) found that individuals in this phase are willing to take on more risk for higher returns, due to individual investor's having a longer time horizon and greater future earning ability during this phase.

Furthermore, it is assumed that students invest because they are motivated to secure their future financial wellbeing. According to the findings of Masenya (2017:153), students often invest in money market accounts, shares, bonds, funds and investment groups such as stokvel. His findings also show that students are high-risk investors, as they mostly invest in shares and derivatives. This is in line with the accumulation phase of investing as students can take on a high extent of risk when investing, as their time period to recover from any potential future losses is longer. According to these sources, university students have an advantage over other types of investors: time to invest.

One of the biggest barriers for student investor is, however, the lack of investment knowledge, which could hinder the way and amount of time they take to recover from financial losses (Masenya, 2017:153). With this in mind, the potential for student investors in the financial market is vast and they could, therefore, invest in sustainable

investments. This is the trend seen among Millennials as returns are earned while it is also environmentally conservative (The South African, 2019). Investments such as stocks, bonds, mutual funds, real estate and commodities are other investment options, depending on the financial means of the student investor (Masenya, 2017).

Finally, Van Deventer (2013:2) states that the generation of today is better positioned than the previous generations, as they could be the richest generation thus far. In addition, Bevan-Dye and Surujlal (2011:49) found that the youth in South Africa has the potential to accumulate higher future earnings, which makes the target market more lucrative for this generation than potential future investors.

3. METHODOLOGY

A quantitative research method approach was used in the article where a positivist paradigm was utilized. Secondary data analysis was applied in this article. Data that were collected and analysed previously are known as secondary data; it is also data that a researcher had no direct control over or had any involvement in (Walliman, 2006:52). This type of analysis is valuable because it provides an opportunity for the data that has not been analysed fully to be used and to bring a different perception to the data that exists already and to be able to execute the research questions that the researcher collected with the primary data (Ritchie and Lewis, 2003:61). The secondary data used in this research paper was collected during 2017 from a study by Masenya (2017). Masenya (2017) used a mixed-methods design with a survey and interviews. The present study only utilised the raw quantitative data not fully utilized by the primary study. The primary study aimed to find out whether students invest and in what type of products. However, the survey allowed additional research opportunities. The present article proposes to investigate this opportunity for further research through focusing on the exploration of the levels of risk tolerance and subjective risk profile of Vaal Triangle students (Gauteng province in South Africa) by comparing these factors with the students' demographics.

3.1. Research Sample

The sample size is drawn from the target population where the sample size must be illustrative so the researcher can make conclusions from the statistics of the sample (Maleske, 1995). It is essential to note that if the sample size is small it will lack the precision to give answers that are being investigated and that are reliable to the researcher. However, if the sample size is too big then time and resources could be wasted, usually at a minimal gain (Chuan, 2006:72). The data were collected by means of a non-probability convenience sample from the full-time undergraduate students that were registered in 2017 at two universities in the Vaal Triangle region (Gauteng province in South Africa).

The sample size of 300 students that were enrolled full-time at two of South Africa's Higher Education Institutions was considered statistically sufficient. Previous studies of a similar nature had comparable sample sizes. Shah et al. (2018), tested the influence of demographic variables on the risk tolerance profile of business students using a sample of 382 students. The study of cross-cultural differences in risk tolerance: a comparison between Chinese and Americans (Zhong and Xiao, 2009) had a sample

of 470 participants. An empirical investigation for determining the relationship between personal financial risk tolerance and demographic characteristic (Anbar et al., 2010) had a sample of 450 students. Furthermore, a study concerning the financial risk tolerance and additional factors that affect risk-taking in everyday money matters (Grable, 2000) had a sample of 600 participants.

3.2. Measuring Instruments

Since this article made use of secondary data, it is necessary to discuss the manner in which the data were collected previously. This article made use of selected sections of the original data set. The questionnaire in the primary study consisted of demographic information, the survey of consumer finances, the risk tolerance scale that was developed by Grable and Lytton, the wealth domain of the DOSPERS scale and subjective financial knowledge. The following risk tolerance measures were used in this article:

3.2.1. Survey of consumer finances (SCF)- (Subjective self-report measure) as the risk profile of students

To measure the participants' risk tolerance and subjective approach, the SCF single-item measure was included by utilising a single-question self-report. This scale is applied to collect data on assets, liabilities, financial attitudes as well as financial behaviours of individual groups. This scale was developed by the University of Chicago and was sponsored by the Board of the Federal Reserve and other governmental agencies (Grable et al., 2001). The use of the SCF financial risk-tolerance assessment has grown over the last couple of years because researchers, due to time constraints, needed a reliable method of assessment; the item has a long inclusion with the SCF so it must also be valid (Grable and Lytton, 2001). The single risk tolerance self-report measure contained a single item: Which of the following statements comes closest to the amount of financial risk that you and your (husband/wife/partner) are willing to take when you save or make investments?

