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THE INFLUENCE OF DEMOGRAHIC FACTORS ON RISK TOLERANCE FOR SOUTH AFRICAN INVESTORS

Abstract:

Financial risk tolerance, which is a known term in the financial world, indicates the amount of risk an investor is willing to tolerate when making investment decisions. Researchers indicate in previous studies that financial risk tolerance could be influenced by demographic factors such as gender, race, age, income and marital status. Hence, it is important to analyse the effect of demographic factors on financial risk tolerance, as it will ultimately affect investment decisions of South African investors. As a result, the aim of this study is to analyse the influence of demographic factors on South African investors' investment decisions. This study can be used as a forecasting tool for South African investment companies to predict risk tolerance levels based on the demographics of their client base. Results from this study indicate that male, African, young investors earning R700 000 and more and who have never been married are more risk tolerant and are willing to invest in high risk portfolios. The results from this study, in a South African context, were similar to previous non-South African studies.

Keywords:

Risk tolerance, investors, demographics, logistic binary regression, South Africa

JEL Classification: J11, G23, G11

1. INTRODUCTION

People encounter risk on a daily basis. Exposure and uncertainty are the two components out of which risk is composed (Su, 2012). The uncertainty component occurs when one does not know if something is true or false or if one is aware or unaware of it. Risk arises when a plan is exposed, which causes uncertainty by an individual in terms of what could happen, what are the chances for realisation and the consequences related to certain events (Holton, 2004). It is believed by researchers such as Samson et al. (2009) that uncertainty is correlated with a set of actions that are quantifiable most of the time. According to Mabalane (2015), factors such as control, preferences, perceptions, human subjectivity based on background and choice can affect risk.

In the financial world, it is believed that investors make rational investment decisions in order to maximise their utility for a certain level of risk that requires financial decisions to be based on rationality (Shikuku, 2013). Almost every investment has an association with a risk level; however, individual investment decisions can be affected by a factor such as investment knowledge.

Investment decisions can be made under risk and have an impact on outcome probabilities that are known, whereas investment decisions that are made under uncertainties can have an impact on outcome probabilities that are unknown. Goldstein and McElligott (2014) identify a relationship between risk propensity, risk perception and risk taking behaviour of investors. It is found that investors have a certain amount of risk they are comfortable taking when making investment decisions. Moreover, the amount of risk is composed of risk appetite and risk capacity of investors. Investors can potentially tolerate a certain amount of risk when making investment decisions. In their research, Tversky and Kahneman (1981) state that risk tolerance is a dependent variable and other factors are independent variables. Various assessment methodologies exist for risk tolerance and it was found that there are psychological, socio-economic and demographic factors that can influence the level of financial risk tolerance (Van de Venter et al., 2012; Nguyen, 2015).

Research studies are indicative that demographic factors influence the level of financial risk an individual is willing to tolerate (MacCrimmon & Wehrung, 1986). However, limited research has been done regarding the influence of demographic factors on financial risk tolerance for South African investors. The actual risk South African investors tolerate may not be displayed accurately on risk profiles as demographic factors have an influence on these risk levels.

Sung and Hanna (1996) highlight from previous research that demographic factors such as education levels, race, employment status, gender, other income and age can possibly influence financial risk tolerance. Previous researchers such as Wang and Hanna (1997) found that there is a relationship between age and risk tolerance; whereas, Grable and Lytton (1998) found that the two most influential variables on risk

tolerance are age and gender. Grable and Lytton continued with research in the field of financial risk tolerance and found that other factors such as marital status, education level, financial knowledge, income level, occupation and economic expectations also have an impact on the level of risk investors are willing to tolerate. In contradiction to the previous findings, Grable and Joo (2000) emphasise in their research that gender, marital status and age are not considered important influences. Moreover, Mazumdar (2014) conducted a research study and concluded that no evidence exists of a relationship between financial knowledge and investment behaviour.

