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The Relationship Between Depositor Behaviour and Risk Tolerance in a South African Context *

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Abstract

The risk tolerance of an individual depositor plays an integral part in a financial decision-making process. Risk perception is furthermore associated with the level of depositor uncertainty, which ultimately leads to irrational depositor behaviour. The South African banking industry is closely concentrated and dominated by a few banks, hence, any adverse changes in the banking industry will affect the financial sector tremendously. It was therefore necessary to test how much risk depositors are willing to tolerate. This paper made use of hypothetical operational risk events within a bank in order to test how likely depositors will be to withdraw funds from their bank accounts. Correlation analysis was used to test the relationship between depositors' likelihood to withdraw and their risk tolerance levels. An inverse relationship exists between depositors' risk tolerance and their willingness to withdraw. Depositors will be less likely to withdraw the higher their risk tolerance level and more likely to withdraw the lower their risk tolerance level. Older depositors indicated to be risk adverse while a positive relationship was found between risk tolerance, income, and education level.

Keywords: Risk tolerance, depositors, behaviour, operational risk, South Africa.

JEL: D81, G21, J10, G32

1. Introduction

Banks are primarily regarded as risk averse but not always fully risk aware (Vardy, 2015). Hence, banks are unintentionally exposed to various financial risks due to their economic and monetary role. These financial institutions must strive in a continuously changing banking regulation and risk management environment, bank automation (non-traditional sources) and consumerism; all of which can be attributed to changing stakeholder behaviour (Coetzee, 2016). These changes and the uncertainties that stem from them, might significantly influence bank revenue and operational costs (Ernst & Young, 2012).

As the banking sector evolves, depositors' rationale and, hence, their expectations will evolve. It may happen that depositors' rationale and expectations can become contradictory of the banks rationale and performance (Hopkin, 2017). The primary fear among regulators is that changing stakeholder (mainly depositors) financial behaviour in the banking environment will influence global financial markets so severely that the total risk in the banking industry will escalate (Koch & Macdonald, 2006).

In the past decade (2010-2018), the South African banking sector has been dominated by the 'Big Four' banks, which included ABSA (as part of Barclays Bank), Standard Bank of South Africa (Standard Bank group), Nedbank (Nedbank group) and First National Bank (FNB) (First Rand Group) (Stemmet, 2016). During 2018, the top five banks in terms of market share (largest customer data base) included: Standard Bank, Absa Bank, Capitec Bank, First National Bank and Nedbank, with Capitec Bank as the leader. The South African banking industry is closely concentrated and dominated by these five banks, hence, any adverse changes in the banking industry will affect the financial sector tremendously (Coetzee, 2016).

The leading South African banks are recognising the evolving depositor rationale and what is at risk − market share (Accenture, 2015). Banks could do more to comprehensively track and evaluate changing perceptions of their most important external stakeholders - depositors. Only by doing this will banks be able to identify their vulnerabilities in such a fashion as to create opportunistic competitive advantage (Louisot & Rayner, 2012). Depositors' risk perception of a bank is imperative to the prosperity and profitability of a bank. A healthy risk perception will only occur if depositors are satisfied with the manner in which a bank manages the risk posed to depositors (Mostert & Lotz, 2010). Depositor risk perception and risk tolerance are associated but often misinterpreted.

The risk perception of an individual depositor plays an integral role in the financial decision-making process (Finucane, 2002). Risk perception is furthermore associated with the level of depositor uncertainty, which

ultimately leads to irrational depositor behaviour (Williams & Noyes, 2007). Risk tolerance is defined as the emotional acceptance, which can possibly influence volatility, the risk attitudes of depositors and also the readiness of these depositors to accept possible financial losses (Hanna & Chen, 1997).

The financial behaviour, risk tolerance and risk perception of depositors can be fundamentally affected by numerous risk events, among these are operational risk events (Chernobai, Rachev, & Fabozzi, 2007). These operational risk events are categorised by the Basel Committee on Banking Supervision (BCBS), (2009) as (1) internal and (2) external fraud, (3) employment practice and workplace safety, (4) clients, products and practices, (5) damage to physical assets, (6) business disruptions and system failures and execution and, lastly, (7) delivery and process management. Over the past three decades (1990-2018), global financial markets have endured tremendous operational risk such as the Global Financial Crisis (GFC of 2008) (Iyer, Ryan, & Puri, 2016).