1. Take substantial financial risks expecting to earn substantial returns.
2. Take above-average financial risks expecting to earn above-average returns.
3. Take average financial risks expecting to earn average returns.
4. Not willing to take any financial risks.

3.2.2. Grable and Lytton risk tolerance scale (objective risk tolerance scale)

This is a scale consisting of 13 items. The 13 items are an assessment that measures financial risk tolerance and were created by Grable and Lytton (2001) to measure the objective risk-taking behaviour. The final version of the assessment gave a multidimensional scale, which was reliable and relatively easy to use. This risk tolerance scale also offered assistance for the construct validity of the tool (Grable and Lytton, 2001).

Two measures were used, namely the 13-item risk tolerance scale by Grable and Lytton (1999) and the SCF single-item measure. To measure the risk tolerance from a multiple dimension, Grable and Lytton's (1999) 13-item risk tolerance scale were included. The multidimensional scale has 13 items that comprise of questions that are multiple-choice and range from 1 to 47. The scale was split equally into three groups to determine low, medium and

Table 2: Descriptive statistics and reliability coefficients for risk tolerance and risk profile (scales adapted to 1-20 for easy comparison)

	Mean	Std. deviation	Reliability
GL-RTS	11.36	2.02	0.64
Risk profile (SCF)	13.43	4.48	

Table 3: Demographics' possible influence on level of risk tolerance and subjective risk profile

	Risk tolerance (GL-RTS)	Risk profile (SCF)
Age	0.18	0.00
Gender	-0.12*	-0.11*
Race	-0.14**	-0.13**
Marital status	0.10*	-0.02
Language	-0.06	-0.16**
Qualification	-0.09	0.02
Year group	0.05	-0.04
Situation	-0.06	-0.11*
Monthly income	0.07	0.04
Source of income	-0.01	-0.06
Number of dependents	-0.06	-0.08
Investment type	-0.05	-0.10*

*P<0.05, **P<0.01

high-risk tolerance. Ratings are assigned to the multiple-choice questions, although not all the scales have the same number of options for the multiple-choice or ratings allocated to them (Grable and Lytton, 1999:177).

3.3. Statistical Analysis

The science of collecting, exploring and presenting large amounts of data is known as statistical analysis in order to find fundamental patterns and trends. Statistical analysis is utilised in everyday scenarios – in governments, research as well as industry – to become more scientific about choices that need to be made (Smith, 2019:1). IBM statistical package for the social sciences™ (SPSS) Version 26 (IBM Corporation, 2020) was applied to analyse the data of this article. The following section shows the statistical methods that were applied during this article.

4. EMPIRICAL RESULTS

The two results from the 13-item scale and the single-item scale for measuring risk tolerance indicated that the majority of the participants have a medium (GLR-TS), and average to above average (SCF) risk tolerance level. Since the 13-item risk tolerance scale and the SCF scale have similar results and the 13-item risk tolerance measures risk tolerance from multidimensional levels, the results from both scales will be used throughout the rest of the article, similar to previous studies such as Ferreira (2019) and Ramudzuli (2016). This article states that participants have a medium risk tolerance level.

As seen in Table 2, the risk tolerance scale (GL-RTS) recorded a mean of 11.36 and a standard deviation of 2.02. Risk profile recorded a mean of 13.43 and a standard deviation of 4.48, which seems higher than that of the risk tolerance scale.

Table 4: Significance of comparison of group means (t-test)

	Risk tolerance (GL-RTS)			Risk profile (SCF)		
	t-statistic	P	Cohen's D	t-statistic	P	Cohen's D
Gender	2.29	0.02*	0.23	2.40	0.02*	0.25
Marital status (without divorce)	-1.06	0.29	-	0.09	0.93	-

*P<0.05, **P<0.01

Table 5: Significance of comparison of group means (ANOVAs)

Variable	Risk tolerance (GL-RTS)	Risk profile (SCF)
Age	0.68	0.66
Race	0.00**	0.00**
Language	0.57	0.05
Qualification	0.00**	0.02*
Year group	0.35	0.41
Situation	0.66	0.10
Monthly income	0.30	0.92
Source of income	0.71	0.47
Number of dependents	0.56	0.05
Investment type	0.03*	0.51

*P<0.05, **P<0.01

Table 6: Tukey's post hoc test for race

Variable	Risk tolerance (GL-RTS)	Risk profile (SCF)
	Mean difference	Mean difference
African		
White	1.88*	0.46*
Coloured	-1.03	0.16
Indian	6.80	1.09
White		
Coloured	-2.91	0.62
Indian	4.93	0.63
Coloured		
Indian	7.83*	1.25