2. LITERATURE

The attitude an investor displays towards risk is known as risk tolerance, in other words, the amount of risk an investor is willing to tolerate (Sahin & Yilmaz, 2009). Ultimately, risk tolerance can be defined as the willingness to accept a maximum amount of uncertainty when making financial decisions (Grable, 2000). Moreover, risk tolerance can be defined as investors' willingness to accept financial losses, risk attitude or the emotional acceptance that can influence volatility (Fredman, 1996; Hanna & Chen, 1997). Irwin (1993) explains that demographical factors (i.e. age, income, gender, ethnicity, marital status) could influence the level of risk an investor is willing to tolerate as discussed below.

2.1 Age

Irwin (1993) states that young people are more risk tolerant than older people. It is believed that older people have time constraints to recover from financial losses due to making inaccurate investment decisions (Grable, 1997). Therefore, young people are willing to take on more financial risk as they have more time to recover from financial losses experienced due to inaccurate investment decisions (Grable & Roszkowski, 2008; Gibson et al., 2013).

In contrary to the above, researchers such as Botwinick (1966), Vroom and Pahl (1971), Baker and Haslem (1974), Okun and DiVesta (1976), Morin and Suarez (1983), Hawley and Fuji (1993), Wang and Hanna (1997), Grable (2000) and Van de Venter et al. (2012) found in their research that older investors are willing to tolerate more risk.

2.2 Gender

No universal agreement is established as to whether gender, as a demographic factor, influences the level of risk an individual is willing to tolerate. Research done by Higbee and Lafferty (1972), Blume (1978), Coet and McDermott (1979), Rubin and Paul (1979) and Yip (2000) indicates that gender is an important influential factor of risk tolerance. Roszkowski et al. (1993), Hawley and Fuji (1993), Slovic (1966), Sung and Hanna (1996), Sharma (2006) and Rahmawati et al. (2015) reached a consensus that females take less risks than males, thus males are more risk tolerant than females.

2.3 Ethnicity

Cultural differences in terms of values, tastes and preferences can affect risk tolerance levels. The general norm is that White people are willing to tolerate more risk than non-Whites (Sung & Hanna, 1996). This norm is based on the accessibility White people have to banks and financial institutions and they are more future oriented and have more investment opportunities than non-White people. White people, therefore, will portray an attitude of confidence in decision-making skills and their abilities to analyse (MacCrimmon & Wehrung, 1986; Zhong & Xiao, 1995).

In South Africa, a study was conducted between risk tolerance and race. Metherell (2011) found, based on research done, that a significant difference exists between the White and Indian population groups. However, Van Schalkwyk (2012) concludes in his study that African people tend to take higher risks than White people do, thus making African people are more risk tolerant.

2.4 Marital status

Marital status can be compartmented into married, never married, divorced, separated and widowed. It can be argued that married investors have more responsibilities in terms of households, dependants and spouses. The identified risk, namely social risk, is apparent for married investors as there can be a possible loss of self-esteem in social circles as financial loss is experienced due to inaccurate investment choices (Roszkowski et al., 1993). Researchers such as Baker and Haslem (1974), Lee and Hanna (1991), Lazzarone (1996), and Sung and Hanna (1996) indicate that married investors tend to have a decreased investment risk appetite in comparison to unmarried investors.

2.5 Income and wealth

The general belief is that people with high gross incomes are more likely to take high investment risks compared to those with lower gross income (Cohn et al., 1975). Moreover, a research study conducted by Warren et al. (1990) concluded that high income males are more likely to invest in risky bonds and stocks than high income females. A general consensus is reached between researchers such as Shaw (1996), Grable and Lytton (1998), Grable and Joo (1999), Grable (2000), Grable and Joo (2004), Ardehali et al. (2005), Gibson et al. (2013) and Rahmawati et al. (2015) that high income individuals take on higher investment risks.

3. METHODOLOGY

3.1. Research purpose and design

The primary objective of this study is to determine whether demographical factors such as age, gender, ethnicity, marital status and income play a role in the financial risk tolerance of South African investors. Hence, the study followed a quantitative research

approach whereby a two section questionnaire was utilised. The inquiry endorsed a positivist world view generally associated with quantitative studies. A positivist research paradigm was adopted due to the observation of variables and empirical testing of prior theory (Goulding, 2005; Creswell & Plano Clark, 2011). The first section required participants to complete their demographic information whereas the second section tested their risk tolerance level.

