# Share options: transaction familiarity as a moderator of share option recipient behaviour.

A Research Report
presented to the

Graduate School of Business Leadership
University of South Africa

In partial fulfilment of the
requirements for the

MASTERS DEGREE IN BUSINESS LEADERSHIP,
UNIVERSITY OF SOUTH AFRICA

by

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3 December 2005

**Abstract**

In this report, the author propose that the endowment effect may be significantly moderated in real world settings and market places, particularly in share option recipients. A key idea is that trading or market experience as well as the degree of portfolio diversification limits or negates the endowment effect. Field evidence from the market place suggests that trading behaviour converge to the neoclassical prediction as market experience increases. In the case of share options, it is expected that both market experience and a diversified financial portfolio will impact the behaviour of the share option recipients. Other factors, such as the "intentions" of the share option holder, which may potentially impact share option holder's behaviour are also identified.

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# Chapter 1
# ORIENTATION

## 1.1 Introduction

The issue of share options to employees can be motivated from many angles. In order for companies to offer share options to their employees, they need to use retained earnings to repurchase shares from the market. Thus, the company foregoes the opportunity to use the retained earnings for investments in growth and expansion. On the other hand, share repurchases decreases the number of shares, thus increasing both EPS (earnings per share) and the share price (Brigham and Ehrhardt, 2002).

Some argue that share repurchases act as effective, positive signalling devices to the investment community, while others view it as a way of retaining employees. Many companies see the issue of stock options as an effective way to motivate employees in management positions.

However, some business analysts disagree with companies which issue share options. Share options are expensive for firms to offer to employees, while these employees tend to value the share options less than cash (Bender and Ward, 2002). Research may side with the sceptics. Weitzman (1995) reviewed empirical and theoretical evidence and found weak support for the proposition that profit sharing improves productivity and lowers employment costs. If share option issues are seen as profit-sharing devices, the connection between share options and productivity may be even more untenable as employees or managers may not perceive that their individual efforts are able to move the share price significantly, if at all.

While companies may take an economical and traditionally neoclassical view of the world, taking into account the financial, tax and signalling implications of share repurchases and share option schemes, a frequently discounted fact is that people do not behave rationally in making economical decisions. Evidence indicate that factors such as "psychological attachment" influences people's economic behaviour (Thaler, 1980, Kahneman and Knetsch, 1990). Kahneman received the Nobel price in economics

in 2002 for pointing out that there is a difference between *homo sapiens* and *homo economicus*. His insights form the foundation of "prospect theory" (To have and to hold, 2003). Prospect theory proposes that people tend to judge their well-being relative to others and not in absolute terms, that people's actions depend on the way choices are presented to them and that people fear loss more than they desire gain. Recent research explored the "endowment effect", one of the major tenets of prospect theory.

This effect is based on the belief that people tend to place a higher value on things they already own or were given. This effect is closely related to the "status quo bias" as proposed by Samuelson and Zeckhauser (1988) and described as a preference for the current state of affairs which predispose consumers against buying and selling goods. The most persistent explanation for the asymmetry in the valuation of objects was given by Kahneman and Tversky (1984). They called this phenomenon "loss aversion" – the loss of an object is greater than the gain.

Support for the existence of the endowment effect have been found in a wide range of experiments over the past decade. The implications of this is that people's economic decisions might be fundamentally different from what the neoclassical economists assumed and the implications are profound. Neoclassical economist's ideas on the functioning of efficient markets, wealth and resource allocation, auctions and many other economic interactions may be turned upside down.

More recently, John List decided to move from the experimental classroom to test the endowment effect in real-world settings of memorabilia trade centres and exchanges. List's (2003a, 2003b) research indicated that market experience and diversification of investment portfolios may lead to the elimination of the psychological attachment. List's findings could subsequently be extended to other real-world examples such as company share option issues.

While market experience may influence (and possibly facilitate) the decision to sell shares, various other considerations may influence this decision. Very recently, Novemsky and Kahneman (2005b) proposed that loss aversion, an inducer of the endowment effect, may itself be moderated by the "intention" of the consumer. This

implies that market experience of experienced traders, which moderates or eliminates the endowment effect entirely, may be related to the intention of the trader to trade purely for gain. Although Knetsch (1989) believe that the endowment effect is not the result of wealth effects, income constraints, strategic behaviour or transaction costs (i.e. tax on gains), these and timing (share price, individual monetary requirements) may contribute to the share holder's loss aversion and thus influence the endowment effect.

Various other moderators of the endowment effect have subsequently been identified. These include: the nature of the object received (Wallendorf and Arnauld, 1988), duration of ownership (Strahilevitz & Loewenstein, 1999), the social relationship between the giver and recipient (McGraw et al., 2003), and the affinity towards the institution when the object is received (Tom, 2004). These psychological aspects are discussed in greater detail, but does not form part of the scope of this investigation.

## 1.2 Purpose of research

Understanding the factors which cause or strengthen the endowment effect as well as understanding the moderating factors may impact an organisation's view of share option issue. Furthermore, insight into behavioural economics may help a company to optimise their share option programme to obtain maximum benefit from it. However, the focus of this study is primarily to determine the effect of market experience on endowment theory in a practical setting such as share option issue as part of remuneration in companies.

## 1.3 Problem Statement

According to List (2003a) several real-world examples of the experience/endowment effect relationship can be found. These can have important implications for businesses. Several experiments, mainly in classroom settings Knetsch (1998), Strahilevitz and Lowenstein (1998), Kahneman and Knetsch (1990), and McGraw et al. (2003), as well as in real-world situations (List, 2003a, 2003b) have been conducted. While the classroom experiments resulted in confirmation of the endowment effect, List found that increased trading experience in real markets caused participants to eliminate emotional attachment to articles (thus the endowment effect).

The primary purpose of this practical (real world) research is to investigate the extent to which transaction familiarity (share trading and investment portfolio diversification experience) or lack thereof, moderates the behaviour of employees receiving share options. The degree of transaction familiarity will be investigated by determining the difference between the behaviour of employees who are "first time", "green" or novice share owners and that of experienced (sophisticated) share traders.

Furthermore, the study will aim to identify if and how exposure to share trading (resulting from the share option issue) alter or impact general investment behaviour of the inexperienced employee. This will indicate if learning takes place in real market settings or if evidence for learning is indeed inconclusive, as proposed by List (2003a).

The existence of behaviour-moderating factors when offering share options to employees, may have implications on an organisation's approach to share option issues. Companies use share option issues as signalling devices to their investors, investment brokers and public. It is also used as a employee retention device. As such, the affectivity of the share option issues may be greatly impacted by theories such as the endowment effect and transaction familiarity as described in this research.

## 1.4 Definitions

The relevant concepts are defined and described as follows:

### 1.4.1 Neoclassical economics

Neoclassical economics is the grouping of a number of schools of thought in economics and refers to a general approach, or "meta-theory", to economics based on supply and demand (Neoclassical economics, 2005). The theory depends on the following fundamental assumptions:

a) Individuals have rational preferences among a range of outcomes.
b) Individuals maximise utility and firms maximise profits.
c) Individuals act independently on the basis of full and relevant information.

Theories based on, or guided by, the above assumptions are neoclassical theories (Weintraub, 2002). As a result, the system will act as if everyone is rational and acts from self-interest. Economists often refer to what has evolved from neoclassical economics as "mainstream economics".

Economists use highly mathematical models including game theory, linear programming, and econometrics. Many of these models may be considered non-neoclassical. As a result, neoclassical economics is often seen as relying too heavily on complex mathematical models without enough regard to wether these describe the real economy. Neoclassical economics are often criticized for not explaining actual economies, but rather an economical "utopia".

Neoclassical economists argue that the basis of neoclassical economics is the assumption that deviations from rational self-interest are random and will cancel out. For the purpose of this study, neoclassical economics is contrasted with behavioural economics, an example of heterodox economics.

### 1.4.2 Behavioural economics

Both behavioural economics and behavioural finance apply scientific research on human and social cognitive and emotional biases to improve understanding of economic decisions and how these decisions affect the neoclassical predictions on market prices, returns and the allocation of resources. Both these fields are concerned with the lack of rationality of economic agents.

Behavioural models usually integrate insights from psychology with neoclassical economic theory. Daniel Kahneman received the Nobel price in economics for pointing out that there is a difference between *homo economicus*, as proposed by neoclassical economists and *homo sapiens* as an example of behavioural economics.

There are three main themes in behavioural finance and economics, namely:

a) Heuristics: People often base there decisions on rules of thumb and not on strictly rational analysis. Topics on heuristics include: Prospect theory, Loss aversion, and Status quo bias (Behavioural finance, 2005).

b) Framing: The way in which a decision is presented to the individual will affect their action. Mental accounting and anchoring are examples of this theme.

c) Market inefficiencies: Observed market outcomes are often contrary to rational expectations and market efficiency. Richard Thaler has written a series of papers describing specific market anomalies from a behavioural perspective. Topics in this theme include the endowment effect.

Models in behavioural economics are typically based on a particular observed market anomaly. These models modify the standard neo-classical models by describing decision makers as using heuristics and/or being affected by framing effects. In general, behavioural economics form a subsection of neoclassical economics, although the standard neoclassical assumption of rational behaviour is often challenged.

Critics of behavioural economics usually emphasize the rationality of economic agents (individuals). They argue that experimentally observed behaviour is inapplicable to market situations because learning opportunities and competition will ensure at least a close approximation of rational behaviour.

### 1.4.3 Endowment effect

The endowment effect was first theorized by Richard Thaler. The endowment effect is a hypothesis that people value something more as soon as they own it. In an early experiment, participants demanded a higher price for a coffee mug they had been given, while putting a lower price to own they could consider buying. This indicated that the endowment effect may be inconsistent with standard economic theory which asserts that a person's willingness to pay (WTP) should be equal to their willingness to accept (WTA) compensation to be deprived of a good.

The endowment effect is related to loss aversion and status quo bias as proposed in prospect theory. It is still somewhat uncertain wether the endowment effect is a relevant economic phenomenon. Specific conditions need to be satisfied for the endowment effect to be observed. These include instances where the object given is not easily replaceable, source dependence, institutional affinity, duration of ownership, etc. Equally, the endowment effect may be diminished or moderated in cases where individuals have extensive market experience and their intentions are not based on emotional attachment.

The aim of this research was to establish if the endowment effect is present in share option recipients and to what extent learning or market experience moderates this effect.

### 1.4.4 Share options

Share options are also referred to as employee stock options. These are share options for the company's own shares which are frequently offered to upper-level employees as part of their executive compensation package. An employee share options is identical to a call option on the company's stock held by an outsider. However, the employee share option carries additional restrictions to a normal call option.

A company gives a share option grant to an employee, specifying:

- The number of options granted to the employee;
- The option's exercise price;
- The option's expiry date;
- The option's vesting schedule, specifying when options may first be exercised;
- A list of restrictions regarding the options.

These guidelines differ from company to company. The employee share option guidelines relevant to this study is described in more detail in Chapter three. The rationale behind the offering of employee share options are twofold, namely: as a financial tool or as a behavioural tool. This is discussed in greater detail in Chapter two.

## 1.5 Delimitation of the study

The approach to the study follows a behavioural economic approach similar to that of List (2003a, 2003b), using the real-world example of share options as opposed to experimental economic approach as commonly used by Knetsch (1998), Strahilevitz and Lowenstein (1998), Kahneman and Knetsch (1990), and McGraw et al. (2003). According to Loewenstein (1999), experimental economics have not been able to avoid the problem of low external validity which is "the Achilles heel of all laboratory experimentation" (Loewenstein, 1999: 33).

Experimental economics can only obtain high external validity if they intent to represent behavioural economics in highly structured markets. This form of economics are less suited to make predictions about the economic behaviour and behavioural consequences in the real world, including decentralised markets.

The scope of the study entails the survey of employees at a specific seniority level, who received share options from their company. The scope of study is limited to one company, namely, Sasol Corporate (spanning all South African operations). Sasol is an international company operating in the petrochemical industry.

Most employees receiving share options in the South African operations include managers with a scientific background (engineers, scientists) and to a lesser extent financial background (commercial, accounting, economics), human resource background or other disciplines. Based on the mainly scientific profile of managers within Sasol, it is expected that the behavioural moderators (endowment effect, transaction familiarity, etc.) will differ from that of a company in the financial sector.

The study is limited to managers in Sasol Corporate:

a) who have been offered company shares,
b) who accepted and exercised their share options, and
c) has had the opportunity to engage in trade (taking up the option).

The study will exclude managers who declined to receive share options. The study will also exclude employees who are members of a share purchase scheme. The study is further limited to the effect of market experience, the degree of financial diversification and duration of ownership of share option holders. The research identifies other behavioural moderators such as the effect of signalling, the company growth phase, institutional affinity, social aspects, tax considerations, financial situations, etc, but will exclude in-depth analysis of these factors.

## 1.6 Study Presentation

**Chapter one**, as introductory chapter focus on the motivation, purpose, research design and limitations of the study, as well as a description of key terms.

**Chapter two** is dedicated to the review of the relevant literature. The organisational context in which the study takes place is discussed in **Chapter three**. This chapter also incorporates all the relevant literature reviewed in the previous chapter into a consolidated model of moderators of the endowment effect.

**Chapter four** discuss the research methodology that was followed. The results of the data analyses are given in **Chapter five**. These results are discussed in detail in **Chapter six**. The study is completed in this chapter with conclusions and recommendations for future research.

# Chapter 2
# LITERATURE REVIEW

## 2.1 Share options: A Financial tool

Companies use the repurchase of their shares from the market place to realise clear economic gains. These include: sending positive signals to the investment community because the repurchase may be motivated by management's belief that the company's shares are undervalued (Brigham and Ehrhardt, 2002, p240). In addition, by removing a large block of shares from the market, the share supply is decreased and the share price (EPS) increased through demand. Repurchases also substitute low-taxed capital gains for high-taxed dividends.

The issue of share options also does not deplete the company's cash resources. In fact, the company receives cash from the share option holder once the shares are sold. Moreover, companies may use the repurchased shares as a component of employee compensation and thus a behavioural tool.

On the down-side, issuing share options dilute the existing shareholders. As a behavioural tool, it may motivate misalignment between executive share option holders and shareholders. Furthermore, if the options are 'out of the money' (share price falls below exercise price), these options may loose their incentive effect (Bender and Ward, 2002).

## 2.2 Share options: A Behavioural tool

The issue of share options to company employees is a widespread practise in listed companies world wide. It is generally accepted that the issue of share options may be used as a motivational tool and/or employee behaviour moderator. When used correctly, benefits of share option schemes may be realised on three levels. Most significantly, on the organisational level, theory on individual-organisational goal-congruence implies that people work towards and accept organisational goals if these goals are similar to their own personal goals (Carrell et al., 1997). Similarly, goal congruence between the

objectives of the shareholders and company executives is created: both are rewarded if the company share price increases during the share option period (Bender and Ward, 2002). Offering share options to employees aim to leverage this individual-organisational goal-congruence, also known as affective commitment.

The benefits include: a stronger bond or partnership between the company and the employee with implications of employee retention, increased employee commitment to the financial performance of the company, and increased awareness of organisational performance (Schuster and Zingheim, 1992). Secondly, on a personal level, it is also recognised that share option programmes increase the competitiveness of the employee's pay package. This is referred to as a side-bets orientation or continuance commitment (Carrell et al., 1997).

Receiving share options may result in a tendency to remain with the organisation because the person cannot afford to leave due to the competitiveness of the remuneration and share option value. On a social level, the issue of share options makes a statement to the employee that he/she is now part of an "exclusive club" (Wilson, 1995). Bender and Ward (2002, p233) agree that remuneration schemes for directors have three basic objectives:

a) To entice good executives to the organisation;
b) To retain valued executives in the organisation; and
c) To align the interests of the directors with those of the shareholders, thus encourage the organisation's performance.

Contrary to the motivational theories, Weitzman (1995) found empirical and theoretical evidence that there is only a weak positive link profit sharing and productivity as well as between profit sharing and lowered employment costs. This may be even more relevant in the case of share options (as a method of profit sharing) where employees or managers are not able to directly affect the organization's share price.

Furthermore, the ability of share option schemes to influence employee's behaviour may be diminished due to the reduced risk associated with the option scheme (Wilson,

1995). Employees are not required to invest their own capital in the company. Thus, the potential loss is limited to not realising a gain they thought or expected to receive. As such, share options represent a one-sided bet for the executive share option recipient. This highlights the difference between a shareholder and executive share option recipient. The shareholder incurs an opportunity cost of holding shares because of liquidity preference, inflation and risk, none of which affects the share option recipient.