*P < 0.05, **P < 0.01

Table 7: Tukey's post hoc test for qualification

Variable	Risk tolerance (GL-RTS)	Risk profile (SCF)
	Mean difference	Mean difference
BA degree		
BCom degree	-0.93	-0.17
BEd degree	2.52*	0.35
BSc degree	-0.29	-0.1
BTech degree	-0.36	-0.25
Diploma	0.77	-0.08
Other	-4.26	-0.1
BCom degree		
BEd degree	3.44*	0.51*
BSc degree	0.63	0.07
BTech degree	0.57	-0.08
Diploma	1.70	0.08
Other	-3.33	0.07
BEd degree		
BSc degree	-2.81	-0.44
BTech degree	-2.87	-0.59
Diploma	-1.74	-0.43*
Other	-6.77	-0.44
BSc degree		
BTech degree	-0.06	-0.15
Diploma	1.07	0.01
Other	-3.96	0.00
BTech degree		
Diploma	1.13	0.16
Other	-3.90	0.15
Diploma		
Other	-5.03	-0.01

*P<0.05, **P<0.01

4.1. Determining Significant Group Mean Differences

The results of the t-tests for the characteristics of gender and marital status are reported in Table 4. From the results, it is clear that the means for the levels of risk tolerance and risk profile, respectively, did not differ significantly when compared between single and married participants. With regards to males and females, both risk tolerance (P= 0.02*) and risk profile (P= 0.02*) showed significant differences between means. Both t-statistics were positive, indicating the means for males were significantly higher than those for females, with a medium effect: Risk tolerance = 0.23; Risk profile = 0.25.

The ANOVA calculation indicates only whether or not significant differences exist, but do not provide information on exactly where those differences are. To determine where differences are located, Tukey's post hoc test is utilised. In addition to Tukey's post hoc test, homogenous subsets will be reported. Possible homogenous subsets within the selected groups are identified to not only confirm Tukey's post hoc test results but also to indicate where similarities might be found. Table 5 reports on the relevant groups identified through the ANOVA process, Table 6 contains Tukey's post hoc test results, and Table 7 the possible homogenous subsets within these groups.

Reliability measures the extent to which an instrument yields the same results over multiple trials. If the reliability is 0.7 or higher, the instrument is considered reliable. It can be seen that risk tolerance reliability is 0.64, which is lower than the 0.7 reliability score. Although this is due to the reason of unidimensionality which indicates that the GL-RTS measured multiple factors rather than a single dimension.

The total risk tolerance levels of the participants, which were measured using Grable and Lytton's 13-item risk tolerance scale, indicated that the majority of the participants, 89.6%, had a medium risk tolerance, followed by high-risk tolerance, 9.1%, and low risk tolerance, 1.3%.

As reported in Table 3, correlations between the different demographic variables and the GL-RTS and SCF, respectively, were calculated and it was found that gender and race were the only two characteristics that had a possible significant influence on the levels of both measures. Marital status could have a significant influence on participants' risk tolerance level, with language and situation possibly influencing risk profile significantly. None of the other demographic characteristics was found to possibly influence either risk tolerance or the subjective risk profile level.

The characteristics race and qualification were the only ones that indicated significant differences in group means for both measures, and investment type was shown to have significant mean differences with regards to only risk tolerance as seen in Table 8.

Significant mean differences for both measures were found between African and White participants (GL-RTS = 1.88*; SCF = 0.46*) and for only risk tolerance between Coloured and Indian participants (GL-RTS = 7.83*). It seems that African participants have both higher risk tolerance and risk profile scores when compared to White participants, and Coloured participant has higher risk tolerance than Indian participants, but do not necessarily have a higher risk profile. In Table 9 two subsets within the race variable for both measures were indicated. For both measures, Indian participants fell into one subset, and African, and Coloured participants fell into a second subset. White participants were categorised in both subsets, which indicated that the group’s mean on risk tolerance and level of subjective risk tolerance profile were close enough to both subsets and could not be classified specifically. It was found that that there was no difference in the objective and subjective risk tolerance between the different racial groups. These results are not in accordance with previous studies that have been done (Ferreira, 2019:6; Masenya, 2017:102) that found that African investors risk tolerance level is lower than that of white individuals.