3.2. Research study sample

The target population for this study consisted of all South African investors, since research into this group is invaluable. A South African investment company granted gatekeeper permission for the collection of data using the company's client base. The sample was selected by simple random sampling since a complete list of the members of a population could be drawn at random, where each investor had the same probability of being selected. A sample of 800 participants (n = 800) was selected where participants participated in an online questionnaire out of their own free will.

3.3. Research instrument

The electronic questionnaire distributed to participants consisted of two sections, namely a demographical section on information of investors, and the second section, which made use of a validated scale to measure risk tolerance (Survey of Consumer Finance (SCF)). SCF uses a single risk tolerance question, which is widely used by researchers. The reason for this is the measured item is the only direct measure of risk attitude in the SCF (Gilliam et al*.,* 2010). The single risk tolerance scale consists of the following question: 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.

3.4. Hypothesis

Based on the background of the study, previous researchers found a difference between the risk tolerance levels of males and females, different ethnicity groups, age groups, income levels and marital status. The following hypotheses were formulated to research the primary objective of this study:

Null hypothesis 1 (H_0): $\text{mean of male risk tolerance} = \text{mean of female risk tolerance}$ (1)

Null hypothesis 2 (H_0): $\text{mean risk tolerance of race 1} = \text{mean risk tolerance of race 2}$ (2)

Null hypothesis 3 (H_0): mean risk tolerance of age 1 = mean risk tolerance of age 2 (3)

Null hypothesis 4 (H_0): mean risk tolerance of income 1 = mean risk tolerance of income 2 (4)

Null hypothesis 5 (H_0): mean risk tolerance of marital status 1 = mean risk tolerance of marital status 2 (5)

The above mentioned hypotheses state that there is no difference between the demographical factors of investors and their respective level of risk tolerance.

3.5. Statistical analysis

The statistical analysis of this study made use of descriptive statistics such as cross tabulations as well as logistic regressions to test how gender, ethnicity, age, annual income and marital status may affect the risk tolerance levels of South African investors. The following equation represents the estimated logistic regression:

$$SCF_i = \emptyset_0 + \emptyset_1 GEN + \emptyset_2 AGE + \emptyset_3 RAC + \emptyset_4 INC + \emptyset_5 MAR + \varepsilon_i \quad (1)$$

The dependant variable was created using the SCF risk tolerance question. Where SCF_i represents dichotomous dependant variable - the risk tolerance level of South African investors (1 for high risk tolerance and 0 for low risk tolerance). The variable $\emptyset_0$ gives the constant, $\emptyset_1$, $\emptyset_2$ …$\emptyset_5$ are the estimated coefficients, while ε_i represents the error term. Five independent variables were created. $\emptyset_1 GEN$ was given as the gender of investors (1=males, 0=female); $\emptyset_2 AGE$, shows the age category of investors; $\emptyset_3 RAC$ represents the ethnicity of the investors (1=African, 2=White, 3=Coloured, 4=Asian); $\emptyset_4 INC$ indicates the annual income level (1=<R100 000, 2=R100 001-R300 000, 3=R300 001-R500 000, 4=R500 001-R700 000, 5=>R700 001). The final independent variable $\emptyset_5 MAR$ represents the marital status of the individual investors (0=never married, 1=married, 2=no longer married).

4. Empirical results

4.1. Demographical background of participants

Illuminating upon the demographic information, more than half of the participants were female (56%), while the remaining percentage (44%) represented male participants. Ethnic distribution indicated that the majority of the participants were White (66.5%), while the remaining percentages were African (17.5%), Coloured (7.75%) and Asian (8.25%). From an age perspective, the demographical information indicates that 25 percent are between the ages of 16-34 years, while 35.75 percent are between the ages of 35-49 years and, lastly, 39.25 percent represent the age category of 50-plus years. Based on the income distribution, 36.12 percent of the sample earn between R100 001-R300 000 annually. The rest of the income groups <R100 000 (15.37%), R300 001-R500 000 (22.75%), R500 001-R700 000 (13.63%) and >R700 001 (12.13%) all had

comparable distributions. Lastly, considering the marital status, the sample consisted mostly of married participants (57.88%), followed by participants that have never been married (25.75%) and, lastly, by participants who are no longer married (16.37%).