According to Bender and Ward (2002) the issue of stock options does not transform managers into shareholders. Most share options are exercised at, or near, the price at the date of issue. Therefore, share options can be described as being 'in the money' as soon as it is issued. Most of the option gains can be realised immediately by selling these shares into the market as soon as possible.

From these benefits and disadvantages, it is clear that organisations which have share option schemes, prescribe predominantly to behavioural economic theories as opposed to neoclassical theories.

## 2.3 Neoclassical Economics

### 2.3.1 Origins of Neoclassical economics

Classical economics was developed in the 18$^{th}$ and 19$^{th}$ centuries and focussed on value theory and distribution theory. The value of a product was thought to be directly related to the costs in producing the product. It was further assumed that goods were distributed in the economy in the same way that costs were distributed. Products was divided or distributed among different social groups in accordance with the costs borne by those groups in producing the good (Weintraub, 2002). Thus, a landlord would receive more goods than a tenant farmer because the landlord bore most of the cost in producing the good.

This approach included the work of Adam Smith, David Ricardo and Karl Marx. The difficulty with this approach was that prices of products did not always reflect the expected value based on the cost of production. People were often willing to pay more

than an object was "worth". The classical theories of value gradually gave way to a perspective in which value was no longer associated purely with the cost of production, but was associated with the relationship between the good or product and the person acquiring the product. These could be explained by differences in the object utility.

Several economists between 1870's and 1880's, began to base the value of an object on a relationship between costs of production and other "subjective elements" (Weintraub, 2002). These elements were later termed "supply" and "demand". This adjustment in the classical economic theory later became known as the Marginal Revolution in economics. The emerging theory that developed from these ideas was later termed neoclassical economics by the American economist, Thorstein Veblen.

### 2.3.2 Neoclassical economic framework

Three economists have been said to have spread the Marginal Utility Revolution or Neoclassical Revolution. William S. Jevons and Carl Menger wrote on the subject in 1871, followed by Leon Walras's *Elements of Pure Economics* in 1874 to 1877 (Neoclassical economics, 2005). Walras's field of interest was more focussed on the interaction of markets than in explaining the individual psyche using hedonistic psychology. Jevons saw his field of economics as development and application of utilitarianism, while Menger had a philosophical objection to the use of mathematics in ecnomics.

Neoclassical economics is a meta-theory – a set of implicit rules or understandings for the construction of satisfactory economic theories (Weintraub, 2002). The fundamental assumptions of neoclassical economics are not open to discussion inthat they define the shared understandings of those who call themselves neoclassical economists.

The neoclassical school of economics assert that people should be thought of as rational economic agents, so called *Homo economicus* (Thaler, 1996). Neoclassical economics have three major assumptions, namely: rationality, self-control and self-interest. These assumptions distinguishes economics from other social sciences such as psychology and sociology. The rationality assumption allows economists to use their

most powerful tool: optimization. However, most economists will agree that not everyone is rational and that people do not choose as if they are optimizing.

During the classical period, economics had a close link with psychology. However, economists began to distance themselves from psychology during the development of neoclassical economics as they sought to reshape the discipline as a natural science. This included explanations of economic behaviour deduced from assumptions about the nature of economic agents. A number of observed and repeatable anomalies challenged their hypotheses.

The following developments or criticisms on neoclassical economics have identified fatal weaknesses in the theory:

- The focus on individuals in the economy may obscure analysis of wider long term issues, i.e. the desirability and stability of the economic system on a finite planet of limited natural resources.
- The assumption that individuals act rationally may be viewed as ignoring an important aspect of human nature. Many see *homo economicus* as being significantly different from *homo sapiens*.
- Problems can be highlighted with making the neoclassical general equilibrium theory compatible an economy that develops over time and includes new products such as capital goods.

Many see the vision of economic man and the attempts at modelling a complex system such as the modern economy using mathematical models, as unrealistic and thus doomed to failure. Other see the incorporation of behavioural aspects into behavioural economics as a subset of neoclassical economics in an attempt to explain the observed anomalies.

## 2.4 Behavioural Economics

From behavioural economic studies, it has come to light that people do not behave rationally (as *Homo economicus*), but rather base their economic decisions on emotional processes and the way in which choices are presented to them. Such insights forms the

centre of "prospect theory". Kahneman and Tversky's (1984) prospect theory is a descriptive model of decision making under uncertainty.

This model captures many human decisions which differ significantly from the expected neoclassical model. The theory captures the fact that we adapt to the status quo and display 'loss aversion'. This explains the observation that people respond much more strongly to losses than to gains. Prospect theory has proven to be a very good model of actual choice.

A specific component of prospect theory is the "endowment effect" (Thaler, 1980). The endowment effect is a hypothesis about behaviour. It has been well established experimentally that people place extra value on things they already own. This evaluation disparity is defined by the endowment effect (Knetsch, 1989).

In an experimental study by Knetsch (1989), students were given objects (a coffee mug or chocolate bar of equal value) and asked to trade these for their preference. Given the random allocation of the objects, one would expect 50% of the students to trade. However, as little as 10% of students opted to trade, indicating what was described as the "instantaneous endowment effect" by Kahneman et al. (1990).

An effect closely related to the endowment effect and its evaluation disparity is the "status quo bias", as proposed by Samuelson and Zeckhauser (1988). This bias can be described as a preference for the current state of affairs to continue, which predispose consumers against buying and selling goods. A series of decision-making experiments preformed by Samuelson and Zeckhauser indicated that individuals disproportionately stick with the status quo. It was further noted that the more options that were given in the choice set, the stronger was the relative bias toward the status quo.

Some explanations of the observed status quo bias supports rational decision making. For example, transition costs may make the switch from the status quo more costly. Transition costs introduces a status quo bias whenever the cost of switching between choices exceeds the efficiency gain associated with a superior alternative. Any economic transaction requiring an irreversible action (sale of share options) would fall in

this category. A related reason for the status quo persistence can be described as the cost of analysis required for decision-making. Individuals may prefer to save themselves the cost of analysis or re-analysis in the decision-making process. Thus, the status quo bias is retained.

In considering a choice between retaining the status quo or opting for a new alternative. Assuming the status quo as the reference point, an individual will weigh potential losses from switching as larger than potential gains. The best explanation for this value disparity (asymmetry of value) is "loss aversion" – the disutility of losing an object is greater than the utility of gaining it (Kahneman and Tversky, 1984). In other words, people fear loss more than they crave gain. Because of loss aversion, the individual is biased in favour of the status quo. The result of loss aversion is a reduced number of transactions in the marketplace. This may cause consumers and managers to take fewer risks.

Thaler (1980) was the first researcher to discuss this bias and referred to is as the "endowment effect". Samuelson and Zeckhauser concluded that status quo bias ("endowment effect) is consistent with, but not solely prompted by loss aversion. Novemsky and Kahneman (2005a) proposed that loss aversion can be influenced by individual intentions as well as the riskiness of the choice. Inadvertently, the intension of the trader and degree of risk associated with the choice will influence the conditions where the endowment effect occurs. The endowment effect, therefore is a possible result of loss aversion.

Some conditions need to be satisfied for the endowment effect to be observed. The endowment effect is mostly observed when an individual is asked to express their preference for one object or good in terms of their willingness to give up another. The endowment effect is specifically noticeable in instances where the object is not easily replaceable.

Endowment effects are also predicted for windfalls and property or resource rights obtained by fortuitous circumstances. Kahneman and Knetsch, (1990) also observed that physical possession of a good result in a more consistent endowment effect, while

assigning a property right to be received at a later time (as in the case with share options) seemed to produce weaker effects.

Demonstrations of endowment effects are mostly observed where transaction costs are small. Similarly, tax considerations may result in the same lack of trading. Several other deviations from microeconomic assumptions also influence people's economic behaviour and may even moderate the magnitude of the well-established endowment and mental accounting effects as described below.

## 2.5 Moderators of the endowment effect

The endowment effect anomaly is not universal. Below, several exceptions to prospect theory are related. It has been found that in many cases the behaviour of people is in line with neoclassical predictions.

*Source Dependence*

Attachment to objects depend on wether the object was obtained by one's own effort or by chance (fortuitous circumstances or windfall). This phenomenon is called "source dependence" (Strahilevitz and Loewenstein, 1999). When income is unanticipated, or perceived as a windfall, it is more likely to be given up.

Thaler and Johnson (1989) observed that individuals gave up windfalls (such as the objects used in experiments) more easily than assets from their own original endowment. This implies that the endowment effects observed during experiments may be weaker than endowment effects encountered in real world situations, especially in the case where objects are acquired by non-fortuitous means.

Similar to findings by Thaler and Johnson (1989), McGraw et al. (2003) found that objects/windfalls that were obtained through market pricing and free market principles were most easily parted with. The results indicate that people are particular regarding the source of the windfall or gift. A higher value and unwillingness to sell, were attached to objects which were received from known individuals ("particularistic") as opposed to cases where the recipient was indifferent to the identity of the giver ("universalistic").

*Social Meaning*

Studies by McGraw et al. (2003) further indicated that people attach social meanings to objects and money which moderate the endowment effect. The study showed that people judge the value of things through lenses of their interpersonal relationships. The strength of the endowment effect was found to depend on the relational history of the object (McGraw et al., 2003).

In general, people find it hardest to part with objects or windfalls that were received from people (family members or outside) with whom they had a deep emotional bond. To a lesser extent, people found it difficult to sell objects/windfalls that were received from people in authority positions (due to prestige, power, experience, rank). Interestingly, younger respondents (students) attributed a higher meaning to objects received from an authority-ranking relationship than older respondents.

*Ownership Duration*

Although the endowment effect has been shown in experimental studies to be almost instantaneous, Strahilevitz and Loewenstein (1999) showed that the magnitude of the effect increases with duration of ownership. Similarly, the acceptable selling price increases with increased length of ownership. Their research also indicated that the object's attractiveness increases the longer the ownership continues. The increased attractiveness and higher selling price are suggested by Strahilevitz and Loewenstein (1999) to be due to people's adaptation of their ownership of an object. This subsequently increases their loss aversion, thereby increasing the value of the possession.

*Object Type*

In some of the experimental studies performed by researchers (Knetsch, 1989; Kahneman and Knetsch, 1998; Strahilevitz and Loewenstein, 1999), the endowment effect was investigated for consumer goods (mugs, chocolate bars, etc.). Kahneman et al. (1990) also investigated the endowment effect for exchange goods, namely, value-induced tokens. These tokens had a fixed value which was made known to the participants during the experiment.

Kahneman (1992) subsequently stated that there are three categories of exchange goods, namely:

a) money held for investment (spending),

b) goods held specifically for resale and

c) goods which are valued because they can be traded or used as 'bargaining chips' (e.g. shares).

Kahneman (1992) concluded that exchange goods routinely traded for money, does not elicit loss aversion for buyers or sellers. However, subsequent studies by Van Dijk and Van Knippenberg (1996) noted that the endowment effect may be perceived for exchange goods when traders are unsure of the future exchange prices. This occurs when the exchange prices are not fixed and traders are uncertain how much money they will eventually receive when trading their exchange good.

Thus, selling a good with an undetermined exchange value can be viewed as a risky trade for cash. Under these conditions, traders may experience loss aversion due to the fact that it is more difficult or impossible to compute net gains of trading cash for uncertain exchange values.

*Anchoring*

Described as a fundamental cognitive misperception by Samuelson and Zeckhauser (1988), anchoring is most visible when a decision takes the form of choosing an optimal value of a continuous variable, typically some quantity or price. A common strategy by an individual is to take some initial value as a starting point and to adjust this value in response to the economic facts to yield a final decision value. This may typically be the case with share option issues where the recipient selects an anchoring value which would represent a good future sales price for the shares.

*Object Utility*

In most laboratory studies, recipients of the objects (usually a coffee mug, key holder, candy bar or tokens) is not given opportunity to use the object (Knetsch, 1989; Kahneman and Knetsch, 1998; Strahilevitz and Loewenstein, 1999). This allows

analysis of the effect of ownership as opposed to object usage. Strahilevitz and Loewenstein (1999) speculates that use of the object may intensify the endowment and duration-of-ownership effects.

On the other hand, quality and novelty value of objects may decline over time once people feel that they have obtained their money's worth from the object. This may partially or completely counterbalance the history and duration of ownership effects investigated by Strahilevitz and Loewenstein (1999).

Wallendorf and Arnauld, (1988) investigated object attachment, possessiveness and social linkage in a cross-cultural sample. The study showed that both the characteristics of the owner (e.g. gender and ethnicity), the individual, and nature of the benefits of the object (useability, status or sentimental value) may influence the attachment to the possession. The latter aspect of sentimental value also relates to the social meaning given to an object. This may impact the individual's view on the utility of the object.

*Institutional affinity*

Not only does people place a higher value on possessions received in the "particularistic" sense as described above, they also use possessions to communicate their identification with an organisation. Tom (2004) demonstrated the endowment effect on institutional affinity for insignia goods.

Affinity marketing is a marketing strategy that is built on the consumer inclination to communicate an identification with an organization by acquiring symbolic representations of the organization. A common strategy is to give logo items to fans, students, business contacts, as a gesture of appreciation for their support and to strengthen their identification and continued support. Based on the effect of duration of ownership on the endowment effect, one may need to consider the length of an individual's institutional affiliation in order to understand the impact of the endowment effect on institutional affinity.

Tom (2004) found that giving insignia items to students seemed to strengthen affinity to the institution only when the students were in the attitude formation stage. However,

when an attitude towards the institution has been firmly established, the affinity towards the institution was not affected by the endowment effect. The receipt of insignia goods seem to strengthen pre-existing affinity. If company shares are likened to insignia goods, the study may provide valuable clues to the timing of share option issues.

Tom (2004) suggests that the use of insignia goods (such as share issues) may be effective to build loyalty in the organization, but only in cases when the recipient does not have an attitude towards the organization or where a positive attitude (affinity) already exists. Therefore, it may be more effective to cultivate employees toward the beginning of their entry in to the organization, rather than at a later point.

*Market experience*

The endowment effect is primarily a problem for sellers. However, not all sellers are afflicted by the endowment effect. Another moderator of the endowment effect was identified by John List (2003, 2004). List's field observations indicated a low number of trades by naïve or novice traders, consistent with prospect theory. However, it was found that market or trading experience played a significant role in eliminating the endowment effect. In cases where persons have extensive trading experience, the endowment effect became negligible. This may be expected as goods are acquired for resale rather than utilisation.

Novemsky and Kahneman (2005a) postulate that loss aversion and the resultant endowment effect, is related to people's emotional attachment to an object and the anticipated emotional response to giving up an object. According to the researchers, trading experience provides people with repeated exposures to their own reactions to object loss. These traders learn that their reaction to the loss is less extreme and less enduring than inexperienced traders believe it to be. This reduction in the anticipated feeling of loss may reduce experienced trader's reluctance to sell or trade objects in their endowment, thus reducing the loss aversion and endowment effect.

*Intentions*

Very recently, Novemsky and Kahneman (2005a) proposed that loss aversion, which promotes the endowment effect, may itself be moderated by the "intention" of the trader. This implies that both market experience of experienced traders, and the intent of the

trader (experienced or inexperienced may moderate or eliminate the endowment effect entirely.

The riskiness of the choice as moderator of loss aversion was also investigated by Novemsky and Kahneman (2005a). The risk associated with the trade of an object may be related to uncertainty in the exchange value as observed by Van Dijk and Van Knippenberg (1996). Furthermore, the replace-ability of an object may impact the associated risk and uncertainty.

## 2.6 Consolidation of endowment theories

The endowment effect has been represented in an utility function: $U = \int(\$, X, loss)$, where $ represent individual wealth, X is the quantity of the good being valued and loss represents loss aversion (Morrison, 2000). In other words, the utility that people place on a good, is a positive function of the value of the of goods in a bundle and a negative function of any loss (real or hypothetical) that trading would incur.

Consolidation of all endowment moderators may be summarised in the following function endowment function: $E = \int(Ex, I, U, t, O)$, where Ex represents experience (List, 2003, 2004), I, intention (Novemsky and Kahneman, 2005a, 2005b), U, utility, t, time or duration of ownership (Strahilevitz and Loewenstein, 1999) and O, ownership. The utility of the object as a moderator, implies mental accounting regarding the substitutability of the object(s) as well as functionality of the object.