South Africa on its own has also experienced numerous banking failures as a result of operational risk such as Saambou Bank (2002), Regal Treasury (2002) Bank, African Bank (2014) and the latest VBS Mutual Bank (2018). Therefore, within the personal, domestic and financial lives of depositors, the instinctive automatic response when exposed to various operational risk, is to be risk adverse (Hopkin, 2017). In South Africa, restricted research has been conducted on the influence of depositor behaviour on the risk tolerance level within the banking sector. Banks mitigate and manage their risks based on historical financial loss patterns but exclude the influence of human factors such as the behaviour of depositors.

Depositor behaviour includes their likelihood to withdraw when exposed to risk and the level of risk that they are willing to tolerate. Therefore, based on the limited financial research of depositor behaviour in the banking sector, research opportunity for this paper emerged. Therefore, the aim of this paper was to determine how much risk depositors within a South African context are willing to tolerate when exposed to operational risks within a bank.

2. Literature Review

Grable (2000) described risk tolerance as the limited amount of risk willing to be accepted during financial decisions. Risk tolerance of depositors can be influenced by various factors such as demographics, employment, financial knowledge and household size as exemplified in Table 1.

Table 1

Influential factors of risk tolerance

Individual characteristics	Assumed to be more tolerant
Time of life	Young personages
Level of schooling	Bachelor's degree or higher
Employment status	Permanent
Ethnicity	Non-Hispanic white
Financial literacy	Extraordinary knowledge level
Financial well-being	Extraordinary satisfaction level
Sex	Male
Bondholder	Titleholder of home property
Household size	Great number of members
Income	High income level
Income type	Entrepreneur
Income changeability	Steady and probable income
Locus of control	Internal locus
Marital status	Single
Marital/gender interaction	Single male
Emotion	Happy
Net wealth	Wealthy
Work	Professional
Personality type	Type A
Religion	Lowe levels of religiosity
Level of self-esteem	Great self-esteem
Sensation level	Great sensation

Source: Irwin (1993)

The researcher, Cutler (1995) stated that one of the most dominant factors determining risk tolerance is their time in life (age). Irwin (1993) did a study to determine whether young or old individuals are more risk tolerant. Grable (1997) concluded that elder personages do not have sufficient time to recover from incorrect financial decisions made and the accompanied losses. Some of the first researchers to analyse the relationship between a person's time in life and risk tolerance were (Wallach & Kogan, 1959). In their research, they found a cautiousness in older individuals' financial decision-making processes. It is believed by Gibson, Michayluk, and Van de Venter (2013) that young individuals are willing to tolerate more risk as time is on their side and a good recovery can be made from losses due to incorrect financial decisions.

Not all researchers have consensus regarding the relationship between age groups and level of risk tolerance. Researchers such as early on as Botwinick (1966) and Vroom and Pahl (1971) concluded from their research that elder persons tolerate more risk than young persons. More recent researcher such as Van de Venter, Michayluk, and Davey (2012) and (Dickason, 2017) also confirm these findings. On the contrary, Sung and Hanna (1996b), Grable and Lytton (1999) and Anbar and Eker (2010) find that no significant relationship exists between age and the level of risk tolerance of individuals.

Irwin (1993) states that it generally is accepted that individuals earning high annual incomes are willing to tolerate more risk than individuals earning lower annual incomes. Moreover, Warren, Stevens, and McConkey (1990) stated that high income earning males are more risk tolerant than high income earning females. This is based on the financial decisions made by males compared to females. Various researchers (Grable, 2000; Grable & Joo, 2004; Rahmawati, Kumar, Kamuaya, Jamil, & Muneer, 2015) find consensus in their research that individuals earning high annual incomes are more likely to take on risk.

Irwin (1993) concludes that high levels of education could affect the risk tolerance of individuals. Hallahan, Faff, and McKenzie (2003) stated that individuals with a bachelor's degree or higher are more risk tolerant. The relationship between risk tolerance and education has been investigated by various researchers (Ardehali, Paradi, & Asmild, 2005; Baker & Haslem, 1974; MacCrimmon & Wehrung, 1986; Sung & Hanna, 1996b).

These researchers reached a consensus that higher education levels enable individuals to better assess risks and benefits than individuals with lower levels of education. The level of schooling can also be a determining factor in the level of risk tolerance that a person is willing to accept (Metherell, 2011). Previous studies like Hawley and Fuji (1993)and Ardehali et al. (2005) have found persons with more years of schooling and tertiary training to be risk aggressive and have superior investment skills. The highest risk

tolerance levels were found for those individuals who obtained a bachelor's degree or higher, while the lowest risk tolerance levels were found for individuals who obtained a high school diploma or less.