4.2. Investor risk tolerance according to all demographics

Table 1 below indicates the cross tabulation of the various levels of investor risk tolerance according to gender, ethnicity, age, income and marital status.

Table 1: Cross tabulation of investor risk tolerance and demographics

Variable	Category	Risk tolerance level		
		Low risk	High risk	Pearson chi-square
Gender	Male	57.3%	42.7%	0.000* (18.172)
	Female	71.7%	28.3%	
Ethnicity	African	51.4%	48.6%	0.002* (15.068)
	White	68.4%	31.6%	
	Coloured	71.0%	29.0%	
	Asian	65.2%	34.8%	
Age	16-34	57.0%	43.0%	0.001* (14.012)
	35-49	63.3%	36.7%	
	50+	72.6%	27.4%	
Income	<R100 000	68.3%	31.7%	0.000* (24.885)
	R100 001-R300 000	70.9%	29.1%	
	R300 001-R500 000	69.8%	30.2%	
	R500 001-R700 000	56.9%	43.1%	
	>R700 001	46.4%	53.6%	
Marital status	Never married	57.3%	42.7%	0.009* (9.425)
	Married	67.0%	33.0%	
	No longer married	72.5%	27.5%	
* Significant at 1% level				

The risk tolerance levels of investors were divided into a low risk tolerance category and a high risk tolerance category. Considering gender, the high chi-square value of 18.712 with a p-value of 0.000 indicates a statistical difference between the risk tolerance level of male and female investors in South Africa. Results further indicate that more male investors have a high risk tolerance (42.7%) when compared to female investors (28.3%). The vast majority of female investors, 71.7 percent, tend to be low risk tolerant. Risk tolerance between ethnicity suggests a statistical difference between African, White, Coloured and Asian groups, with a high chi-square value (15.068) and a significant p-value (0.002). Out of all four ethnicity groups more investors that are African fall under the high risk tolerant category. Coloured investors are the largest low risk tolerance race with 71 percent being low risk tolerant. Table 1 furthermore provides a statistical difference between the three age categories with a p-value significant at 1 percent. The majority of investors between the ages of 16-34 were high risk tolerant

when compared to the other age groups. Investors older than 50 years of age (72.6%) were low risk tolerant. The statistical difference between income groups was also significant. Investors earning an income between R100 001-R300 000 were largely low risk tolerant (70.9%), whereas investors earning more than R700 001 were more high risk tolerant (53.6%). The results also indicate a statistical difference between marital groups. The majority of married investors are low risk tolerant (67%).

4.3. Binary logistic regression results

Table 2 indicates the results found for the logistic regression considering the influence of demographical factors on the financial risk tolerance of South African investors.

Table 2: Binary logistic regression analysis

Variable	Beta	Std. Error	Wald	df	Sig.	Exp (B)
Gender (Female)	-0.715	0.167	18.382	1	0.000*	0.489
African (Ref. group)			8.825	3	0.032**	
White	-0.583	0.210	7.737	1	0.005**	0.558
Coloured	-0.724	0.340	4.539	1	0.033**	0.485
Asian	-0.385	0.330	1.362	1	0.243	0.680
16-34 (Ref. group)			13.556	2	0.001*	
35-49	-0.244	0.209	1.358	1	0.244	0.784
50+	-0.782	0.225	12.080	1	0.001*	0.458
<R100 000			23.270	4	0.000*	
R100 001-R300 000	-0.145	0.245	0.351	1	0.553***	0.865
R300 001-R500 000	-0.054	0.269	0.41	1	0.840***	0.947
R500 001-R700 000	0.487	0.290	2.813	1	0.094***	1.627
>R700 001	0.975	0.302	10.436	1	0.001*	2.651
Never married (Ref. group)			3.203	2	0.202	
Married	-0.356	0.200	3.168	1	0.075***	0.700
No longer married	-0.308	0.274	1.261	1	0.261	0.735
-2 Log likelihood 955.703			Omnibus test 76.448			
Hosmer & Lemeshow 9.858 (0.275)			p-value 0.000			
Nagelkerke R-squared 0.126						