Ownership of an object includes aspects of individual characteristics (owner wealth, gender and ethnicity) (Wallendorf and Arnauld, 1988), the social context or relational history (source dependence) of the object (Wallendorf and Arnauld, 1988; Thaler and Johnson, 1989; Strahilevitz and Loewenstein, 1999; McGraw et al., 2003) and the owner's institutional affinity to the donor of the object (Tom, 2004).

# Chapter 3
# FOUNDATION OF THE STUDY

## 3.1 Sasol Share Option Guidelines

First time Sasol share option recipients are provided with booklet containing the Sasol Share Trust Deed, a short guide to the recipients rights and obligations in terms of the Sasol Share Trust Deed, Opinions from KPMG on dealing with the tax, the Insider Trading Act and Dealing in option shares before payment and allotment (Sasol Share Option booklet, 2002). The broad terms of the Sasol share option scheme include:

a) A participant (person to whom a share option is granted) obtains an option by accepting a grant of option made to them by the Trustees of the Sasol Share Trust.

b) An offer to purchase shares at a specified price (the "option offer") is made to a participant, and the participant may accept or reject the offer. By accepting the option offer, an option contract is established between the company and the participant. Acceptance of the offer obliges Sasol to sell the shares to the participant if and when the participant decides to buy the shares at any time during the term of the option. It does not oblige the participant to pay the purchase price for the shares.

c) By accepting the share offer, the participant acquires the right (option) to purchase Sasol shares at the price specified in the option offer over a period of nine years. In order to purchase the shares, the participant have to exercise the option. Exercising the option may be delayed to a date which is more advantageous (exercise price equal or lower than offer price).

d) The option may be exercised wholly or in part in multiples of 100 shares during specified intervals from the option date until the ninth anniversary of the option date.

e) Up to a third (1/3) of the scheme shares in an offer may be traded on or after the second anniversary of the offer date, while up to two thirds (2/3) of the scheme shares in an offer may be traded on or after four years of the offer date. The remaining third may be traded on or after six years of the offer date.

f) Should an option not be exercised by the ninth anniversary of the option date, the option shall lapse. The option issue also lapses if the participant ceases to be an employee for reasons other than death, becoming a retired employee, taking early retirement due to age or incapacity of ill health.

g) The participant is entitled to the delivery of the shares once the purchase price specified in the option offer is paid by the recipient, or on the balance of the proceeds if the sale of the shares proceeded through the Sasol Shares Office.

h) If the participant has exercised his/her option, but fail to take up the shares before the expiry date of the option term (nine years), the participant will be obliged to take delivery of the shares and pay on the ninth anniversary of the option offer.

i) The trading of share options are governed by the rules relating to insider trading and not possible during the "closed periods" as specified by the company (during the time periods of publication of the interim and yearly report and declaration of interim and final dividends).

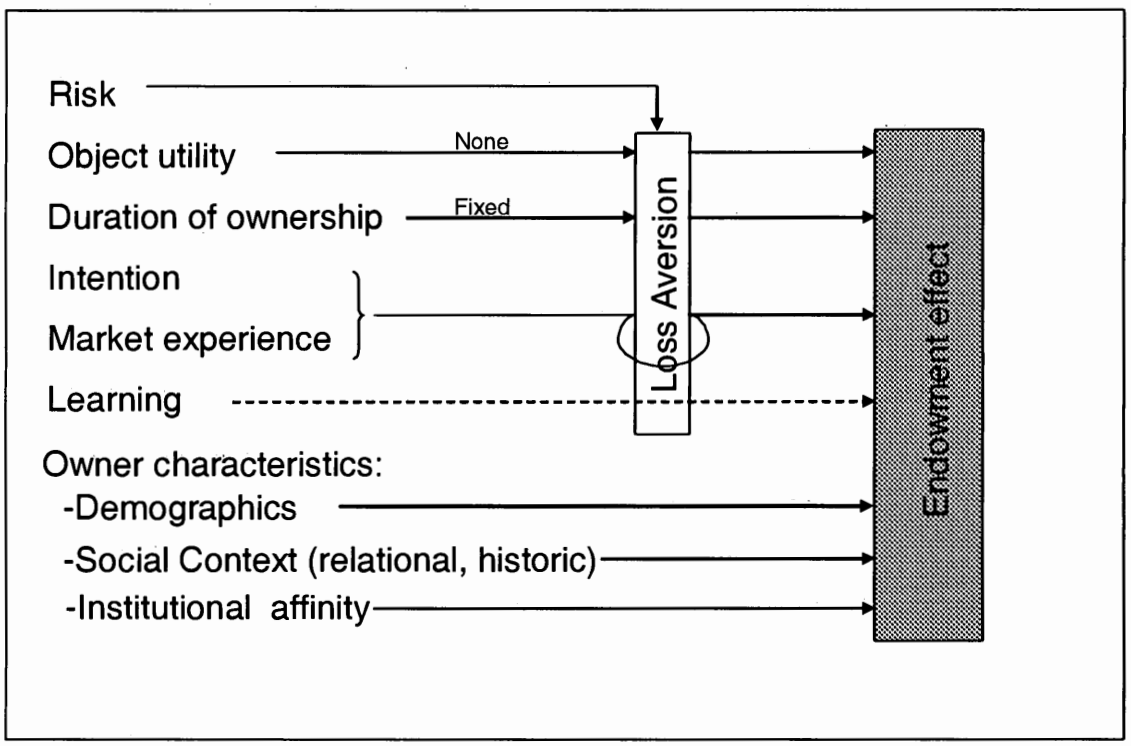
Since the listing of Sasol on the JSE in 1988, some amendments to the Sasol share option scheme have been made. The most significant is the contraction of the initial fixed holding period from 4 years to 2 years where after a third of the share option may be traded. This occurred in October 1999. The data gathered during this study have been amended to reflect this change. The historic Sasol share price is shown in Appendix 2.

### 3.2 Discussion on applicable theory

An evaluation of the various theories pertaining to the endowment effect may be represented visually as shown in Figure 1. Most researchers accept loss aversion and

the endowment effect as both a description and an explanation of the phenomenon being studied. Although the endowment effect is consistent with loss aversion, it is not solely prompted by loss aversion. Very few studies have examined the moderators of the endowment effect and loss aversion in an attempt to understand its underlying drivers.

**Figure 1.** Moderators of the endowment effect




Taking the endowment function: $E = \int(Ex, I, U, t, O)$ as a summation of the major moderating factors on the endowment effect, this function can be used to investigate the applicability of the various moderating factors in the real life scenario of share option trading. It can be seen that not all moderators are universal. Some moderating factors may be not be developed beyond the experimental scenario, while others are dependent on the type of object, etc.

Firstly, the utility of the object has been shown in previous studies to play a role in the endowment effect. The degree of utility afforded by an endowment, gift, or bequest may influence the recipient's willingness to part with the object. Experimental studies by

Knetsch (1989) and Kahneman and Knetsch (1990) included the endowment of participants with objects of utility or consumer goods (candy bars, coffee mugs).

The influence of object utility on the recipient's loss aversion and inevitably the endowment effect elicited, has been removed by the experimenter providing subjects with value-induced tokens (Kahneman et al., 1990). These tokens do not elicit the endowment effect as they are valued only because they can be redeemed for cash. In the case of share options, the share issue document is similar to the tokens in that it has no explicit utility other than to be redeemed for cash or a share certificate.

List's research included objects of little or no utility (sports memorabilia, collector pins). A recipient's utility of the traded objects was negated in List's market place experiments. List's observations and conclusions on real-world markets are therefore more relevant to the case of share option issues than purely experimental studies. Shares have no other function than resale and providing a dividend income while being held. As such, the utility of the share issue can be negated as a moderating factor.

The duration of ownership can potentially influence the endowment effect of share option recipients. However, the effect of ownership duration may be negated in the case of share option issues and trade. Sasol's share option scheme stipulates that one third of the initial share option may be traded at intervals of 2 years. Therefore, after 2 years from the issue of the share option, the recipient may sell one third. Another third may be sold after 2 more years and the final third after 6 years from the date of issue. The shares may be held to a maximum of nine years where after, if not sold, the issue is forfeited. Therefore, once the share offer is exercised, the duration of ownership (t) is unlikely to play a role in the decision of the trader to sell or not, and therefore in the observation of the endowment effect in this case.

It can be argued that employees accept the share option issue with the intention to sell the shares at a later date, as specified by the share option scheme. Therefore, the role of "intention' in the moderation of loss aversion can be eliminated. This researcher argues that intention is not a pure function of market experience as proposed by Novemsky and Kahneman (2005b), but also present in novice traders (share option

recipients) as studied in this research. The degree of market experience, as a moderating effect, presented in the share option recipients is relevant to this research and subsequently determined in this study.

The extent to which a trader has a diversified investment portfolio may not be directly related to his/her trading experience. In other words, an individual may acquire a diversified portfolio through selected share acquisition, but may not have traded from this portfolio previously. A diversified investment portfolio may relate more to an individual's risk orientation (a diversified portfolio implies diversified and thus lower risk) than to the individual's trading experience.

It is possible that the exposure to share options and trading may increase the market experience of non-traders or novice traders, thereby eliminating the endowment effect. However, evidence of learning is mixed and inconclusive according to List (2003a).

This study aims to determine if learning does indeed occur through exposure to share trading. Various factors may influence learning both positively (intent, ownership characteristics such as attitude to risk) and negatively (ownership characteristics such as attitude toward social status, object replaceablility, etc.).

While the focus of this research is predominantly on market experience or transaction familiarity as a moderator of the endowment effect, other moderators, similar to those identified earlier by Wallendorf and Arnauld (1988), McGraw et al. (2003), List (2003a) and Tom (2004), may be identified for share option issues.

The research presented here proposes to establish the degree of influence exerted by individual characteristics (gender, ethnicity), the relational history with the source (Sasol), in addition to institutional affinity.

The moderators of the endowment effect may be represented as follows for the case of share options: $E = \int(Ex, D, O)$, where Ex represents experience in share trading, D represents the degree of investment portfolio diversification and O represents the

various ownership characteristics which may influence the endowment effect positively or negatively.

All the evidence regarding influences on behavioral economics may have a profound influence on the way in which share option issues are accepted, the duration of ownership and the subsequent behavioral change affected in the share option recipients. Companies need to understand the moderators of the endowment effect on order to decide the appropriateness of issuing share options or to make optimal use of share options as a motivational and commitment-enhancing tool.

The implications for companies issuing share options are that effective use of the options is optimized in cases where the employee has a significant relationship with his or her employer or direct manager. In cases where the employee obtains share options directly upon employment, and where these personal interaction and relationship have not been established, the use of share options may be significantly less successful compared the a share issue to a long term employee who has risen through the ranks.

# Chapter 4
# RESEARCH METHODOLOGY

## 4.1 Problem Statement

According to List (2003a) several real-world examples of the experience/endowment effect relationship can be found. Several experiments, mainly in classroom settings Knetsch (1998), Strahilevitz and Lowenstein (1998), Kahneman and Knetsch (1990), and McGraw et al. (2003), as well as in real-world situations (List, 2003a, 2003b) have been conducted. While the classroom experiments resulted in confirmation of the endowment effect, List found that increased trading experience in real markets caused participants to eliminate emotional attachment to articles (referred to as the endowment effect).

The primary purpose of this practical (real world) research is to investigate the extent to which transaction familiarity (share trading or market experience) and investment portfolio diversification experience or lack thereof, moderates the behaviour of employees receiving share options. The degree of transaction familiarity will be investigated by determining the difference between the behaviour of employees who are "first time", "green" or novice share owners and that of experienced (sophisticated) share owners/traders.

Furthermore, the study will aim to identify if and how exposure to share trading (resulting from the share option issue) alter or impact general investment behaviour of the inexperienced employee. This will indicate if learning takes place in real market settings or if evidence for learning is indeed inconclusive, as proposed by List (2003a).

## 4.2 Hypothesis

In developing the hypothesis, it was assumed that there is no causal relationship between market experience and a diversified investment portfolio. However, a diversified investment portfolio may imply a fair amount of market experience or transaction familiarity.

The following hypothesis will be investigated in this research project:

Dependent Measure: Endowment effect
*A decreased endowment effect will be observed for individuals with significant market experience.*

1. Employees with significant market experience who receives share options tend to keep their shares for the same duration as the average employee.

1a. Employees with significant market experience, who receives share options tend to keep their shares for a shorter duration than the average employee.

## 4.3 Study scope and Limitations

The approach to the study follows a behavioural economic approach similar to that of List (2003a, 2003b), using the real-world example of share options as opposed to experimental economic approach as commonly used by Knetsch (1998), Strahilevitz and Lowenstein (1998), Kahneman and Knetsch (1990), and McGraw et al. (2003).

According to Loewenstein (1999), experimental economics have not been able to avoid the problem of low external validity which is "the Achilles heel of all laboratory experimentation" (Loewenstein, 1999: 33). Experimental economics can only obtain high external validity if they intent to represent behavioural economics in highly structured markets. This form of economics are less suited to make predictions about the economic behaviour and behavioural consequences in the real world, including decentralised markets.

The scope of the study entails the survey of employees at a specific seniority level, who received share options from their company. The scope of study is limited to one company, namely, Sasol Corporate (spanning all South African operations). Sasol is an international company operating in the petrochemical industry. Most employees receiving share options in the South African operations include managers with a scientific background (engineers, scientists) and to a lesser extent financial background (commercial, accounting, economics), human resource background or other disciplines.

Based on the mainly scientific profile of managers within Sasol, it is expected that the behavioural moderators (endowment effect, transaction familiarity, etc.) will differ from that of a company in the financial sector.

The study is limited to managers in Sasol Corporate:

a) who have been offered company shares,
b) who accepted and exercised their share options, and
c) has had the opportunity to engage in trade (taking up the option).

The study will exclude managers who declined to receive share options. The study will also exclude employees who are members of a share purchase scheme.

The study is further limited to the effect of market experience, the degree of financial diversification and duration of ownership of share option holders. The research identifies other behavioural moderators such as the effect of signalling, the company growth phase, institutional affinity, social aspects, tax considerations, financial situations, etc, but will exclude in-depth analysis of these factors.

## 4.4 Assumptions

The following assumptions were made regarding the issue of share options and the sample population:

### 4.4.1 Share option issues

Companies issue share options based on the motivational effect generally believed to be inherent to the share issue. The successful use of share option issues was assumed to include: increased awareness of and concern for the organisational performance by employees who are in a position to have an impact on the performance of the company (Schuster and Zingheim, 1992; Wilson, 1995), increased employee loyalty and commitment to the company (improving employee retention) and a means of providing a competitive pay package.

a) It is therefore assumed that the successful use of share options inadvertently rely primarily on the employee's psychological attachment to the share option to elicit employee commitment and loyalty.

b) It is further assumed that the company under investigation (Sasol) did not consider behavioural economics in their decision to issue share options or in the design of the share option scheme itself.

c) It is also assumed that Sasol has not revised the share option scheme based on behavioural economics and that there is opportunity for optimisation and improvement. As share options are expensive to offer to employees, it is assumed that Sasol has not taken the share option scheme lightly and that the company would be partial to gain understanding of any impacts on the successful utilisation of the scheme.

### 4.4.2 Sample population

It is expected that managers receiving share options in Sasol has had adequate financial exposure to share trading, investments, etc. in order to observe the moderating factors on the endowment effect in this study. The tendency to retain the status quo bias as described by Samuelson and Zeckhauser (1988) may be observable in the sample population in the short term.

However, the Sasol share option guidelines provide opportunity to sell a third of the shares after every consecutive two year period and to a maximum of nine years. All share options held for a nine year period and not sold before this period lapse, expire. Therefore, the status quo bias of share option holders may only be valid for a nine year period.

## 4.5 Sampling

The study sample consisted of all current level 3 and 4 managers within the Sasol Group of Companies who received share option issues. Share options are offered to managers from level 4 (senior management) in the organisation up to level 2 (GEC members) and

level 1 (Sasol CEO). A sampling frame was obtained from the SAP system of Sasol Corporate's Human Resource department. This will eliminate the problem of sample recruiting as the potential sample list is easily sorted according to the criteria required in this study.

## 4.6 Measuring Instrument

The research methodology will entail structured questionnaires on the relevant measures (See Appendix 1 for a draft Measurement Instrument). The study will include a combination of quantitative and qualitative data. Primary data will be collected via the distribution of a self-administered questionnaire via inter-company e-mail to all relevant persons in the sample. This method of data collection is associated with low cost and has short turnaround of results. Furthermore, respondents feel anonymous.