Table 8: Tukey’s post hoc test for investment type

Variable	Risk tolerance (GL-RTS)	
	Mean difference	
Money market account		
Government bonds		-3.60
Derivatives (FOREX, ETFs)		-3.39
Investment club/group (Stokvel)		-6.2
Other types		-1.6
Multiple types		-2.27
Doesn’t invest, would consider		-1.07
Doesn’t invest, would not consider		1.47
Government bonds		
Derivatives (FOREX, ETFs)		0.21
Investment club/group (Stokvel)		-2.60
Other types		2.00
Multiple types		1.33
Doesn’t invest, would consider		2.53
Doesn’t invest, would not consider		5.07
Derivatives (FOREX, ETFs)		
Investment club/group (Stokvel)		-2.81
Other types		1.79
Multiple types		1.12
Doesn’t invest, would consider		2.32
Doesn’t invest, would not consider		4.85
Investment club/group (Stokvel)		
Other types		4.60
Multiple types		3.93
Doesn’t invest, would consider		5.13
Doesn’t invest, would not consider		7.67*
Other types		
Multiple types		-0.67
Doesn’t invest, would consider		0.53
Doesn’t invest, would not consider		3.07
Multiple types		
Doesn’t invest, would consider		1.20
Doesn’t invest, would not consider		3.73
Doesn’t invest, would not consider		2.53

* P<0.05, ** P<0.01

BCom degree students and BEd degree students showed significant differences between their means on both risk tolerance and risk profile levels (GL-RTS = 3.44*; SCF = 0.51*), with BCom degree students showing higher levels of both subjective risk tolerance and objective risk tolerance. A mean difference was found between BA degree and BEd degree students in mean levels of risk tolerance (GL-RTS = 2.52*), where BA degree students exhibited higher levels of risk tolerance. With regards to the subjective risk tolerance profile, students studying towards a diploma were willing to take higher risks than BEd students (SCF = -0.43*). When homogenous subsets for risk tolerance were identified, students studying towards a BEd degree or a diploma were placed in the first subset, with students studying for unspecified qualifications placed in the second subset and for the intent of reporting/using these stats, the two homogenous groups could also be classified into one, this is because of the number of students studying “other”, which was only four. If these students were left out of the calculation, only one subset would have been identified.

There was only one significant difference between means found with regard to risk tolerance in the investment type group (the only significant difference indicated by ANOVA), i.e., between participants that invest in clubs or groups like stokvels, and participants who did not invest that would also not consider investing (GL-RTS = 7.67*). Participants not investing who would also not consider investing have thus been shown to have lower risk tolerance. No other important differences in levels of risk tolerance or risk profiles were found, regardless of the type of investment. Only one subset was identified for all types of investment.

Table 9: Homogenous subsets

Variable	Objective Risk tolerance (GL-RTS)		Subjective Risk profile (SCF)	
	Subset 1	Subset 2	Subset 1	Subset 2
Race				
Indian	20.00		1.67	
White	24.93	24.93	2.30	2.30
African		26.80		2.75
Coloured		27.83		2.92
Qualification				
BEd degree	24.23		2.31	
Diploma	25.97		2.65	
BA degree	26.74	26.74	2.74	
BSc degree	27.04	27.04	2.75	
BTech degree	27.10	27.10	2.75	
BCom degree	27.67	27.67	2.82	
Other		31.00	2.90	
Investment type				
Doesn’t invest, would not consider	23.93		-	-
Money market account	25.40		-	-
Doesn’t invest, would consider	26.47		-	-
Other types	27.00		-	-
Multiple types	27.67		-	-
Derivatives (FOREX, ETFs)	28.79		-	-
Government bonds	29.00		-	-
Investment club/group (Stokvel)	31.60		-	-

5. CONCLUSION

Based on the findings of the article, it can be concluded that risk tolerance is a pivotal factor that should be taken into consideration when planning individual investors' investment strategies. It is also important for these individuals to know and understand how their demographics affect their risk tolerance level and how important it is to have basic financial knowledge before investing. Students also have a lack of investment knowledge, which contributes to them not measuring their risk tolerance accordingly, which affects their investment strategies; therefore, the framework was created to guide students in investing. Students must increase the knowledge that they have on investing to assist them in creating an investment portfolio before they start working to gain wealth from an earlier age than most individuals. If their risk tolerance and investment knowledge improve it could contribute to better investment decisions to assist in securing their financial well-being and to improve their quality of life.

Age, gender, race, marital status, nationality, home language, qualification, year of study, the study situation, monthly income, source of income, number of dependents along with the investments that they invest in were all taken into consideration. Grable and Lytton's risk tolerance was measured in three different levels, these being low risk, medium risk and high-risk tolerance followed by the SCF that measured risk tolerance in four different levels, namely no risk, average risk, above-average risk and substantial risk. The total Grable and Lytton risk tolerance found that most of the participants had a medium risk tolerance, followed by high-risk tolerance and low-risk tolerance. The investment risk of the participants was also measured, and it was found that most of the students have a medium investment risk tolerance level, followed by high-risk tolerance and low-risk tolerance.