*Significant at 1% level of significance, **5% level of significance, ***10% level of significance

Table 2 refers to the omnibus test for model coefficients, as well as the Hosmer and Lemeshow test. Both the omnibus test and the Hosmer and Lemeshow test were significant at 1 percent with the chi-square values of 76.448 and 9.858 respectively. Consequently, the model is significantly better and passed the goodness-of-fit model and a p-value=0.275 was obtained, which is greater than the 5 percent significance

level. The Nagelkerke R-squared test also suggests that the model coefficients in Table 2 explained 12.6 percent of the variation in investors risk tolerance levels.

5. DISCUSSION

In a revolutionised world, demographical factors such as race and gender have become key influencers in the financial market. As Table 2 specifies, female investors are less likely to be high risk tolerant compared to male investors, since a significant negative coefficient was present. The p-value (0.000) for gender is indicative that the null hypothesis (coefficients=0) could be rejected at a 1 percent level of significance. Resultantly, a difference exist between male and female investors in terms of their level of risk tolerance. The odds ratio of 0.489 indicates that (0.489-1) female investors are 51.1 percent less likely to be high risk tolerant than males investors. These results also prove to be similar to cross tabulation results of Table 1. Moreover, these results are in line with previous research done by Higbee and Lafferty (1972), Blume (1978), Coet and McDermott (1979), Rubin and Paul (1979) and Yip (2000) who indicate that gender is an important influential factor of risk tolerance. Roszkowski et al. (1993), Hawley and Fuji (1993), Slovic (1966), Sung and Hanna (1996), Sharma (2006) and Rahmawati et al. (2015) reached a consensus that females take less risks than males, thus males are more risk tolerant than females, which is similar to the results in this study.

Ethnicity has also become a key point of discussion in South Africa. In this model, ethnicity was entered with four categories, where African was used as the reference group. The p-value (0.032) for African investors concludes that the null hypothesis (coefficients=0) could be rejected at a 5 percent level of significance. This indicates that there is indeed a difference between the risk tolerance level of African investors, White investors, Coloured investors and Asian investors. Hence, considering ethnicity, Coloured and White investors in South Africa are less likely to be high risk tolerant compared to African investors considering the largely negative coefficients for Coloured (-0.724) and White investors (-0.583). Considering the exponential beta of 0.485 and odds ratio (0.485-1) Coloured investors are 51.5 percent less likely to be high risk tolerant than African investors. White investors are 42 percent less likely to be high risk tolerant. Asian investors are also less likely to be high risk tolerant than African investors with a negative coefficient of (-0.385). The odds ratio (0.680-1) suggests that Asian investors are 32 percent less likely to be high risk tolerant than African investors. Previous research done by Van Schalkwyk (2012) also concludes African people to be more risk tolerant than White people. An international researcher, Leigh (1986), also found non-Whites to be more risk tolerant than Whites.

Table 2, furthermore, indicates a difference between the risk tolerance levels among the four age groups, where the 16-34 year age group was entered as the reference group. The p-value (0.001) for investors among the 16-34 year age group concludes that the null hypothesis (coefficients=0) could be rejected at a 1 percent level of significance. This indicates that there is indeed a difference between the risk tolerances of investors considering their age. Hence, considering age groups 35-49 years, these investors are

less likely to be high risk tolerant compared to age group 16-34, taking into account the negative coefficient for 35-49 years (-0.244). However, the p-value of 0.244 suggests a non-significant influence on the investors' risk tolerance level. On the contrary, for investors 50+ years a large negative coefficient was obtained (-0.782) with an odds ratio (0.458-1) indicating that older investors are 54.2 percent less likely to be high risk tolerant. Results are in line with the findings of Irwin (1993) who indicates that young people are more risk tolerant than older people. It is believed that older people have time constraints to recover from financial losses due to making inaccurate investment decisions (Grable, 1997).