This paper analyses depositor's levels of risk tolerance and whether the various demographic factors of age, income and education effect the risk tolerance level of depositors. The paper aims to determine whether the risk tolerance of South African depositors is in line with previous studies or contradicts them. The established risk tolerance level associated with individuals will give the top five banks in South Africa a better indication of how much risk their customers are willing to tolerate when faced with risk. This could possibly contribute tremendously towards risk mitigation by accounting for irrational human behaviour.

3. Methodology

This section discusses the methodology that was utilised in the research process. The research design, study area, sample selection as well as the statistical techniques that were used in the analysis of the data are explained.

a. Research purpose and design

A positivist approach was followed in this paper which allowed the researchers to test existing theory and to determine the causation of variables (Goulding, 2005). Moreover, a quantitative approach was used which allowed for the predictions of the variables that are in fact included in the model as well as the elimination of the influence of irrelevant variables (Johnson & Onwuegbuzie, 2004). The collection of quantitative data provided faster results since time was a limitation. The main reason for using a quantitative research approach is that it provided results that were quantifiable, accurate and unbiased which could be generalised across the research population (Creswell, 2014).

b. Research area and sample

Upon selecting the target population, the population parameters need to be set (Quinlan, 2011). The target population comprises all South African bank depositors in Gauteng, South Africa. The target population parameters for this paper, furthermore, required all South African bank depositors to be 18 years or older and earning a monthly salary, which is deposited into their bank account. The sample size consists out of 418 participants (n = 418).

c. Survey design and procedure method

Non-probability purposeful sampling was used for this paper in order to filter individual not meeting the criteria of 18 years and older, have some form of education, more than five years banking experience, owns a deposit account at the top five banks in Gauteng where a salary gets deposited into. A self-report measure administered through questionnaires were used by the participants of the study.

The questionnaire consisted of two sections namely Section A which entails demographic information of the participants and Section B which measures the risk tolerance level of participants. The risk tolerance measure, Survey of Consumer Finance (SCF) does not fully incorporate all of the variables of financial risk tolerance but it is the only direct measure for investment choice attitudes and experience (Grable & Lytton, 2001). The majority of researchers use the following statements where the participants have to select the closest option towards the amount of financial risk that they are willing to take:

1. take substantial financial risk expecting to earn substantial returns;
2. take above average financial risk expecting to earn above average returns;
3. take average financial risk expecting to earn average returns; and
4. not willing to take any financial risk.

Grable and Lytton (2001) further carried out numerous reliability tests to conclude whether the SCF scale is a reliable measure of risk tolerance. The SCF measure continues to be used by researchers, practitioners and regulators, since it is the first straight measure of risk attitude (Gilliam, Chatterjee, & Grable, 2010).

d. Hypothesis

Null hypothesis (H_{01}): Depositors level of risk tolerance does not influence depositors' behaviour to withdraw.

Null hypothesis (H_{02}): Depositors demographic factors do not influence their risk tolerance level.

4. Results

The following section display the results by first giving a demographic break down of the sample, descriptive statistics of the scale used and correlation analysis.

a. Demographic background of the sample

The first question in the questionnaire required participants to indicate their age in terms of age categories. From this sample 30 percent of the participants were between the ages of 30 and 39 followed by age category 18 to 29 years, which represented 26.1 percent of the sample. Age category 40 to 49 represented almost a quarter of the sample (22.3%) while the remaining participants were older than 50 years of age (19.6%). Moreover, the sample included 54.9 percent female bank depositors and 45.1 percent male bank depositors.

Majority of participants (71.8%) in the sample represented White depositors, followed by African (23.3%) depositors. Coloured participants only accounted for a minor percentage (3.6%) of the sample, which was followed by Indian participants (1.2%). The largest portion of the sample (24.5%) indicated that their highest level of education is an honours degree. This was followed by 20.4 percent of the participants who had high school education. Almost 30 percent indicated that they had some form of further formal training or had a diploma.

Moreover, 15.6 percent of the participants had an undergraduate degree while almost 9 percent of the sample had higher forms of formal education such as a master's degree or doctorate (PhD) degree. Almost 75 percent of the sample earn less than R400 000 per annum. This roughly indicates that the majority of depositors in this sample earn a salary of between R1-R33 000 per month.

The largest income category (30.3%) was R200 000 - R400 001 per annum followed by the income category of less than R100 000 (27.9%). A total of 25.1 percent of the sample earn more than R400 0001 per annum. A total of 12.2 percent earn between R400 001 and R550 000 per annum. Less than 1 percent earn more than R1.5 million per year.

b. Descriptive analysis

Table 2 indicates the frequencies for each risk tolerance statement frequency and percentage is shown. The majority (40.8%) of the participants indicated that they are willing to take average financial risk in expectance to earn average financial returns. On the risk aversion side 100 participants out of the 412 (24.3%) indicated that they want to avoid any financial risk.