The outcomes for the remaining demographic characteristics (age group, race, language, qualification, year group, situation, monthly income, source of income, number of dependents and investment type) were provided. Only race and qualification indicated significant differences in groups means for both measures, and investment type was shown to have significant mean differences with regards to only risk tolerance. Tukey's post hoc test was used to report for groups that had significant differences. Significant mean differences for both measures were found between African and White participants (GL-RTS = 1.88*; SCF = 0.46*) and for only risk tolerance between Coloured and Indian participants (GL-RTS = 7.83*). It seems that African participants have both higher risk tolerance and risk profile scores when compared to White participants, and Coloured participant has higher risk tolerance than Indian participants.

BCom degree students and BEd degree students showed significant differences between their means on both risk tolerance and risk profile levels (GL-RTS = 3.44*; SCF = 0.51*), with BCom degree students showing higher levels of both risk tolerance and risk profile. A mean difference was found between BA degree and BEd degree students in mean levels of risk tolerance (GL-RTS = 2.52*), where BA degree students exhibited higher levels of risk tolerance. With regards to risk profile levels, students studying towards a diploma were willing to take higher risks than BEd

students (SCF = -0.43*). When homogenous subsets for risk tolerance were identified, students studying towards a BEd degree or a diploma were placed in the first subset, with students studying for unspecified qualifications placed in the second subset. The other participant groups all had means too close to both subsets to be classified as part of either. All the qualification groups were classified together in one subset for risk profile levels.

There was only one significant difference between means found in the investment type group, and only with regards to risk tolerance, i.e., between participants that invest in clubs or groups, like stokvels, and participants who did not invest that would also not consider investing (GL-RTS = 7.67*). No other important differences in levels of risk tolerance or risk profiles were found, regardless of type of investment. Only one subset was identified for all types of investment.

5.1. Limitations

- Although the study achieved all the set objectives, there were certain limitations to the article. The first limitation that was encountered was that the sample size was only of 300 students within the Vaal Triangle District, which consisted of two universities, one traditional and one university of technology and also that studied specific courses. The sample size could have been more if more institutions were included in the article, such as colleges and/or all degrees that are offered at these universities.
- Secondly, the sample that was used did not have an equal distribution of students from the two universities, the best ratio would have been a 50 per cent ratio from each, however, it was split into a ratio of 70 per cent from a traditional university and 30 per cent from a university of technology.
- Future research could include more Higher Education Institutions (HEI) in the country, instead of just two from the Vaal Triangle region and by including more HEIs, a more accurate analysis could be done on students within South Africa and students within the Vaal Triangle district.
- The article could also be replicated in universities in other countries. This will assist researchers to determine the investment options for students as well as compare the results that they receive to students within South Africa. This will also assist in measuring and to see if students in other countries are affected in the same way as South African students and to see if the investment options offered in other studies are similar to the investment options offered in this article.
- The test of the empirical objectives of the article can be replicated using a wider variety of classifying factors, such as the behaviours, attitudes and any other socioeconomic characteristics. This could assist in contributing to determine the importance of other demographical factors in differentiation of the levels of risk tolerance.

To increase risk tolerance levels, students are encouraged to learn more about different investment options and how their risk tolerance level affects their risk-taking decisions. Students will be able to understand and be more aware of their risk tolerance levels, this will assist in making better investment decisions when it comes to investing and will assist them in adopting new investment behaviours

In terms of gender, both the objective risk tolerance scale and the subjective risk tolerance profile indicated a significant difference in risk tolerance. Hence, both scales reported similar results. There was no difference in the objective and subjective risk tolerance between the different racial groups. Both scales indicated a difference in risk tolerance within the groups. Students studying towards a BEd degree or a diploma were placed in the first subset, with students studying for unspecified qualifications placed in the second subset. The other participant groups all had means too close to both subsets to be classified as part of either. All the qualification groups were classified together in one subset for subjective risk profile levels. For the other demographics, year group, situation, monthly income, source of that income and the number of dependents, no statistical difference in the mean values were found between groups for both objective risk tolerance and the subjective risk tolerance profile.