## 4.7 Data Analysis

### 4.7.1 Descriptive Statistics

Categorical data obtained from questionnaire will be organized and presented in frequency and percentage summary tables and charts. Comparative analysis will be performed on the data obtained from questions 3 and 12 regarding the level of trading the respondents engaged in before and after share options were issued to them. This will indicate the degree of learning or experience gained by the respondents from the share option issue.

### 4.7.2 Regression analysis

Simple linear and multiple regression will be used to determine possible correlations between the following biographical (independent) variables:

a) Gender,
b) Age,
c) Race,
d) Qualifications,
e) Number of months shares were retained beyond fixed period,
and the approximate number of share options trades, as well as trading experience.

### 4.7.3 Hypothesis testing

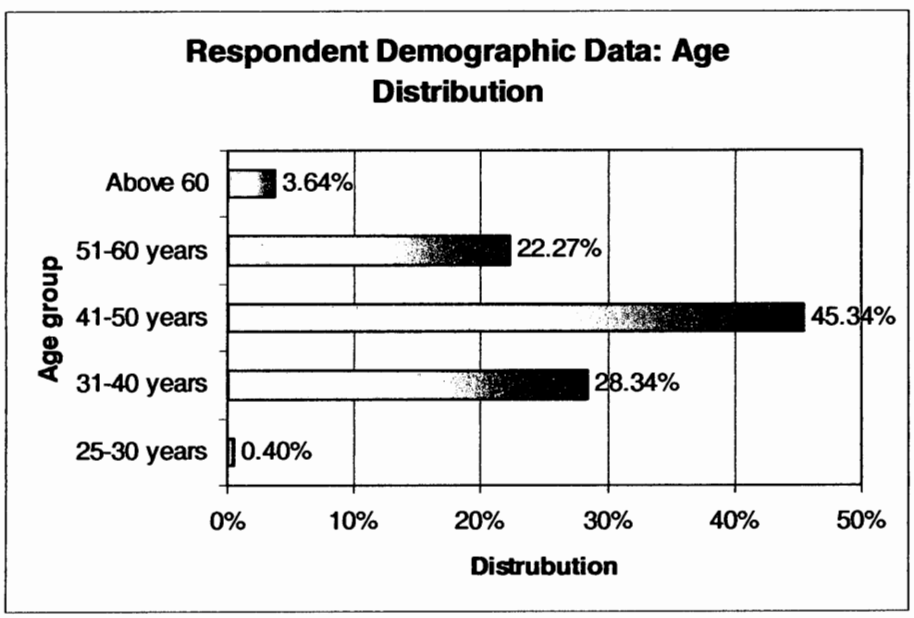
The hypotheses tested will be using statistical significance tests on the results of the questionnaire.

# Chapter 5
# RESEARCH RESULTS

## 5.1 Biographical Profile

The share option questionnaire was distributed via intra-company e-mail and targeted at level 3 and 4 employees at Sasol who have received share options as part of their benefit package. The response rate for this study was 32.0%. Female respondents numbered 4.8%. The age distribution of respondents is given below in Graph 1.

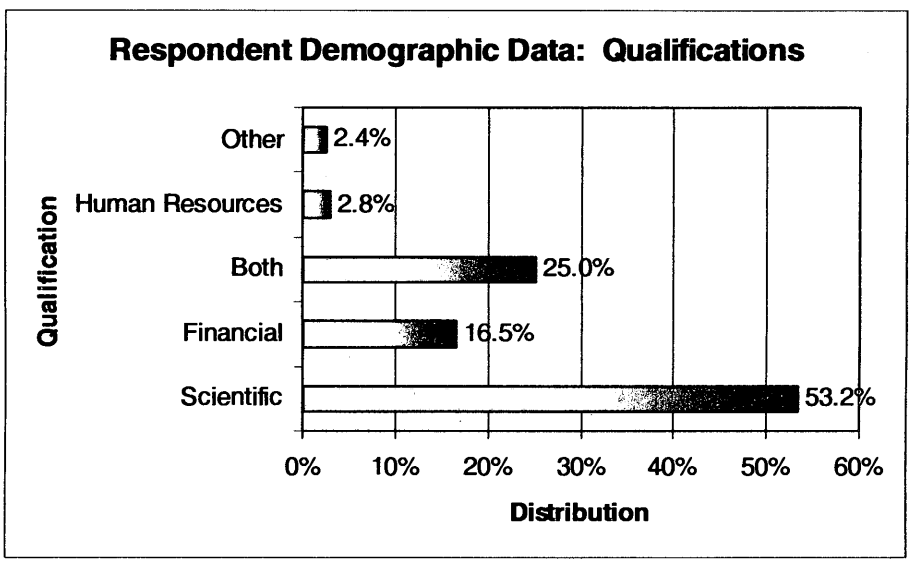
The largest portion of respondents fall in the age group of 41 to 50 years (45.34%), followed by the second largest portion of respondents in the 31 to 40 years age group (28.34%). Respondents in the age group of 51 to 60 years represented 22.27% of the respondents while respondents above 60 years of age embody 3.64% of respondents. The lowest fraction of respondents (0.4%) is under the age of 30 years.




**Graph 1.** Respondent age distribution

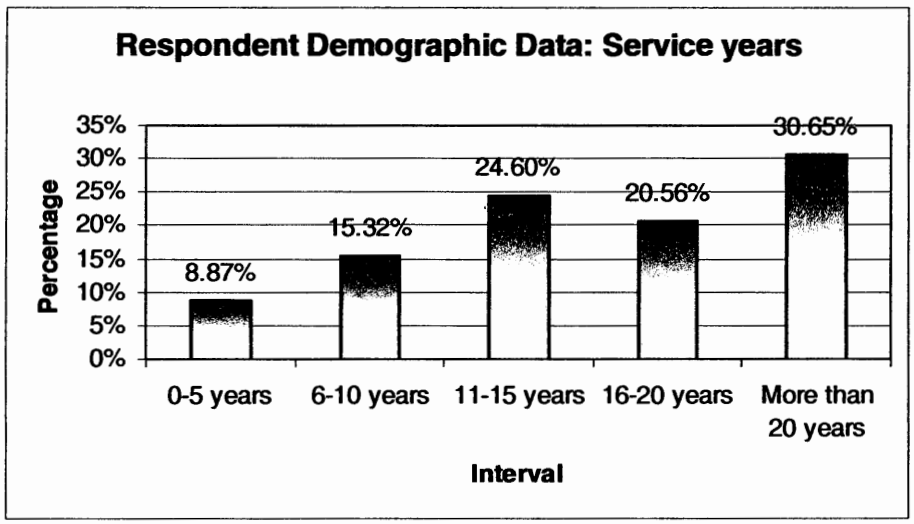
The majority of respondents were of white or European ethnicity (94.7%), while 2.5% of the respondents in this study are of Indian or Asian ethnicity. Black respondents made up 1.6% and coloured respondents 1.2%, of the total.

The tertiary qualifications of respondents are depicted below in Graph 2. The largest portion of respondents (53.2%) have a scientific qualification. This includes engineering and science degrees. Respondents with a financial background totalled 16.5%, while respondents with both scientific and financial degrees numbered 25%. The latter group predominantly consists of scientists and engineers with a MBL or MBA qualification. Some 2.8% of respondents have human resource qualifications, while 2.4% comprise other qualifications such as legal qualifications.




**Graph 2.** Respondent qualifications

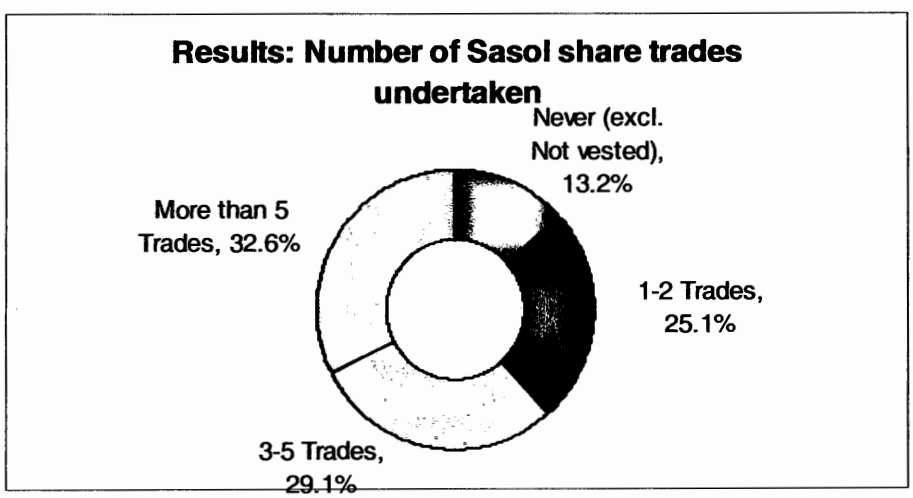
The distribution of number of service years at Sasol within the respondents are shown below in Graph 3. The largest portion on respondents (30.65%) have been with the company for more than 20 years. The percentage of respondents with 11 to 15 years service (24.6%) outnumbers respondents with 16 to 20 years service (20.56%). Respondents with less than 5 years service at Sasol is 8.87%, while 15.32% of respondents have between 6 to 10 years service.




**Graph 3.** Respondent service years

## 5.2 Share Trading Results

The percentage of respondents' share options which have vested (become available for trade after a 4 or 2 year contractual waiting period) was calculated at 92.7%. Some 13.2% of respondents who's shares have vested, reported that they have never traded their shares. The number of share trade occasions engaged in by respondents are shown below in Graph 4. The distribution of share trading occasions is fairly evenly divided between one to two trades (25.1%) , three to five trades (29.1%) and more than 5 trade occasions (32.6%).




**Graph 4.** Number of Sasol share trade occasions undertaken

The average time period (months) which lapsed after shares vested and was traded, was calculated at 13 months. From further analysis it is clear that the average holding period for vested shares by experienced and infrequent traders as well as for inexperienced traders is 11 months compared to the sample average of 13 months.

**Table 1.** Average time lapsed per experience level of trader

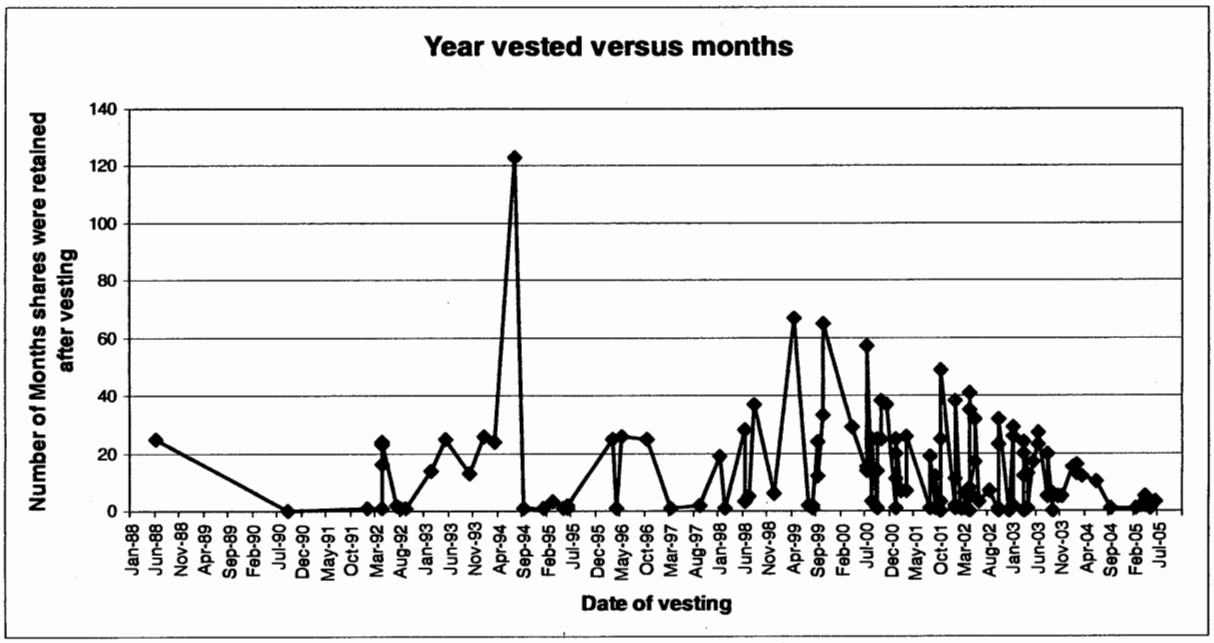
| **Experience level** | **Average time lapsed after vesting** |
|---|---|
| Non-trader | 15 months |
| Inexperienced trader (occasional trades) | 11 months |
| Experienced, infrequent trader (yearly trades) | 11 months |
| Experienced, frequent trader (weekly, monthly trades) | 28 months* |
| **Total sample average** | **13 months** |

*NOTE: Only one respondent in this group.

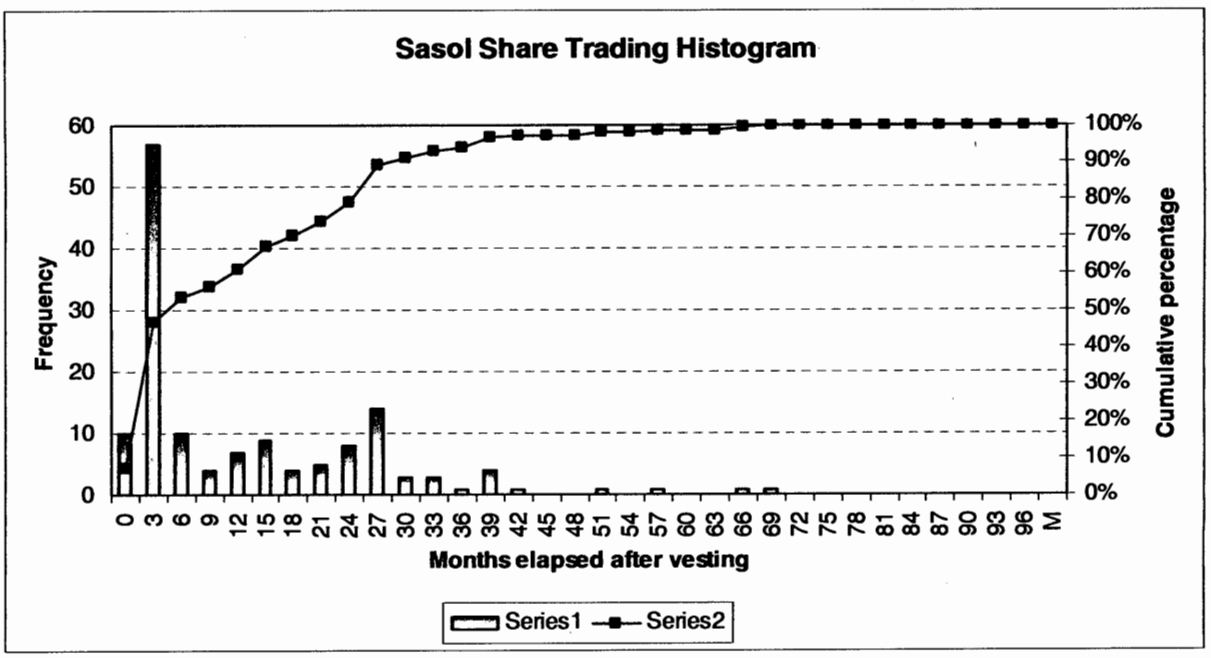
When the date of share option vesting is plotted against the number of months the vested shares were retained after vesting (Graph 5), a clear change in the share option behaviour of respondents can be seen. Analysis of the graph data indicated that respondents retained their vested shares for an average of 12 months over the five year period from January 1990 to December 1994. This holding period lengthened to 15 months for the five years from January 1995 to December 1999. The latest five year period (January 2000 to November 2005) indicated that the average holding period of vested shares have decreased to only 12 months.

Results show that 6.94% of respondents sold their shares as soon as it vested (became available for trade). Graph 6 indicates the number of trades undertaken at specific monthly intervals after shares have vested. The graph also indicates the cumulative percentage of the respondent's share trading activities.

Three months after shares have vested, 46.53% of respondents have sold their shares. Eighteen months after their shares have vested, 70.14% of respondents reported to have sold their shares. Two years (24 months) after their shares have vested, some 80% of respondents have sold their shares.