On the higher level of the risk tolerance spectrum, 24.5 percent indicated that they are willing to take more than the average amount of financial risk in the hope of making above average financial return. Just more than 10 percent indicated that they are willing to take extensive financial risk expecting to earn abnormal returns.

(i) Depositor risk tolerance and willingness to withdraw

A theoretical inverse relationship exist between depositors risk tolerance level and their willingness to withdraw (Boyle, Stover, Tiwana, & Zhylyevskyy, 2015).

(ii) Correlation between risk tolerance and depositors' willingness to withdraw

As seen in Table 3, the correlation amongst depositors' willingness to withdraw internal fraud and SCF risk tolerance indicated significant results (r =-0.174) and a negative small linear association. The results for internal fraud were significant at the 1 percent significance level ($p < 0.01$). Similar results were found for depositors' willingness to withdraw during external fraud since a (r =-0.129) negative small linear association significant at the 1 percent significance level ($p < 0.01$) was found. For employment practice and workplace safety, no relationship was found between depositors' willingness to withdraw and their subjective risk tolerance level.

Damage to physical assets also indicated (r =-0.111) a small negative association between the level of subjective risk tolerance and depositors' likelihood to withdraw which was significant at the 5 percent significance level ($p < 0.05$). Clients, products and business practice also indicated (r =-0.131) a small negative association between the level of risk tolerance and depositors' likelihood to withdraw which was significant at the 1 percent significance level ($p < 0.01$). For these four events, the correlation coefficients suggest that the higher the level of risk tolerance, the less likely depositors will be to withdraw and hence the null hypothesis could be rejected.

Table 2

Risk tolerance self- report measure (SCF)

SCF – Risk tolerance	N	Percentage
Take substantial financial risk	43	10.4
Take above average risk	101	24.5
Take average financial risk	168	40.8
Not willing to take any financial risk	100	24.3
Total	412	100.0

For business disruptions and a pure reputational event, no relationship was found between depositors' willingness to withdraw and their subjective risk tolerance level. No significant association was found which was combined with very small effect sizes. Therefore, the level of subjective risk tolerance did not have a significant relationship with depositors' likelihood to withdraw after these events. Null hypothesis (H_{01}) stating that there is no relationship between depositors' behaviour to withdraw and their risk tolerance could not be rejected for the last events.

Boyle et al. (2015) researched the levels of risk perception of depositors regarding a set of hypothetical banking failures and the role that deposit insurance plays towards risk mitigation during a banking failure. The paper also considered the risk tolerance levels of 349 student depositors based in the United States, Europe and New Zealand, which indicated how much risk student depositors are willing to take concerning their country's deposit insurance schemes. Those countries who did not implement an explicit deposit insurance scheme indicated a higher withdraw risk and lower levels or risk tolerance. Hence, the results of this paper is similar to those of Boyle et al. (2015) since South Africa makes use of an implicit deposit insurance scheme.

(iii) Depositor risk tolerance and demographics

Since the focus of this paper was to determine the risk tolerance levels of the South Africa depositor base, emphasis was given to the demographical factors, which can be influential.

(iv) Correlation between risk tolerance and demographic factors

A non-parametric Spearman correlation was used to test the relationship between demographic characteristics of depositors and their risk tolerance level. A two-tailed significance level can be assumed at a 1 percent significance level. The correlations amongst the variables ranged from small (r =0.10-0.29) to medium (r = 0.3-0.49). Table 4 below indicated the linear relationship between age, level of education and income level of depositors with their risk tolerance level.

Table 3

Depositor reaction to operational risk and depositors' risk tolerance

Operational event factor	Spearman correlation	SCF-Risk tolerance
Internal fraud	*r*	-0.174
	P-value	0.000*
External fraud	*r*	-0.129
	P-value	0.009*
Employment practice and workplace safety	*r*	-0.043
	P-value	0.383
Clients, products and business practice	*r*	-0.131
	P-value	0.008*
Damage to physical assets	*r*	-0.111
	P-value	0.025**
Business disruptions and system failure	*r*	-0.081
	P-value	0.102
Execution and delivery	*r*	-0.094
	P-value	0.058***
Reputational event	*r*	-0.074
	P-value	0.135

*Significant at 0.01 level; ** 0.05 level; *** 0.1 level

Table 4

Non-parametric correlation- SCF risk tolerance and demographics

Spearman correlation		**Age**	**Education**	**Income**	**SCF**
Age	*r*	1.000	-0.078	0.202	-0.127
	P-value.		0.120	0.000***	0.011**
Education	*r*	-0.078	1.000	0.450	0.154
	P-value.	0.120		0.000***	0.002***
Income	*r*	0.202	0.450	1.000	0.147
	P-value	0.000***	0.000***		0.003***
SCF	*r*	-0.127	0.154	0.147	1.000
	P-value	0.011**	0.002**	0.003***	