REFERENCES

- Adem, Dr. (2010), An Empirical Investigation for Determining of the Relation between Personal Financial Risk Tolerance and Demographic Characteristic. Uludag University Faculty of Economic Sciences. (PhD).
- Anbar, A., Eker, M. (2010), An empirical investigation for determining of the relation between personal financial risk tolerance and demographic characteristics. *EGE Academic Review*, 10(2), 503-523.
- Bailey, J.J., Kinerson, C. (2005), Regret avoidance and risk tolerance. *Financial Counselling and Planning*, 16(1), 269-289.
- Baker, H.K., Haslem, J.A. (1974), Toward the development of client-specified valuation models. *The Journal of Finance*, 29(4), 1255-1263.
- Baker, H.K., Ricciardi, V. (2015), Understanding behavioral aspects of financial planning and investing. *Journal of Financial Planning*, 28(3), 22-26.
- Barsky, B.R., Juster, F.T., Kimball, M., Shapiro, M. (1997), Preference parameters and behavioral heterogeneity: An experimental approach in the health and retirement study. *The Quarterly Journal of Economics*, 112(2), 537-579.
- Bayyurt, N.K.V., Coşkun, A. (2013), Gender differences in investment preferences. *European Journal of Economic and Political Studies*, 6(1), 71-83.
- Bevan-Dye, A., Surujlal, J. (2011), Attitude towards materialism in sport and materialism tendencies amongst black generation Y students. *African Journal for Physical Health Education Recreation and Dance*, 17(1), 43-55.
- Blume, M.E., Friend, I. (1978), The Changing role of the Individual Investor: A Twentieth Century Fund Report. United States: Krieger Publishing Company.
- Bodie, Z., Kane, A., Marcus, A.J. (2010), *Essentials of Investments*. 8th ed. New York: McGraw-Hill.
- Botha, M., Rossini, L., Geach, W., Goodall, B., Du Preez, L., Rabenowitz, P. (2012), *The South African Financial Planning Handbook*. Durban: LexisNexis.
- Chang, C., DeVaney, S.A., Chiremba, S.T. (2004), Determinants of subjective and objective risk tolerance. *Journal of Personal Finance*, 3(3), 53-67.
- Charlett, D., Garland, R., Marr, N. (1995), How damaging is negative word of mouth. *Marketing Bulletin*, 6(1), 42-50.
- Chuan, C.L. (2006), Sample size estimation using Krejcie and Morgan and Cohen statistical power analysis: A comparison. *Journal of Risk Analysis*, 7, 78-86.
- Cocco, J.F., Gomes, F.J., Maenhout, P.J. (2005), Consumption and portfolio choice over the life cycle. *The Review of Financial Studies*, 18(2), 491-533.
- Coet, L.J., McDermott, P.J. (1979), Sex, instructional set, and group make-up: Orgasmic and situational factors influencing risk-taking. *Psychological Reports*, 44(1), 1283-1294.
- Coronation Fund Managers. (2017), *Profile's Unit Trusts and Collective Investments*. Johannesburg: Profile Media.
- Crouhy, M., Galai, D., Mark, R. (2014), *The Essentials of Risk Management*. 2nd ed. New York: McGraw-Hill Education.
- Dickason, Z. (2017), *Modelling Investor Behaviour in the South African Context*, Thesis PhD. Vanderbijlpark: NWU.
- Dickason, Z., Ferreira, S. (2018), The effect of age and gender on financial risk tolerance of South African investors. *Investment Management and Financial Innovations*, 15(2), 1-8.
- Dickason, Z., Nel, I., Ferreira, S.J. (2017), Gender, behavioural finance and satisfaction of life. *African Journals Online*, 15(3), 9550-9559.
- Dickason-Koekemoer, Z., Ferreira, S. (2018), Establishing a link between risk tolerance, investor personality and behavioural finance in South Africa. *Cogent Economics And Finance*, 2018(1), 1-13.
- Faff, R., Hallahan, T., McKenzie, M. (2011), Women and risk tolerance in an aging world. *International Journal of Accounting and Information Management*, 19(2), 100-117.
- Ferreira, S. (2019), *Financial Well-being amongst Different Races in South Africa*. Vanderbijlpark: NWU. (Thesis-PhD).
- Fredman, A.J. (1996), Wrestling with risk: A multiheaded concept with no single measure. *Associates of America Individual Investor*, 1(2), 25-30.
- Garman, E., Fogue, R. (1997), *Personal Finance*. Boston, Mass: Houghton Mifflin Company.
- Gibson, R., Michayluk, D., van de Venter, G. (2013), Financial risk tolerance: An analysis of unexplored factors. *Financial Services Review*, 22(1), 23-50.
- Goodall, B. (2005), *Investment Planning*. Durban: LexisNexis Butterworths.
- Grable, J., Lytton, R.H. (1999), Financial risk tolerance revisited: The development of a risk assessment instrument. *Financial Services Review*, 8, 163-181.
- Grable, J.E. (1997), *Investor Risk Tolerance: Testing the Efficacy of Demographics as Differentiating and Classifying Factors*, Thesis PhD., Blacksburg, Virginia.
- Grable, J.E. (2000), Financial risk tolerance and additional factors that affect risk taking in everyday money matters. *Journal of Business and Psychology*, 14(4), 625-630.
- Grable, J.E. (2016), Financial risk tolerance. In: Xiao, J.J., editors. *Handbook of Consumer Finance Research*. Switzerland: Springer International Publishing. p19-31.
- Grable, J.E., Joo, S. (2004), Environmental and bio psychosocial factors associated with financial risk tolerance. *Journal of Financial Counselling and Planning*, 15(1), 73-82.
- Grable, J.E., Lytton, R.H. (1999a), Assessing financial risk tolerance: Do demographic, socioeconomic and attitudinal factors work. *Family Relations and Human Development/Family Economics and Resource Management Biennial*, 3(1), 80-88.
- Grable, J.E., Lytton, R.H. (2001), Assessing the concurrent validity of the SCF risk tolerance question. *Journal of Financial Counseling and Planning*, 12(2), 43-53.
- Grable, J.E., McGill, S., Britt, S. (2009), Risk tolerance estimation bias: The age effect. *Journal of Business and Economic Research*, 7(7), 1-12.
- Grable, J.E., Roszkowski, M.J. (2008), The influence of mood on the willingness to take financial risks. *Journal of Risk Research*, 11(7), 905-923.