**Graph 5.** Changes in share option retention over time



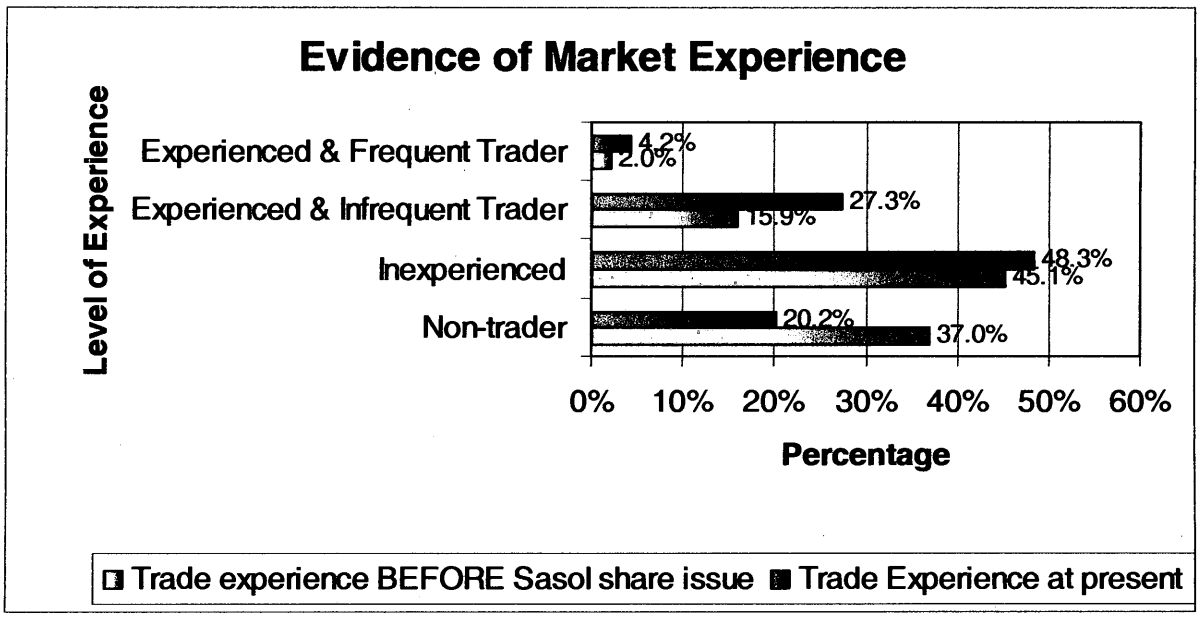

**Graph 6.** Sasol share trading histogram

## 5.3 Evidence of Market Experience

Some 66.3% of respondents reported that they have engaged in trading as defined in the questionnaire, before receiving Sasol shares. Previous trading experience was subdivided into the trading of financial instruments (shares, unit trusts, currency, etc.) and assets (real estate, art, vintage cars and other valuable items). Respondents reported that 90.1% have engaged in trading financial instruments, while 49.7% of respondents also traded in assets.

Twenty seven percent of respondents indicated that receiving Sasol share options motivated them to start trading. Results also indicate that 36.1% of respondents engaged in trading between the period of first share option issue and share vesting. Similarly, 54.8% of respondents claimed that receiving Sasol share options motivated them to diversify their financial portfolio.

Graph 7 compares the perceptions of the respondents on their level of share trading experience before their first share issue and at present. There is clear evidence that the respondents' perception of their proficiency in the market has increased from the time when the first received their share option. The self-perception as "non-traders" decreased from 37% to 20.2% at the present. Concurrently, the perception of experience (as infrequent trader (15.9%) and as frequent trader (2%) increased to 27.3% and 4.2% respectively.




**Graph 7.** Evidence of market experience

## 5.4 Regression Analysis

The results from regression analysis is shown below in Table 2. No significant correlation could be found between the gender of respondents and other variables. Similarly, no significant correlation was found between the ethnicity of respondents and any other variable. Low correlations were obtained for most variables. As could be expected, some degree of correlation was obtained between respondent age and service years (r=0.263). The number of years a respondent is a share option holder also indicates a correlation with the respondent age (r=0.261).

No significant correlation was found between the qualifications of respondents and any of the other variables. The number of service years at Sasol correlates to some extent to the number of years a respondent has been a share option holder (r=0.314) and to the number of share trades undertaken by the respondent (r=0.214). The number of years as a share option holder correlates well (r=0.45) with the number of share trades undertaken by the respondent.

The correlation coefficient of 0.607 indicates that most trading activities of respondents prior to reception of Sasol share options where related to financial trading while asset trading correlates poorly (r=0.21) with the respondent's trading activities. Furthermore, a correlation coefficient of 0.262 was obtained between previous trading activities and the respondents' perceptions of their trading experience as determined partly by their trading frequency.

The impact of specifically financial trading activities (Question 2) on respondents' perception on their trading experience is visible in the coefficient of 0.335. This is not evident from respondents who traded in assets. A correlation of 0.301 was obtained between respondents' perception of their trading experience before receiving Sasol share options and their current perceptions of their trading experience.

A good correlation (0.556) was found between the selection option of the share price lower than the share option exercise price and the share price being too low to realise adequate capital gains in selling (the first 2 selections of Question 10). These two issues could both be classified as selections based on loss aversion.

The loss aversion based on a share price lower than the exercise price was also correlated with the following selections: Institutional affinity ("loyalty to Sasol/sentimental value", (r=0.223)), Intention ("Share transaction published/signalling" (r=0.435)), market experience or lack thereof ("I am unsure/inexperienced regarding the option taking process", (r=0.311), "It entails too much paperwork, tracking of share prices, etc.", (r=0.747), "No need to diversify my portfolio as it is already well diversified", (r=0.327)), Status quo bias ("Once sold, I cannot / am unwilling to replace it", (r=0.327)), and Social context ("It has status value", (r=0.496)).

Similar correlation coefficients were found for loss aversion based on a share price lower than the exercise price and intention ("Share transaction published/signalling" (r=0.239)), market experience (or lack thereof ("It entails too much paperwork, tracking of share prices, etc.", (r=0.327), "No need to diversify my portfolio as it is already well diversified", (r=0.327), Status quo bias ("Once sold, I cannot / am unwilling to replace it", (r=0.327)), and Social context ("It has status value", (r=0.496)). Loss aversion ("It is too risky, the

share price is too uncertain) indicated a low correlation (0.201) with institutional affinity ("Loyalty to Sasol/sentimental value"), while institutional affinity ("Loyalty to Sasol/sentimental value") correlated with Intention ("Share transaction published/signalling" (r=0.297)).

Institutional affinity ("Loyalty to Sasol/sentimental value") correlated slightly (r=0.297)with Intention ("My share transactions are published/signalling"). Intention ("My share transactions are published/signalling") showed low correlations with market experience ("I am unsure/inexperienced regarding the option taking process", (r=0.238), "It entails too much paperwork, tracking of share prices, etc.", (r=0.325), and social context ("It has status value", (r=0.216)).

Market experience ("I am unsure/inexperienced regarding the option taking process") also showed correlations with another market experience variable: "It entails too much paperwork, tracking of share prices, etc.", (r=0.422), as well as Status quo bias ("Once sold, I cannot / am unwilling to replace it", (r=0.422)), and to a lesser degree, Social context ("It has status value", (r=0.28)).

The market experience variable "It entails too much paperwork, tracking of share prices, etc.", correlated with another market experience variable, namely "No need to diversify my portfolio as it is already well diversified", (r=0.439), Status quo bias ("Once sold, I cannot / am unwilling to replace it", (r=0. 439)), and Social context ("It has status value", (r=0.664)).

Respondents with well diversified portfolio's correlated well with Status quo bias ("Once sold, I cannot / am unwilling to replace it", (r=0. 439)), and Social context ("It has status value", (r=0.664)). No correlation was found between the use of share options as a retirement package and any other variables. The Status quo bias ("Once sold, I cannot / am unwilling to replace it", correlated well with the Social context of the share option issue ("It has status value", r=0.664).

## 5.5 Hypothesis Testing

Dependent Measure: Endowment effect

*A decreased endowment effect will be observed for individuals with significant market experience.*

1. Employees with significant market experience, who receives share options tend to keep their shares for a shorter duration than the average employee.

1a. Employees with significant market experience who receives share options tend to keep their shares for the same duration as the average employee.

No correlation could be determined between the holding period of share options after vesting and the degree of market experience of the respondents. As a result, the null hypothesis is rejected. The holding period of vested shares by experienced traders is not significantly shorter than that of the other groups with lower experience levels.

# Table 2. Regression analysis

| | Gender | Age | Race | Qualifi-cations | Service Years | Years of share option holding calc. | Time Lapsed (month) calc. | Number trades | Q1 | Q2a | Q2b | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9a | Q9b | Q9c | Q9d | Q9e | Q10a | Q10b | Q10c | Q10d | Q10f | Q10g | Q10h | Q10i | Q10j | Q10k | Q10l | Q10m | Q11 | Q12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gender | 1.000 | 0.016 | 0.003 | 0.008 | 0.010 | 0.007 | 0.003 | 0.002 | 0.010 | 0.013 | 0.001 | 0.001 | 0.003 | 0.005 | 0.003 | 0.000 | 0.000 | 0.000 | 0.004 | 0.003 | 0.003 | 0.006 | 0.014 | 0.014 | 0.011 | 0.009 | 0.000 | 0.003 | 0.006 | 0.022 | 0.022 | 0.015 | 0.022 | 0.038 | 0.005 | 0.002 |
| Age | | 1.000 | 0.006 | 0.011 | 0.263 | 0.261 | 0.009 | 0.156 | 0.004 | 0.002 | 0.000 | 0.004 | 0.007 | 0.012 | 0.008 | 0.034 | 0.016 | 0.004 | 0.008 | 0.020 | 0.003 | 0.003 | 0.001 | 0.001 | 0.004 | 0.001 | 0.004 | 0.001 | 0.001 | 0.000 | 0.000 | 0.013 | 0.002 | 0.003 | 0.003 | 0.017 |
| Race | | | 1.000 | 0.020 | 0.008 | 0.002 | 0.000 | 0.000 | 0.011 | 0.000 | 0.015 | 0.020 | 0.003 | 0.006 | 0.009 | 0.003 | 0.000 | 0.001 | 0.006 | 0.003 | 0.000 | 0.004 | 0.001 | 0.001 | 0.001 | 0.004 | 0.004 | 0.002 | 0.002 | 0.001 | 0.001 | 0.003 | 0.001 | 0.000 | 0.006 | 0.006 |
| Qualifications | | | | 1.000 | 0.018 | 0.000 | 0.002 | 0.004 | 0.004 | 0.003 | 0.001 | 0.018 | 0.005 | 0.011 | 0.000 | 0.000 | 0.003 | 0.013 | 0.009 | 0.000 | 0.004 | 0.002 | 0.000 | 0.002 | 0.001 | 0.000 | 0.001 | 0.006 | 0.002 | 0.000 | 0.000 | 0.012 | 0.000 | 0.000 | 0.001 | 0.000 |
| Service Years | | | | | 1.000 | 0.314 | 0.021 | 0.214 | 0.010 | 0.010 | 0.001 | 0.010 | 0.038 | 0.023 | 0.000 | 0.021 | 0.001 | 0.035 | 0.009 | 0.002 | 0.007 | 0.004 | 0.009 | 0.015 | 0.016 | 0.000 | 0.000 | 0.002 | 0.000 | 0.002 | 0.016 | 0.000 | 0.005 | 0.011 | 0.007 | 0.002 |
| Years of share option holding | | | | | | 1.000 | 0.037 | 0.460 | 0.006 | 0.005 | 0.000 | 0.006 | 0.027 | 0.032 | 0.006 | 0.033 | 0.001 | 0.025 | 0.083 | 0.036 | 0.001 | 0.006 | 0.001 | 0.003 | 0.005 | 0.001 | 0.001 | 0.003 | 0.001 | 0.000 | 0.003 | 0.000 | 0.003 | 0.003 | 0.024 | 0.012 |
| Time Lapsed (months) calc. | | | | | | | 1.000 | 0.050 | 0.011 | 0.010 | 0.000 | 0.010 | 0.002 | 0.003 | 0.006 | 0.002 | 0.002 | 0.007 | 0.041 | 0.003 | 0.000 | 0.009 | 0.000 | 0.000 | 0.016 | 0.004 | 0.000 | 0.000 | 0.004 | 0.001 | 0.001 | 0.005 | 0.000 | 0.001 | 0.006 | 0.011 |
| Number trades | | | | | | | | 1.000 | 0.019 | 0.003 | 0.002 | 0.004 | 0.017 | 0.030 | 0.002 | 0.155 | 0.003 | 0.025 | 0.187 | 0.040 | 0.003 | 0.045 | 0.003 | 0.003 | 0.082 | 0.011 | 0.000 | 0.003 | 0.006 | 0.000 | 0.000 | 0.014 | 0.006 | 0.002 | 0.088 | 0.019 |
| Q1 | | | | | | | | | 1.000 | 0.607 | 0.211 | 0.262 | 0.007 | 0.000 | 0.077 | 0.002 | 0.000 | 0.022 | 0.012 | 0.000 | 0.002 | 0.001 | 0.000 | 0.002 | 0.001 | 0.001 | 0.002 | 0.001 | 0.000 | 0.000 | 0.000 | 0.004 | 0.006 | 0.001 | 0.043 | 0.081 |
| Q2a | | | | | | | | | | 1.000 | 0.054 | 0.335 | 0.025 | 0.001 | 0.074 | 0.001 | 0.004 | 0.036 | 0.013 | 0.000 | 0.017 | 0.000 | 0.000 | 0.000 | 0.006 | 0.000 | 0.001 | 0.003 | 0.003 | 0.003 | 0.000 | 0.006 | 0.003 | 0.000 | 0.033 | 0.113 |
| Q2b | | | | | | | | | | | 1.000 | 0.082 | 0.002 | 0.000 | 0.026 | 0.005 | 0.000 | 0.001 | 0.005 | 0.000 | 0.000 | 0.003 | 0.014 | 0.002 | 0.017 | 0.000 | 0.014 | 0.020 | 0.001 | 0.007 | 0.007 | 0.002 | 0.000 | 0.001 | 0.048 | 0.007 |
| Q3 | | | | | | | | | | | | 1.000 | 0.034 | 0.001 | 0.154 | 0.000 | 0.001 | 0.008 | 0.013 | 0.001 | 0.005 | 0.005 | 0.001 | 0.000 | 0.004 | 0.000 | 0.001 | 0.000 | 0.007 | 0.001 | 0.005 | 0.006 | 0.000 | 0.000 | 0.071 | 0.309 |
| Q4 | | | | | | | | | | | | | 1.000 | 0.146 | 0.020 | 0.012 | 0.000 | 0.019 | 0.032 | 0.009 | 0.000 | 0.001 | 0.000 | 0.006 | 0.021 | -0.002 | 0.003 | 0.001 | 0.004 | 0.000 | 0.004 | 0.009 | 0.004 | 0.003 | 0.000 | 0.000 |
| Q5 | | | | | | | | | | | | | | 1.000 | 0.033 | 0.026 | 0.001 | 0.080 | 0.036 | 0.000 | 0.001 | 0.004 | 0.000 | 0.000 | 0.001 | 0.002 | 0.001 | 0.001 | 0.000 | 0.003 | 0.000 | 0.001 | 0.003 | 0.000 | 0.001 | 0.006 |
| Q6 | | | | | | | | | | | | | | | 1.000 | 0.003 | 0.000 | 0.033 | 0.000 | 0.000 | 0.002 | 0.005 | 0.000 | 0.000 | 0.002 | 0.001 | 0.004 | 0.002 | 0.009 | 0.001 | 0.001 | 0.008 | 0.001 | 0.000 | 0.084 | 0.070 |
| Q7 | | | | | | | | | | | | | | | | 1.000 | 0.361 | 0.003 | 0.039 | 0.000 | 0.008 | 0.007 | 0.003 | 0.003 | 0.001 | 0.000 | 0.000 | 0.000 | 0.003 | 0.001 | 0.001 | 0.005 | 0.001 | 0.001 | 0.084 | 0.004 |
| Q8 | | | | | | | | | | | | | | | | | 1.000 | 0.002 | 0.007 | 0.005 | 0.005 | 0.001 | 0.000 | 0.000 | 0.167 | 0.005 | 0.001 | 0.002 | 0.045 | 0.006 | 0.006 | 0.083 | 0.026 | 0.010 | 0.001 | 0.000 |
| Q9a | | | | | | | | | | | | | | | | | | 1.000 | 0.000 | 0.013 | 0.000 | 0.009 | 0.012 | 0.012 | 0.007 | 0.009 | 0.020 | 0.016 | 0.010 | 0.009 | 0.000 | 0.015 | 0.009 | 0.006 | 0.019 | 0.030 |
| Q9b | | | | | | | | | | | | | | | | | | | 1.000 | 0.033 | 0.004 | 0.002 | 0.001 | 0.001 | 0.046 | 0.004 | 0.000 | 0.001 | 0.004 | 0.000 | 0.004 | 0.008 | 0.004 | 0.000 | 0.052 | 0.003 |
| Q9c | | | | | | | | | | | | | | | | | | | | 1.000 | 0.010 | 0.023 | 0.011 | 0.011 | 0.003 | 0.002 | 0.006 | 0.006 | 0.000 | 0.002 | 0.003 | 0.003 | 0.003 | 0.002 | 0.001 | 0.000 |
| Q9d | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.001 | 0.001 | 0.001 | 0.008 | 0.004 | 0.000 | 0.002 | 0.002 | 0.001 | 0.001 | 0.003 | 0.001 | 0.001 | 0.007 | 0.009 |
| Q9e | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.005 | 0.000 | 0.023 | 0.003 | 0.001 | 0.003 | 0.001 | 0.003 | 0.003 | 0.001 | 0.003 | 0.002 | 0.028 | 0.000 |
| Q10a | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.556 | 0.073 | 0.128 | 0.223 | 0.435 | 0.311 | 0.747 | 0.327 | 0.073 | 0.327 | 0.486 | 0.008 | 0.004 |
| Q10b | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.073 | 0.128 | 0.119 | 0.239 | 0.133 | 0.327 | 0.327 | 0.073 | 0.327 | 0.496 | 0.008 | 0.001 |
| Q10c | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.081 | 0.048 | 0.046 | 0.087 | 0.041 | 0.041 | 0.085 | 0.105 | 0.069 | 0.036 | 0.000 |
| Q10d | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.201 | 0.150 | 0.084 | 0.074 | 0.074 | 0.009 | 0.074 | 0.118 | 0.003 | 0.000 |
| Q10f | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.297 | 0.190 | 0.168 | 0.069 | 0.008 | 0.069 | 0.110 | 0.001 | 0.008 |
| Q10g | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.238 | 0.325 | 0.139 | 0.025 | 0.139 | 0.216 | 0.001 | 0.000 |
| Q10h | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.422 | 0.162 | 0.036 | 0.422 | 0.280 | 0.000 | 0.005 |
| Q10i | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.439 | 0.102 | 0.439 | 0.664 | 0.003 | 0.006 |
| Q10j | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.102 | 0.439 | 0.664 | 0.003 | 0.006 |
| Q10k | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.102 | 0.160 | 0.018 | 0.008 |
| Q10l | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.664 | 0.011 | 0.000 |
| Q10m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.004 | 0.002 |
| Q11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.009 |
| Q12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 |