** Significant at 0.05 level, *** 0.01 level

From Table 4 it can be seen that risk tolerance had a negative relationship with age which is in-line with the lifecycle of investors and other market participants (Dickason-Koekemoer & Ferreira, 2018). Furthermore, the relationship also showed a statistical significance at the 1 percent confidence interval ($p < 0.01$) and had very small effect sizes ($r < 0.29$) showing a small practical significant relationship. Therefore, age did have a significant relationship with depositors' risk tolerance level. These results are similar to older market related studies such as Botwinick (1966) and Vroom and Pahl (1971) that found a significant relationship between different age and the level of risk tolerance of a person.

The results also concurs with more recent studies such as Grable (2000), Van de Venter et al. (2012) and Dickason (2017). Since the relationship is negative, it indicates that the older depositors get the less risk they are willing to tolerate in terms of their financials. Hence, they will be unhappy if banks expose them to additional risk. Previous research by Wallach and Kogan (1959, p. 24) also indicated a cautiousness in older individuals' financial decision-making processes. Gibson et al. (2013) also found that young individuals are willing to tolerate more risk exposure.

The correlation among risk tolerance and the level of education indicated a significant result (r =-0.154) and a positive small linear association. Therefore, the level of schooling was significant factors contributing to the level of depositors' risk tolerance. These results confer with previous research as Irwin (1993) concluded that high levels of education could affect the risk tolerance of individuals. Hallahan et al. (2003) also state that individuals with a bachelor's degree or higher are more risk tolerant. The relationship between risk tolerance and schooling has been investigated by various researchers (Ardehali et al., 2005; Baker & Haslem, 1974; MacCrimmon & Wehrung, 1986; Sung & Hanna, 1996b) who also reached the consensus that more schooling enable individuals to better assess risks and benefits than individuals with lower levels of schooling.

Table 4 indicates that income had a positive linear relationship with the level of risk tolerance ($p < 0.01$) and had very small effect sizes. Therefore, the level of income did have a significant relationship with depositors' risk tolerance level. These results are similar to Irwin (1993) who found that individuals earning high annual incomes are willing to tolerate more risk than individuals earning lower annual incomes are. Moreover, Warren et al. (1990, p. 74) also stated that high income earning males are more risk tolerant than high income earning females. Various researchers (Grable, 2000, p. 625; Grable & Joo, 2004, p. 73; Rahmawati et al., 2015, p. 376) find consensus in their research that individuals earning high annual incomes are more likely to take on risk.

5. Conclusion and Recommendations

In South Africa, restricted research has been conducted on the influence of depositor behaviour on the risk tolerance level within the banking sector. Banks mitigate and manage their risks based on historical financial loss patterns but exclude the influence of human factors such as the behaviour of depositors. Depositor behaviour includes their likelihood to withdraw when exposed to risk and the level of risk that they are willing to tolerate. Therefore, based on the limited financial research of depositor behaviour in the banking sector, research opportunity for this paper emerged. Hence this paper aimed to determine the risk tolerance level of depositors and how demographics play a role.

The results from this paper gave interesting results which confirmed previous research done in international financial markets. Negative correlation coefficients were found for all operational risk events and their risk tolerance level. Hence, depositors will be less likely to withdraw their funds from a bank given their higher risk tolerance level. On the other hand, depositors will be more likely to withdraw their funds from a bank, the lower their risk tolerance level. It was also important to determine depositors risk tolerance level based on their demographics to see whether demographic variables play a role.

The results indicated that risk tolerance had a negative relationship with age, which is in line with the lifecycle of investors and other market participants. Therefore, age had a significant relationship with depositors' risk tolerance level. The correlation between risk tolerance and the level of education indicated a significant result and a positive small linear association. Therefore, the level of education had a significant relationship with depositors' risk tolerance level. The level of income also had a significant relationship with depositors' risk tolerance level.

Considering the empirical findings of this paper, a few managerial implications and recommendations can be offered. Bank risk management strategies can be focused on reducing risk that stems from internal and external fraud, clients, products and business practice, and damage to physical assets by investing in the robustness of their operations. Risk mitigation strategies can also include human factors such as depositor behaviour in order to predict losses and possible bank runs. Future researchers are recommended to use a bigger sample size and extend the region of the sample (to not only use Gauteng but also the other provinces).

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