A statistical difference also exists between the risk tolerance of investors between different annual income levels as a p-value of 0.000 was obtained and is significant at a 1 percent level. Negative coefficients were found for income levels R100 001-R300 000 (-0.145) and R300 001-R500 000 (-0.054) suggesting that these groups are less likely to be high risk tolerant. However, the p-values for both categories 0.553 and 0.840 suggest that these groups have a non-significant influence on the risk tolerance level of investors. On the other hand, the p-values for income groups R500 001-R700 000 (0.094) and R700 001 and more (0.001) were significant at the 10 percent and 1 percent level of significance. The explanation to these results stems from the assumption that individuals with higher income levels are more willing to take on high risk investments. Higher income investors are more able to recoup losses from investments than lower income investors. The positive coefficient of 0.975 and odds ratio of (2.651-1) indicates that investors within this income group are 165.1 percent more likely to be high risk tolerant than low income investors. A similar consensus is reached between researchers such as Shaw (1996), Grable and Lytton (1998), Grable and Joo (1999), Grable (2000), Grable and Joo (2004), Ardehali et al. (2005), Gibson et al. (2013) and Rahmawati et al. (2015) that high income individuals take on higher investment risks when making financial decisions.

Considering the last demographic factor, marital status, where never married was entered as the reference group, for both married investors and no longer married investors negative coefficients was obtained, however, for no longer married investors the p-value was not significant. Married investors had a negative coefficient of -0.356 and a statistical difference with a p-value of 0.075 at 10 percent significance level. The odds ratio (0.700-1) suggests that married investors are 30 percent less likely to be high risk tolerant than never married investors. The explanation to this finding may emanate from the assumption that married investors have more household variables to consider when making high risk decisions than single investors do. The results of this study are similar to researchers such as Baker and Haslem (1974), Lee and Hanna (1991), Lazzarone (1996), and Sung and Hanna (1996) who indicate that married investors tend to have a decreased investment risk appetite in comparison to unmarried investors. Resultantly, married investors will take more caution when making high risk investment decisions.

6. CONCLUSION

Financial risk tolerance refers to the amount of risk or the attitude of a person that is willing to take risks when making a financial decision or investing money, for example, saving for retirement purposes. Most investments are associated with some level of risk; however, many other factors impact individual investment decision-making. An investor needs to make important financial choices regarding investment products, asset allocation and/ or fund accumulation strategies. These choices have been attributed to risk tolerance. Therefore, it was important to investigate and consider the demographic variables involved in the investor's level of risk tolerance. Hence, the primary objective of this study was to determine whether gender, ethnicity, age, annual income and marital status play a role in the financial risk tolerance of South African investors. This study aimed to place investors in a certain level of risk tolerance (low risk tolerant and high risk tolerant) based on their demographical factors. This will significantly contribute towards the risk profiling of investment companies to invest accurately according to the investor's risk tolerance level.

The results for the study indicated that male investors are more risk tolerant than female investors and that there exists a statistical difference between the risk tolerance levels of different ethnic groups. These results concurred with previous research done by non-South African researchers. African investors were found to be more risk tolerant than White, Coloured and Asian investors. A difference was also detected between investors within different age groups. Investors between the ages of 16-34 were more likely to be high risk tolerant whereas investors above 50 years of age were less likely to be risk tolerant. This researcher regarded risk tolerance as a one-dimensional attitude and as risk tolerance decreases with age, it ultimately influences investment decisions.

Results also indicated that marital status does not play a significant role in risk tolerance but did suggest that married investors will be less likely to be high risk tolerant when making financial decisions. The results were similar to a few previous studies in international markets. To conclude, a consensus is reached among various researchers that the above mentioned factors are all related to financial risk tolerance. However, no agreement is reached as to whether financial risk tolerance changes over time and which factors cause the change.

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