# Chapter 6
# DISCUSSION AND CONCLUSIONS

## 6.1 Discussion

*Market Experience*

While the response to the e-mail distributed questionnaire within the company provided a much higher than anticipated response rate, representation of all levels of market experience was significantly skewed in the sample. This fact contributed to a general lack of correlation and the subsequent rejection of the null hypothesis. Similarly, the ethnicity of the respondents as well as their tertiary qualifications were heavily skewed towards white males with a scientific or engineering background.

The average holding period for share options was calculated at 13 months. The average holding period of experienced and frequent share traders was 28 months. However, this group of experienced traders constituted only 2% (6) of the respondent total (248) of which only one respondent's average holding period could be calculated.

Of the six experienced and frequent traders, only 2 have engaged in more than 5 trades with Sasol share options. One respondent in this group has never traded his share options while another's share options have not vested as yet. As a result, no correlation could be obtained between market experience and any other variables.

*Ownership Duration*

Only 7.3% of respondents' share options have not vested. It was interesting to find that 13.2% of respondents who's shares have vested have opted not to sell their shares to date. The primary reason for this lack of trading was found to be expectations of a rising share price (50% of respondents who have never traded their share options). Another reason cited for not trading Sasol share options was its use as a retirement package (30% of respondents).

The company policy regarding share options dictates that the full share option issue should be traded within nine years after the issue. It may be argued that respondents

who have expectations of a rising share price exhibit the endowment effect as their theoretical reference price (anchor) for their shares is higher than current market asking price. Strahilevitz and Loewenstein (1999) proposed that the acceptable selling price of an object increases with length of ownership. This is in concordance with anchoring whereby the share option participant selects some initial value as a starting point and adjusts this value in response to economic or other changes (Samuelson and Zeckhauser, 1988).

Share option participants may take any of three different approaches to anchoring. Firstly, the share option participant may not select an anchor or reference price for the share option. Rather, the participant may prefer to postpone the decision to the point where there is a need for trading (i.e. need for cash or ending of the nine year option period).

Secondly, upon issue and exercising of the share option offer, the participant may select a fixed mental anchor (reference price) which would exemplify a good or excellent monetary profit when traded. This fixed anchor could, but does not need to include a time frame. Thirdly, a participant may select an initial anchor point, which is adjusted as market conditions change. This method demands that the share option participant is actively adjusting his/her mental anchor in relation to economic and market information obtained. It implies a much more active management of the share options as compared to the first approach. The results obtained where respondents reported a reluctance to trade due to expectations of a rising share price may therefore be related to the approach of the individual share option participant to anchoring.

*Learning*

While List (2003) concluded that evidence of learning was mixed in his field experiments, he concluded that such learning builds up slowly (possibly over years) and would therefore not be visible over the short time span of his experiment. There is clear evidence of learning in this study. The self-perception of respondents regarding their level of trading experience improved significantly (Graph 7). Closer inspection indicated that ten (4%) of share option holders who have engaged in more than 5 trades, still

considered themselves non-traders. Some 66.3% of respondents reported that they have engaged in trading as defined in the questionnaire, before receiving Sasol shares.

Previous trading experience was subdivided into the trading of financial instruments (shares, unit trusts, currency, etc.) and assets (real estate, art, vintage cars and other valuable items). Respondents reported that 90.1% have previously engaged in trading financial instruments, while 49.7% of respondents also previously traded in assets. It may be argued that learning in the case of share option recipients is limited to the share option structures internal and specific to that company and may not be applicable in external share trading markets.

Twenty seven percent of respondents indicated that receiving Sasol share options motivated them to start trading, resulting in the shift in self-perception regarding respondents' trading skill level. Similarly, 54.8% of respondents claimed that receiving Sasol share options motivated them to diversify their financial portfolio.

This type of behaviour would be expected from employees who have been exposed to financial markets and share option schemes. This exposure seem to encourage a macroeconomic interest and more specifically an interest in financial markets and the underlying drivers of those markets.

*Social Meaning and Institutional affinity*

While not the focus of this research, the results of the study failed to indicate wether the social meaning attached to share option offers moderate the endowment effect. Similarly, the effect of institutional affinity on share option participant behaviour could not be determined. This may be primarily due to the small percentage (13.2%) of respondents who's shares have vested, but who have not traded the vested share options. A clearer understanding of the potential impact of social meaning, source dependence and institutional affinity would be gained from personal interviews of a specific group within the population who have not traded in their vested share options.

## 6.2 Conclusion

Most behavioural scientist have managed to prove the presence of loss aversion and the endowment effect in controlled settings. In this study however, the researcher departs from the traditional experimental investigation by observing actual real world market behaviour.

The study examines behaviour in only one market, namely the share option environment within a single organisation. The endowment effect is primarily a problem for sellers. Kahneman and Knetsch (1990) argued that an owner will not be reluctant to sell if the object, in this case share options, is easily replaced. In the case of share options, top-up share option issues are given yearly as a bonus as well as with a promotion. Therefore, share options should not be seen as unreplaceable.

Share option recipients approach to the share options that they received may greatly influence their treatment of the endowment. Share options can be viewed either as a windfall or as a reward which should be maximised (or alternatively, losses are found to be unacceptable). This may be the origin of substantial disparities in the valuation of the individuals share options. In the first instance, a share option issue (seen as a windfall) would not exhibit as strong an endowment effect as in the case where the aim it to maximise the reward.

In this latter case share options sold at a selling price which is slightly lower than what a colleague obtained, will be experienced as a loss. This is referred to as the hedonic reference point and is largely determined by the objective status quo ands will as expectation and social comparisons (Kahneman and Tversky, 1984). A mismatch between decision values and experience values is common and introduces an element of uncertainty in many decisions. This is a reminder that people judge their well-being through a prism of interpersonal relationships, and that these effects can be extended to every-day financial decisions.

The data suggest that there is an overall endowment effect present in the share option recipient sample. Also, there is some indication that individual behaviour converges to

the neoclassical prediction as trading experience increases. Due to the extremely small portion of experienced and frequent traders in the organisation, the possibility that the endowment effect will be negated, is unlikely. It is also suggested that, while learning do take place and market experience in share option trading may increase over time, due to the specificity of the share option trading experience, this market experience cannot be extended to national or international financial markets.

The study highlights the multiple factors which could potentially influence the behaviour of share option participants. While in the majority of share option participants, the endowment effect seem to be present, the underlying motivation for the behaviour may be very diverse. The role of anchoring or reference pricing have not been investigated and may play an significant role in the share option participant behaviour.

## 6.3 Recommendations for future research

The study could be expanded to include share option recipients' reference price (anchor) which each individual attaches to their share option issue as well as determining the reasoning behind it. This may give an indication of the extent of the instantaneous endowment effect as noted by Kahneman and Knetsch (1990). In a longitudinal study, the change in reference price (anchor) can be tracked to determine if and by how much share option recipients adjust their reference point in response to changing personal and market circumstances.

Similarly, the effect of the fixed period prior to a portion of share options vesting (in this case 2 years for every third of the share option issue) could be determined hypothetically. The effect of the fixed holding period on the strength of the endowment effect could, unfortunately, only be determined theoretically in this case. The length of the fixed holding period is clearly dependent on the growth rate of the share value (Graph 5).

The source dependence, where the level of attachment to an object depends on the method by which it was acquired, was not tested explicitly in this study. Future research could include a comparison between the trading behaviour exhibited by share option

participants trading their share options versus personal shares acquired by the participant with a diversified share portfolio. This could also provide insights into the effect of institutional affinity and the use of share options to motivate such affinity.

# Share options: Transaction familiarity as a moderator of share option recipient behaviour.

*Heidri M. Saayman*

*This article review moderators of the endowment effect and focuses specifically on transaction familiarity. It is proposed that the endowment effect may be significantly moderated in real world settings and market places, particularly in share option recipients. A key idea is that trading or market experience as possibly reflected in the degree of portfolio diversification, limits or negates the endowment effect. Field evidence from the work place suggests that share option holder's behaviour converge to the neoclassical prediction as market experience increases. Market experience is also related to "intentions" of the share option holder.*

## Introduction

The issue of share options to employees can be motivated from many angles. In order for companies to offer share options to their employees, they need to use retained earnings to repurchase shares from the market. Thus, the company foregoes the opportunity to use the retained earnings for investments in growth and expansion. On the other hand, share repurchases decreases the number of shares, thus increasing both EPS (earnings per share) and the share price (Brigham and Ehrhardt, 2002: 722). Some argue that share repurchases act as effective, positive signalling devices to the investment community, while others view it primarily as a way of retaining employees. Many companies use the issue of stock options as a way to motivate employees in management positions.

However, some business analysts disagree with companies which issue share options. Share options are expensive for firms to offer to employees, while these employees tend to value the share options less than cash (Bender and Ward, 2002: 240). Research may side with the sceptics. Weitzman (1995: 51-78) reviewed empirical and theoretical evidence and found weak support for the proposition that profit sharing improves productivity and lowers employment costs. If share option issues are seen as profit-sharing devices, the connection between share options and productivity may be even

more untenable as employees or managers may not perceive that their individual efforts are able to move the share price significantly, if at all.

While companies may take an economical and traditionally neoclassical view of the world, taking into account the financial, tax and signalling implications of share repurchases and share option schemes, a frequently discounted fact is that people do not behave rationally in making economical decisions. Evidence indicate that factors such as "psychological attachment" influences people's economic behaviour (Thaler, 1980: 1, 39-60, Kahneman and Knetsch, 1990: 98, 1325-1348). Kahneman received the Nobel price in economics in 2002 for pointing out that there is a difference between *homo sapiens* and *homo economicus*. His insights form the foundation of "prospect theory" (To have and to hold, 2003: 368, 56). Prospect theory proposes that people tend to judge their well-being relative to others and not in absolute terms, that people's actions depend on the way choices are presented to them and that people fear loss more than they desire gain. Recent research explored the "endowment effect", one of the major tenets of prospect theory. This effect is based on the belief that people tend to place a higher value on things they already own or were given. This effect is closely related to the "status quo bias" as proposed by Samuelson and Zeckhauser (1988: 1, 7-59) and described as a preference for the current state of affairs which predispose consumers against buying and selling goods. The most persistent explanation for the asymmetry in the valuation of objects was given by Kahneman and Tversky (1984: 39, 341-350). They called this phenomenon "loss aversion" – the loss of an object is greater than the gain.

Support for the existence of the endowment effect have been found in a wide range of experiments over the past decade. The implications of this is that people's economic decisions might be fundamentally different from what the neoclassical economists assumed and the implications are profound. Neoclassical economist's ideas on the functioning of efficient markets, wealth and resource allocation, auctions and many other economic interactions may be turned upside down.

More recently, John List decided to move from the experimental classroom to test the endowment effect in real-world settings of memorabilia trade centres and exchanges. List's (2003: 118,41-72, 2004) research indicated that market experience and diversification of investment portfolios may lead to the elimination of the psychological

attachment. List's findings could subsequently be extended to other real-world examples such as company share option issues.

While market experience may influence (and possibly facilitate) the decision to sell shares, various other considerations may influence this decision. Very recently, Novemsky and Kahneman (2005: 42, 139-140) proposed that loss aversion, an inducer of the endowment effect, may itself be moderated by the "intention" of the consumer. This implies that market experience of experienced traders, which moderates or eliminates the endowment effect entirely, may be related to the intention of the trader to trade purely for gain. Although Knetsch (1989: 79, 1277-1284) believe that the endowment effect is not the result of wealth effects, income constraints, strategic behaviour or transaction costs (i.e. tax on gains), these and timing (share price, individual monetary requirements) may contribute to the share holder's loss aversion and thus influence the endowment effect.

Various other moderators of the endowment effect have subsequently been identified. These include: the nature of the object received (Wallendorf and Arnauld, 1988: 14, 531-547), duration of ownership (Strahilevitz and Loewenstein, 1999: 25, 276-289), the social relationship between the giver and recipient (McGraw et al., 2003: 30, 219-230), and the affinity towards the institution when the object is received (Tom, 2004: 138, 160-170). These psychological aspects does not form part of the scope of this investigation.

Understanding the factors which cause or strengthen the endowment effect, as well as understanding the moderating factors, may impact an organisation's view of share option issue. Furthermore, insight into behavioural economics may help a company to optimise their share option programme to obtain maximum benefit from it. However, the focus of this study is primarily to determine the effect of market experience on endowment theory in a practical setting such as share option issue as part of remuneration in companies.

According to List (2003a) several real-world examples of the experience/endowment effect relationship can be found. These can have important implications for businesses. Several experiments, mainly in classroom settings Knetsch (1998: 79, 1277-1284), Strahilevitz and Lowenstein (1998: 25, 276-289), Kahneman and Knetsch (1990: 98, 1325-1348), and McGraw et al. (2003: 30, 219-230), as well as in real-world situations

(List, 2003: 118,41-72, 2004) have been conducted. While the classroom experiments resulted in confirmation of the endowment effect, List found that increased trading experience in real markets caused participants to eliminate emotional attachment to articles (thus the endowment effect).

The primary purpose of this practical (real world) research is to investigate the extent to which transaction familiarity (share trading and investment portfolio experience) or lack thereof, moderates the behaviour of employees receiving share options. The degree of transaction familiarity will be investigated by determining the difference between the behaviour of employees who are "first time", "green" or novice share owners and that of experienced (sophisticated) share traders. Furthermore, the study will aim to identify if and how exposure to share trading (resulting from the share option issue) alter or impact general investment behaviour of the inexperienced employee. This will indicate if learning takes place in real market settings or if evidence for learning is indeed inconclusive, as proposed by List (2003: 118,41-72).