- Hallman, G.V., Rosenbloom, J.S. (1987), *Personal Financial Planning*. 4th ed. New York: McGraw-Hill.
- Hanna, S.D., Chen, P. (1997), Subjective and objective risk tolerance: Implications for optimal portfolios. *Journal of financial Counseling and Planning*, 8(2), 17-26.
- Hanna, S.D., Gutter, M.S., Fan, J.X. (2001), A measure of risk tolerance based on economic theory. *Association for Financial Counseling and Planning Education*, 12(2), 53-60.
- Harty, N. (2014), *Financial Planning and the Investor Life Cycle*. Available from: <http://www.jamaicaobserver.com/business/Financial-planning-and-the-investor-life-cycle-15839917> [Last accessed on 2016 Sep 24].
- Hawley, C.B., Fujii, E.T. (1993), An empirical analysis of preferences for financial risk: Further evidence on the Friedman-Savage model. *Journal of Post Keynesian Economics*, 16(2), 197-204.
- Higbee, K.L., Lafferty, T. (1972), Relationships among risk preferences, importance, and control. *The Journal of Psychology*, 81(2), 249-251.
- IBM Corporation. (2020), *IBM SPSS Statistics for Windows*, Version 26.0. Armonk, NY: IBM Corporation.
- Irwin, C.E. (1993), In: Bell, N.J., Bell, R.W., editors. *Adolescence and Risk Taking: How are they Related? Adolescent Risk taking*. Newbury Park, CA: SAGE. p7-28.
- Kuhnen, C.M., Knutson, B. (2011), The influence of effect on beliefs, preferences, and financial decisions. *Journal of Financial and Quantitative Analysis*, 46(3), 605-626.
- Larkin, C., Lucey, B.M., Mulholland, M. (2013), Risk tolerance and demographic characteristics: Preliminary Irish evidence. *Financial Services Review*, 22(1), 1-26.
- Lawrenson, J. (2020), *Modelling Financial Risk Tolerance of Female South African Investors*. Vanderbijlpark: North-West University. Thesis PhD.
- Lefcourt, H.M. (1965), Risk taking in negro and white adults. *Journal of Personality and Social Psychology*, 2(1), 765-770.
- Leigh, J.P. (1986), Accounting for tastes: Correlation of risk and time preferences. *Journal of Post-Keynesians Economics*, 9(2), 17-31.
- Lucarelli, C., Brighetti, G. (2011), *Risk Tolerance in Financial Decision Making*. New York: Palgrave Macmillan.
- Mabalane, M.D. (2015), *Cultural and Demographic Differences in Financial Risk Tolerance*, Dissertation-Masters. Pretoria: University of Pretoria.
- Maleske, R.T. (1995), *Foundations for Gathering and Interpreting Behavioral Data*. Pacific Grove, CA: Brooks/Cole Publishing Company.
- Malkiel, B.G. (1996), *A Random Walk Down Wall Street*. New York: W. W. Norton and Co.
- Marx, J. (2009), *Investment Management*. 4th ed. Hatfield, Pretoria: Van Schaik.
- Masanya, R.W. (2017), *Measuring Student Investment Potential: A Mixed Methods Approach*, Thesis-Masters. Vanderbijlpark: NWU.
- McLendon, T. (2016), *The Millennial Investor: Mutual Funds Versus Exchange Traded Funds*, Thesis-BSc. United States: University of Arkansas.
- Metherell, C. (2011), *The impact of demographic factors on subjective financial risk tolerance: A South African study*. KwaZulu-Natal: UKZN. Thesis Masters.
- Michaelides, A.G., Gomes, F.J. (2005), Optimal life cycle asset allocation: Understanding the empirical evidence. *The Journal of Finance*, 60(2), 869-904.
- Mittra, S. (1995), *Practicing Financial Planning: A Complete Guide for Professionals*. Michigan: Mittra & Associates.
- Ramudzuli, P.M. (2016), *Subjective Financial Risk Tolerance among Students at Selected South African Universities*, MA-Dissertation. NWU: Vanderbijlpark.
- Reilly, F.K., Brown, K.C. (2012), *Analysis of Investment and Management of Portfolios*. 10th ed. South Western: Cengage Publishers.