The existence of behaviour-moderating factors when offering share options to employees, may have implications on an organisation's approach to share option issues. Companies use share option issues as signalling devices to their investors, investment brokers and public. It is also used as a employee retention device. As such, the affectivity of the share option issues may be greatly impacted by theories such as the endowment effect and transaction familiarity as described in this research.

**Research Strategy**

The approach to the study follows a behavioural economic approach similar to that of List (2003: 118,41-72, 2004), using the real-world example of share options as opposed to experimental economic approach commonly used by Knetsch (1998: 79, 1277-1284), Strahilevitz and Lowenstein (1998: 25, 276-289), Kahneman and Knetsch (1990: 98, 1325-1348), and McGraw et al. (2003: 30, 219-230). According to Loewenstein (1999, 109, 25-34), experimental economics have not been able to avoid the problem of low external validity which is "the Achilles heel of all laboratory experimentation" (Loewenstein, 1999: 109, 33). Experimental economics can only obtain high external validity if they intent to represent behavioural economics in highly structured markets. This form of economics are less suited to make predictions about the economic behaviour and behavioural

consequences in the real world, including decentralised markets.

The scope of the study entails the survey of employees at a specific seniority level, who received share options from their company. The scope of study is limited to one company, namely, Sasol Corporate (spanning all South African operations). Sasol is an international company operating in the petrochemical industry. Most employees receiving share options in the South African operations include managers with a scientific background (engineers, scientists) and to a lesser extent financial background (commercial, accounting, economics), human resource background or other disciplines. Based on the mainly scientific profile of managers within Sasol, it is expected that the behavioural moderators (endowment effect, transaction familiarity, etc.) will differ from that of a company operating predominantly in the financial sector.

The study was limited to managers in Sasol Corporate:

a) who have been offered company shares,
b) who accepted and exercised their share options, and
c) has had the opportunity to engage in trade (taking up the option).

The study excluded managers who declined to receive share options. The study also excluded employees who are members of a share purchase scheme. The study was further limited to the effect of market experience and duration of ownership of share option holders. The research identified other behavioural moderators such as the effect of signalling, the company growth phase, institutional affinity, social aspects, tax considerations, financial situations, etc, but excluded in-depth analysis of these factors.

**Hypothesis**

In developing the hypothesis, it was assumed that there is no causal relationship between market experience and a diversified investment portfolio. However, a diversified investment portfolio may imply a fair amount of market experience or transaction familiarity.

The following hypothesis was investigated in this research project:

Dependent Measure: Endowment effect

*A decreased endowment effect will be observed for individuals with significant market experience.*

1. Employees with significant market experience, who receives share

options tend to keep their shares for a shorter duration than the average employee with little or no market experience.

1a. Employees with significant market experience who receives share options tend to keep their shares for the same duration as the average employee with little or no market experience.

*Sampling*

The study sample consisted of all current level 3 and 4 managers within the Sasol Group of Companies who received share option issues. Share options are offered to managers from level 4 (senior management) in the organisation up to level 2 (GEC members) and level 1 (Sasol CEO). A sampling frame was obtained from the SAP system of Sasol Corporate's Human Resource department. This will eliminate the problem of sample recruiting as the potential sample list is easily sorted according to the criteria required in this study.

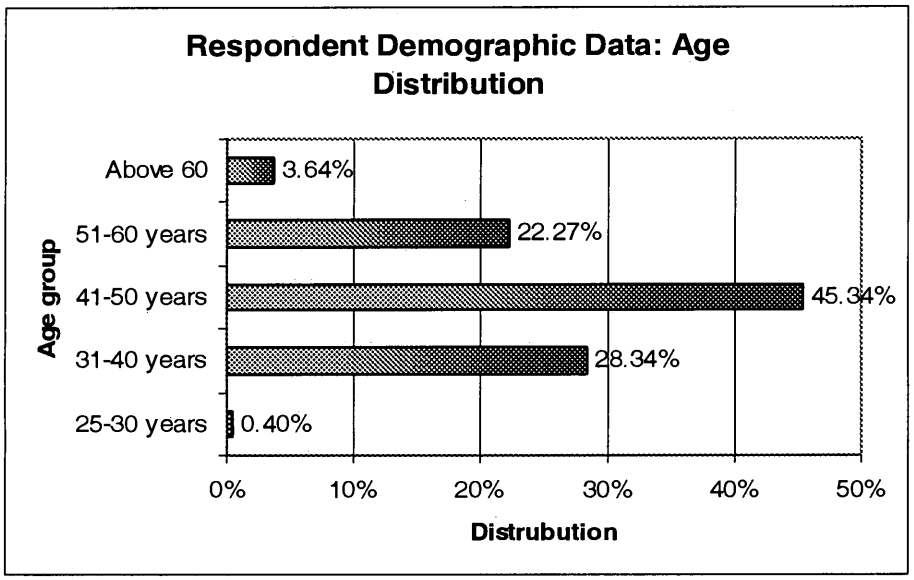
*Measuring Instrument*

The research methodology entailed structured questionnaires on the relevant measures. The study included a combination of quantitative and qualitative data. Primary data was collected via the distribution of a self-administered questionnaire via inter-company e-mail to all relevant persons in the sample. This method of data collection is associated with low cost and has short turnaround of results. Furthermore, respondents feel anonymous.

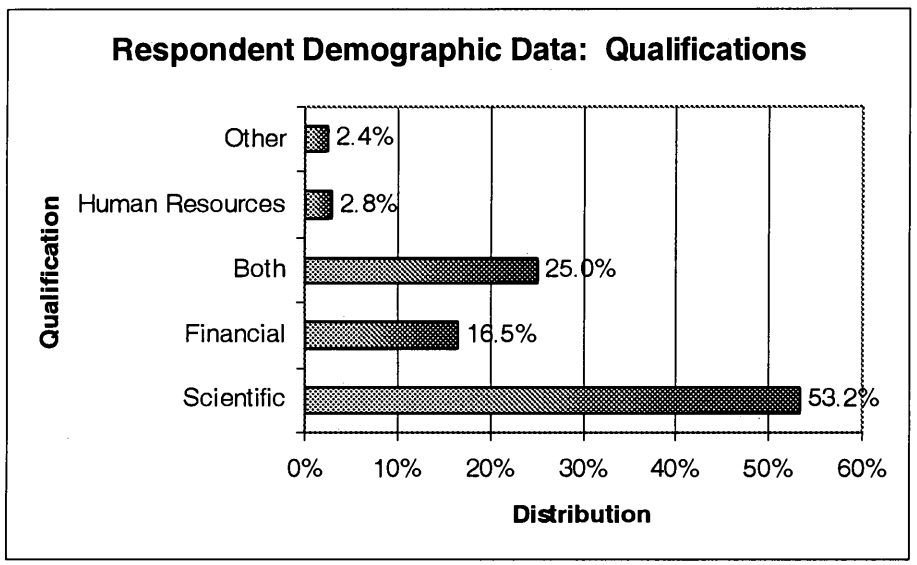
**Results**

*Biographical Profile*

The share option questionnaire was distributed via intra-company e-mail and targeted at level 3 and 4 employees at Sasol who have received share options as part of their benefit package. The response rate for this study was 32.0%. Female respondents numbered 4.8%. The age distribution of respondents is given below in Graph 1. The largest portion of respondents fall in the age group of 41 to 50 years (45.34%), followed by the second largest portion of respondents in the 31 to 40 years age group (28.34%). Respondents in the age group of 51 to 60 years represented 22.27% of the respondents while respondents above 60 years of age embody 3.64% of respondents. The lowest fraction of respondents (0.4%) is under the age of 30 years.



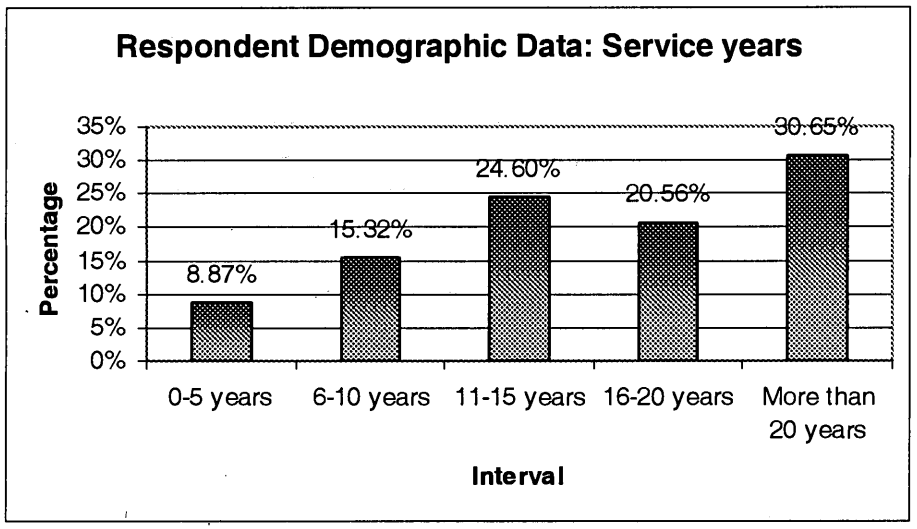

Graph 1. Respondent age distribution




Graph 2. Respondent qualifications

The majority of respondents were of white or European ethnicity (94.7%), while 2.5% of the respondents in this study are of Indian or Asian ethnicity. Black respondents made up 1.6% and coloured respondents 1.2%, of the total. The tertiary qualifications of respondents are depicted below in Graph 2. The largest portion of respondents (53.2%) have a scientific qualification. This includes engineering and science degrees. Respondents with a financial background totalled 16.5%, while respondents with both scientific and financial degrees numbered 25%. The latter group predominantly consists of scientists and engineers with a MBL or MBA qualification. Some 2.8% of

respondents have human resource qualifications, while 2.4% comprise other qualifications such as legal qualifications.

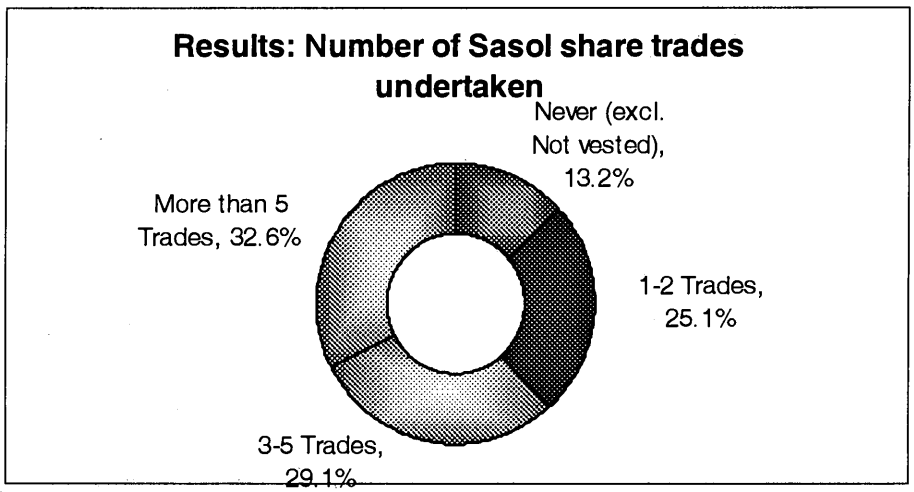



Graph 3. Respondent service years

The distribution of number of service years at Sasol within the respondents are shown below in Graph 3. The largest portion on respondents (30.65%) have been with the company for more than 20 years. The percentage of respondents with 11 to 15 years service (24.6%) outnumbers respondents with 16 to 20 years service (20.56%). Respondents with less than 5 years service at Sasol is 8.87%, while 15.32% of respondents have between 6 to 10 years service.

*Share Trading Results*

The percentage of respondents' share options which have vested (become available for trade after a 2 year contractual waiting period) was calculated at 92.7%. Some 13.2% of respondents who's shares have vested, reported that they have never traded their shares. The number of share trade occasions engaged in by respondents are shown below in Graph 4. The distribution of share trading occasions is fairly evenly divided between one to two trades (25.1%) , three to five trades (29.1%) and more than 5 trade occasions (32.6%).




Graph 4. Number of Sasol share trade occasions undertaken

Table 1. Average time lapsed per experience level of trader

| **Experience level** | **Average time lapsed after vesting** |
|---|---|
| Non-trader | 22 months |
| Inexperienced trader (occasional trades) | 20 months |
| Experienced, infrequent trader (yearly trades) | 19 months |
| Experienced, frequent trader (weekly, monthly trades) | 15 months |
| **Total sample average** | **20 months** |

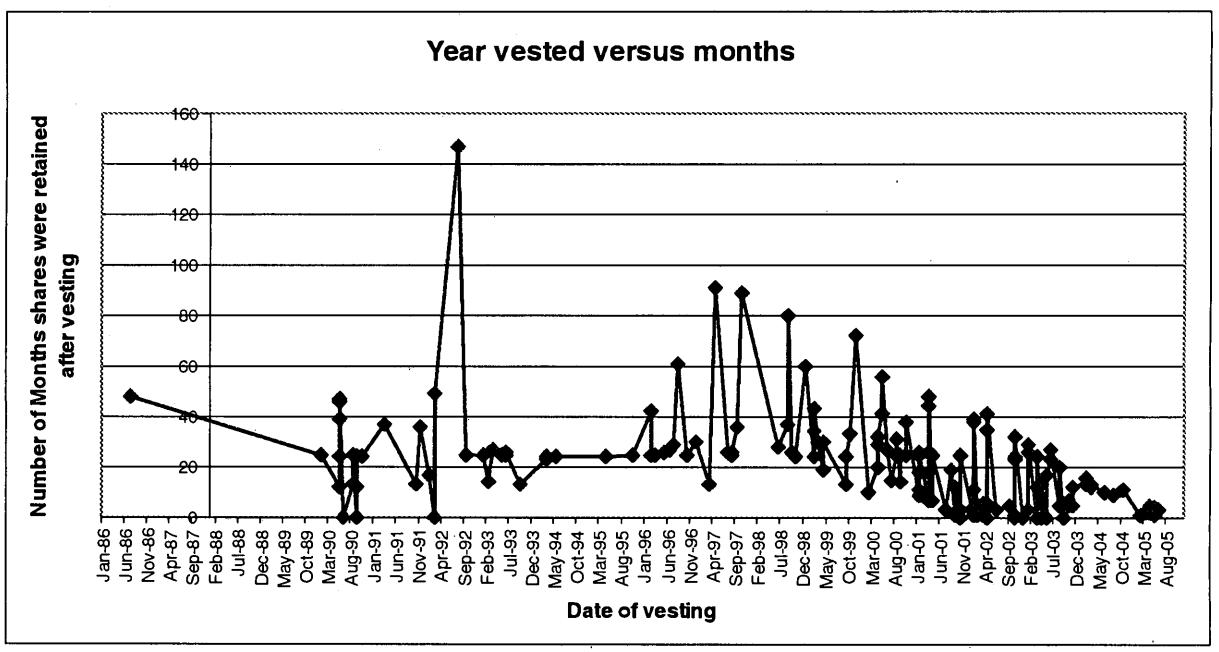
The average time period (months) which lapsed after shares vested and was traded, was calculated at 20 months. From further analysis it is clear that the average holding period for vested shares by experienced and frequent traders is only 15 months compared to the sample average of 20 months. However, this difference is not significant (see Regression Analysis) as the size of the experienced, frequent traders makes up only 2% of the total sample size.

When the date of share option vesting is plotted against the number of months the vested shares were retained after vesting (Graph 5), a clear change in the share option behaviour of respondents can be seen. Analysis of the graph data indicated that respondents retained their vested shares for an average of 25 months over the five year period from January 1990 to December 1994. This holding period lengthened to 36 months for the five years from January 1995 to December 1999.