- RIMS. (2012), *Exploring Risk Appetite and Risk Tolerance*, RIMS Executive Report.
- Ritchie, J., Lewis, J. (2003), *Qualitative Research Practice: A Guide for Social Science Students and Researchers*. London: Sage.
- Roszkowski, M.J., Snelbecker, G.E., Leimberg, S. (1993), Risk tolerance and risk aversion. *The Tools and Techniques of Financial Planning*, 4, 213-225.
- Rubin, P.H., Paul, C.W. (1979), An evolutionary model of tastes for risk. *Economic Inquiry*, 17(4), 585-596.
- Rutgers. (2014), *Investment Risk Tolerance Quiz*. Available from: <http://www.njaes.rutgers.edu/money/riskquiz> [Last accessed on 2019 Aug 27].
- Shah, N.H, Aman, Q., Khan, M.A. (2018), Risk tolerance profile of business students in Pakistan. *Journal of Business and Tourism*, 4(1), 23-27.
- Sharma, K. (2006), An insight into determinants of financial risk tolerance. *SCMS Journal of Indian Management*, 11(3), 12-23.
- Slovic, P. (1966), Risk taking in children: Age and sex differences. *Child Development*, 37(4), 169-176.
- Smith, A. (2017), *The Top 5 Biggest Banks in South Africa*. Available from: <http://www.buzzsouthafrica.com/top-5-biggest-banks-in-south-africa> [Last accessed on 2017 Apr 15].
- Snelbecker, G.E., Roszkowski, M.J., Cutler, N.E. (1990), Investors' risk tolerance and return aspirations, and financial advisors' interpretations: A conceptual model and exploratory data. *Journal of Behavioral Economics*, 19(4), 377-393.
- Sung, J., Hanna, S. (1996a), Factors related to household risk-tolerance: An ordered profit analysis. *Consumer Interests Annual*, 42(2), 227-228.
- Sung, J., Hanna, S.D. (1996), Factors related to risk tolerance. *Financial Counseling and Planning*, 7(1), 11-19.
- The South African. (2019), *Risk in South Africa*. Available from: <https://www.thesouthafrican.com/news/issue-risk-africa-exaggerated-president-ramaphosa> [Last accessed on 2019 Jul 09].
- Trone, D.B., Allbright, W.R., Taylor, P.R. (1996), *The Management of Investment Decisions*. Chicago: Irwin.
- Van Deventer, M. (2013), *Black Generation Y Students' Knowledge of and Attitudes Towards Personal Financial Management*. North West University. (Dissertation MCom).
- van den Bergh, A. (2018), *Analysis of Risk Tolerance during the Investor Life Cycle*, Thesis-Masters. Vanderbijlpark: NWU.
- Van Schalkwyk, C.H. (2012), *Member Choice in a Defined Benefit Contribution Pension Plan: Decision-Making Factors*, Unpublished Thesis-PhD. Johannesburg: University of Johannesburg.
- Wallach, M.A., Kogan, N. (1961), Aspects of judgment and decision making: Interrelationships and changes with age. *Behavioral Science*, 6(1), 23-26.
- Walliman, N. (2006), *Research Strategies and Design*. London: Social Research Methods. p37-50.
- Weber, E.U., Blais, A.R., Betz, N.E. (2002), A domain-specific risk-attitude scale: Measuring risk perceptions and risk behaviors. *Journal of Behavioral Decision Making*, 15(4), 263-290.
- Wehrung, D.A. (1986), *Taking Risks*. New York: The Free Press.
- Yao, R., Gutter, M.S., Hanna, S.D. (2005), The financial risk tolerance of blacks, hispanics and whites. *Association for Financial Counseling and Planning Education*, 16(1), 51-62.
- Yao, R., Hanna, S.D., Lindamood, S. (2004), Changes in financial risk tolerance, 1983-2001. *Financial Services Review*, 13(1), 249-266.
- Yip, U.Y. (2000), *Financial Risk Tolerance: A State or a Trait?* Thesis-Masters. Australia: University of New South Wales.
- Zhong, L.X., Xiao, J.J. (2009), Determinants of family bond and stock holdings. *Journal of Financial Counseling and Planning*, 6, 1-10.