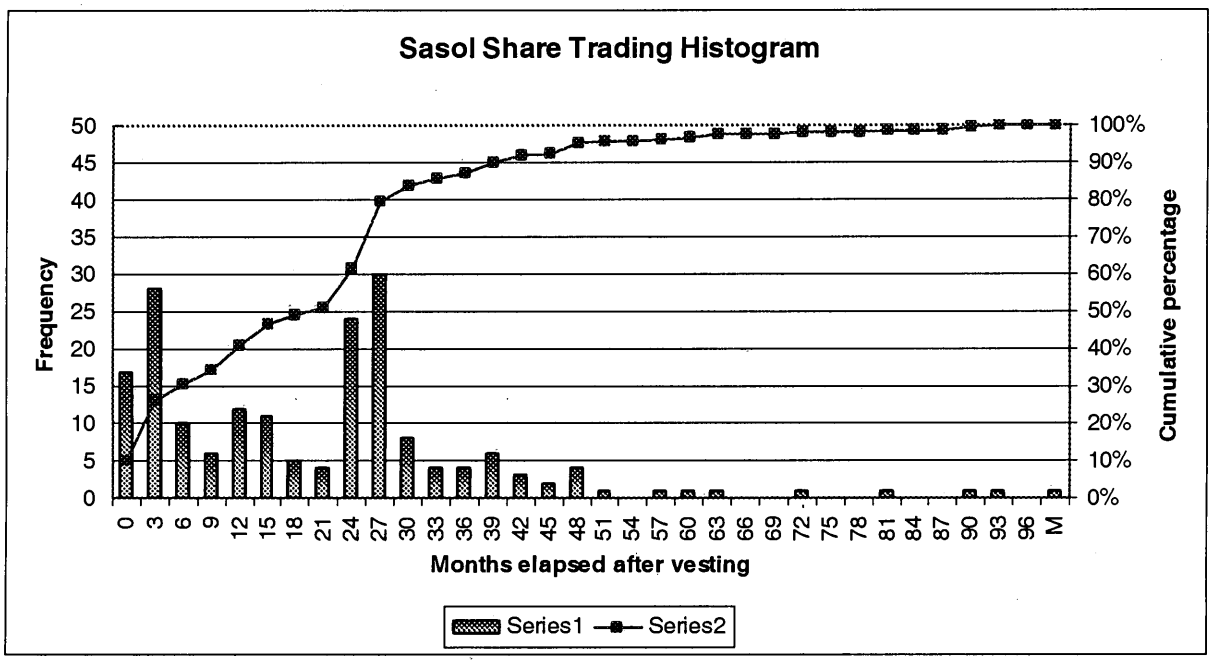
The latest five year period (January 2000 to November 2005) indicated that the average holding period of vested shares have decreased to only 13 months.

Results show that 9.94% of respondents sold their shares as soon as it vested (became available for trade). Graph 6 indicates the number of trades undertaken at specific monthly intervals after shares have vested.

The graph also indicates the cumulative percentage of the respondent's share trading activities. Three months after shares have vested, 26.1% of respondents have sold their shares. Eighteen months after their shares have vested, 49% of respondents reported to have sold their shares. Just over two years (27 months) after their shares have vested, some 80% of respondents have sold their shares.




Graph 5. Changes in share option retention over time

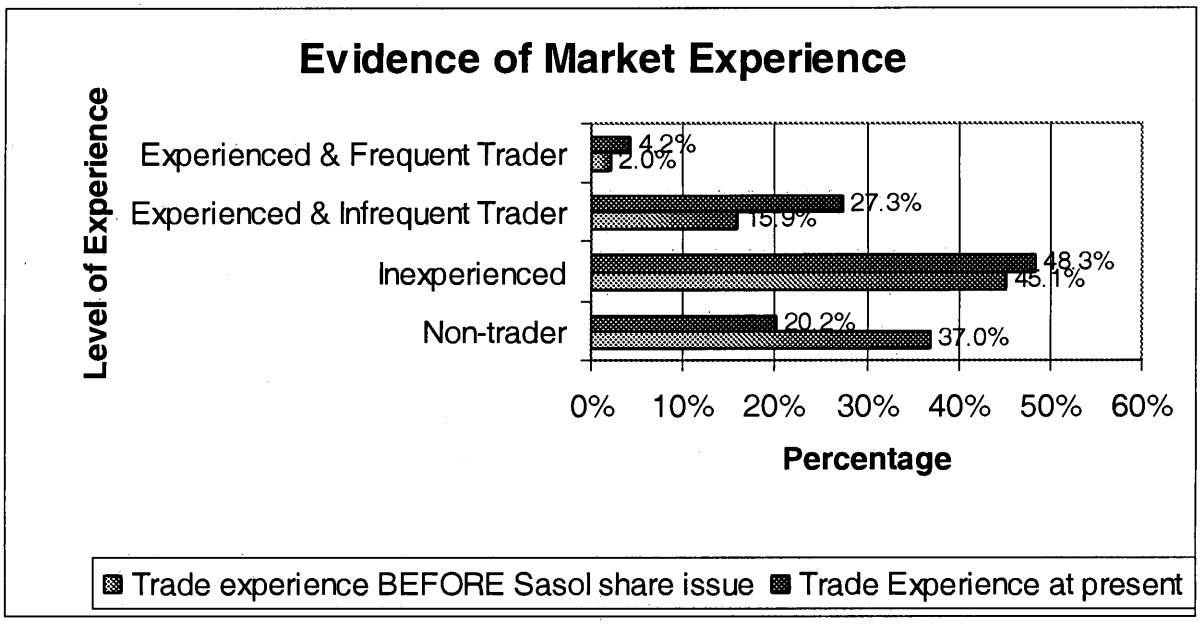



Graph 6. Sasol share trading histogram

*Evidence of Market Experience*

Some 66.3% of respondents reported that they have engaged in trading (as defined in the questionnaire) before receiving Sasol shares. Previous trading experience was subdivided into the trading of financial instruments (shares, unit trusts, currency, etc.) and assets (real estate, art, vintage cars and other valuable items). Respondents reported that 90.1% have engaged in trading financial instruments, while 49.7% of respondents also traded in assets. Twenty seven percent of respondents indicated that receiving Sasol share options motivated them to start trading. Results also indicate that 36.1% of respondents engaged in trading between the period of first share option issue and share vesting. Furthermore, 54.8% of respondents claimed that receiving Sasol share options motivated them to diversify their financial portfolio.

Graph 7 compares the perceptions of the respondents on their level of share trading experience before their first share issue and at present. There is clear evidence that the respondents' perception of their proficiency in the market has increased from the time when the first received their share option. The self-perception as "non-traders" decreased from 37% to 20.2% at the present. Concurrently, the perception of experience (as infrequent trader (15.9%) and as frequent trader (2%) increased to 27.3% and 4.2% respectively.




Graph 7. Evidence of market experience

*Regression Analysis*

The results from regression analysis is shown below in Table 2. No significant correlation could be found between the gender of respondents and other variables. Similarly, no significant correlation was found between the ethnicity of respondents and any other variable. Low correlations were obtained for most variables. As could be expected, some degree of correlation was obtained between respondent age and service years (r=0.263). The number of years a respondent is a share option holder also indicates a correlation with the respondent age (r=0.261).

No significant correlation was found between the qualifications of respondents and any of the other variables. The number of service years at Sasol correlates to some extent to the number of years a respondent has been a share option holder (r=0.314) and to the number of share trades undertaken by the respondent (r=0.214).

The correlation coefficient between the time lapsed after vesting of the share options and the number of years that a respondent is a share option holder, is 0.21. Furthermore, the number of years as a share option holder correlates well (r=0.45) with the number of share trades undertaken by the respondent.

# Table 2. Regression analysis

| | Gender | Age | Race | Qualifi-cations | Service Years | Years of share option holding calc. | Time Lapsed (month) calc. | Number trades | Q1 | Q2a | Q2b | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9a | Q9b | Q9c | Q9d | Q9e | Q10a | Q10b | Q10c | Q10d | Q10f | Q10g | Q10h | Q10i | Q10j | Q10k | Q10l | Q10m | Q11 | Q12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Gender** | 1.000 | 0.018 | 0.009 | 0.009 | 0.010 | 0.007 | 0.001 | 0.002 | 0.010 | 0.013 | 0.001 | 0.001 | 0.003 | 0.005 | 0.009 | 0.000 | 0.000 | 0.000 | 0.004 | 0.009 | 0.003 | 0.005 | 0.014 | 0.014 | 0.011 | 0.009 | 0.000 | 0.003 | 0.006 | 0.022 | 0.022 | 0.015 | 0.022 | 0.036 | 0.005 | 0.002 |
| **Age** | | 1.000 | 0.006 | 0.011 | **0.263** | **0.261** | 0.046 | 0.158 | 0.004 | 0.002 | 0.000 | 0.004 | 0.007 | 0.012 | 0.008 | 0.094 | 0.016 | 0.004 | 0.008 | 0.020 | 0.003 | 0.009 | 0.001 | 0.001 | 0.004 | 0.001 | 0.004 | 0.001 | 0.001 | 0.000 | 0.000 | 0.013 | 0.002 | 0.009 | 0.003 | 0.017 |
| **Race** | | | 1.000 | 0.020 | 0.008 | 0.002 | 0.000 | 0.000 | 0.011 | 0.000 | 0.015 | 0.020 | 0.003 | 0.005 | 0.009 | 0.003 | 0.000 | 0.001 | 0.005 | 0.008 | 0.000 | 0.004 | 0.001 | 0.001 | 0.001 | 0.004 | 0.004 | 0.002 | 0.002 | 0.001 | 0.001 | 0.003 | 0.001 | 0.000 | 0.005 | 0.005 |
| **Qualifications** | | | | 1.000 | 0.018 | 0.000 | 0.000 | 0.004 | 0.004 | 0.008 | 0.001 | 0.018 | 0.005 | 0.011 | 0.000 | 0.000 | 0.009 | 0.013 | 0.009 | 0.000 | 0.004 | 0.002 | 0.000 | 0.002 | 0.001 | 0.000 | 0.001 | 0.005 | 0.002 | 0.000 | 0.000 | 0.012 | 0.000 | 0.000 | 0.001 | 0.000 |
| **Service Years** | | | | | 1.000 | **0.314** | 0.076 | **0.214** | 0.010 | 0.010 | 0.001 | 0.010 | 0.038 | 0.023 | 0.000 | 0.021 | 0.001 | 0.035 | 0.009 | 0.002 | 0.007 | 0.004 | 0.009 | 0.015 | 0.016 | 0.000 | 0.000 | 0.002 | 0.000 | 0.002 | 0.016 | 0.000 | 0.005 | 0.011 | 0.007 | 0.002 |
| **Years of share option holding** | | | | | | 1.000 | **0.210** | **0.450** | 0.009 | 0.005 | 0.000 | 0.005 | 0.027 | 0.002 | 0.008 | 0.033 | 0.001 | 0.025 | 0.003 | 0.035 | 0.001 | 0.005 | 0.001 | 0.003 | 0.005 | 0.001 | 0.001 | 0.003 | 0.001 | 0.000 | 0.003 | 0.000 | 0.003 | 0.024 | 0.012 |
| **Time Lapsed (months) calc.** | | | | | | | 1.000 | 0.156 | 0.005 | 0.006 | 0.003 | 0.009 | 0.009 | 0.001 | 0.000 | 0.000 | 0.002 | 0.019 | 0.054 | 0.000 | 0.000 | 0.006 | 0.002 | 0.000 | 0.016 | 0.009 | 0.000 | 0.002 | 0.009 | 0.000 | 0.000 | 0.001 | 0.002 | 0.000 | 0.002 | 0.001 |
| **Number trades** | | | | | | | | 1.000 | 0.019 | 0.009 | 0.002 | 0.004 | 0.017 | 0.030 | 0.002 | 0.155 | 0.009 | 0.025 | 0.187 | 0.040 | 0.003 | 0.045 | 0.009 | 0.009 | 0.062 | 0.011 | 0.000 | 0.003 | 0.006 | 0.000 | 0.000 | 0.014 | 0.006 | 0.002 | 0.068 | 0.019 |
| **Q1** | | | | | | | | | 1.000 | **0.607** | **0.211** | **0.262** | 0.007 | 0.000 | 0.077 | 0.002 | 0.000 | 0.022 | 0.012 | 0.000 | 0.002 | 0.001 | 0.000 | 0.002 | 0.001 | 0.001 | 0.002 | 0.001 | 0.000 | 0.000 | 0.000 | 0.004 | 0.006 | 0.001 | 0.043 | 0.051 |
| **Q2a** | | | | | | | | | | 1.000 | 0.054 | **0.335** | 0.025 | 0.001 | 0.074 | 0.001 | 0.004 | 0.036 | 0.013 | 0.000 | 0.017 | 0.000 | 0.000 | 0.000 | 0.006 | 0.000 | 0.001 | 0.003 | 0.003 | 0.003 | 0.000 | 0.006 | 0.009 | 0.000 | 0.033 | 0.113 |
| **Q2b** | | | | | | | | | | | 1.000 | 0.092 | 0.002 | 0.000 | 0.026 | 0.005 | 0.000 | 0.001 | 0.005 | 0.000 | 0.000 | 0.009 | 0.014 | 0.002 | 0.017 | 0.000 | 0.014 | 0.020 | 0.001 | 0.007 | 0.007 | 0.002 | 0.000 | 0.001 | 0.049 | 0.007 |
| **Q3** | | | | | | | | | | | | 1.000 | 0.034 | 0.001 | 0.154 | 0.000 | 0.001 | 0.009 | 0.013 | 0.001 | 0.005 | 0.005 | 0.001 | 0.000 | 0.004 | 0.000 | 0.001 | 0.000 | 0.007 | 0.001 | 0.005 | 0.005 | 0.000 | 0.000 | 0.071 | **0.309** |
| **Q4** | | | | | | | | | | | | | 1.000 | 0.149 | 0.020 | 0.012 | 0.000 | 0.019 | 0.002 | 0.009 | 0.000 | 0.001 | 0.000 | 0.005 | 0.021 | 0.002 | 0.008 | 0.001 | 0.004 | 0.000 | 0.004 | 0.009 | 0.004 | 0.008 | 0.000 | 0.000 |
| **Q5** | | | | | | | | | | | | | | 1.000 | 0.033 | 0.026 | 0.001 | 0.080 | 0.036 | 0.000 | 0.001 | 0.004 | 0.000 | 0.000 | 0.001 | 0.002 | 0.001 | 0.001 | 0.000 | 0.003 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 | 0.005 |
| **Q6** | | | | | | | | | | | | | | | 1.000 | 0.009 | 0.000 | 0.033 | 0.000 | 0.000 | 0.002 | 0.005 | 0.000 | 0.000 | 0.002 | 0.001 | 0.004 | 0.002 | 0.009 | 0.001 | 0.001 | 0.008 | 0.001 | 0.000 | 0.064 | 0.070 |
| **Q7** | | | | | | | | | | | | | | | | 1.000 | **0.351** | 0.003 | 0.039 | 0.000 | 0.005 | 0.007 | 0.003 | 0.008 | 0.001 | 0.000 | 0.000 | 0.000 | 0.003 | 0.001 | 0.001 | 0.005 | 0.001 | 0.001 | 0.094 | 0.004 |
| **Q8** | | | | | | | | | | | | | | | | | 1.000 | 0.002 | 0.007 | 0.005 | 0.005 | 0.001 | 0.000 | 0.000 | 0.187 | 0.005 | 0.001 | 0.002 | 0.045 | 0.005 | 0.005 | 0.089 | 0.026 | 0.010 | 0.001 | 0.000 |
| **Q9a** | | | | | | | | | | | | | | | | | | 1.000 | 0.000 | 0.013 | 0.000 | 0.009 | 0.012 | 0.012 | 0.007 | 0.009 | 0.020 | 0.016 | 0.010 | 0.009 | 0.000 | 0.015 | 0.009 | 0.006 | 0.019 | 0.030 |
| **Q9b** | | | | | | | | | | | | | | | | | | | 1.000 | 0.033 | 0.004 | 0.002 | 0.001 | 0.001 | 0.046 | 0.004 | 0.000 | 0.001 | 0.004 | 0.000 | 0.004 | 0.009 | 0.004 | 0.000 | 0.052 | 0.003 |
| **Q9c** | | | | | | | | | | | | | | | | | | | | 1.000 | 0.010 | 0.029 | 0.011 | 0.011 | 0.009 | 0.002 | 0.006 | 0.005 | 0.000 | 0.002 | 0.008 | 0.009 | 0.008 | 0.002 | 0.001 | 0.000 |
| **Q9d** | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.001 | 0.001 | 0.001 | 0.009 | 0.004 | 0.000 | 0.002 | 0.002 | 0.001 | 0.001 | 0.009 | 0.001 | 0.001 | 0.007 | 0.009 |
| **Q9e** | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.005 | 0.000 | 0.023 | 0.003 | 0.001 | 0.003 | 0.001 | 0.003 | 0.003 | 0.001 | 0.003 | 0.002 | 0.028 | 0.000 |
| **Q10a** | | | | | | | | | | | | | | | | | | | | | | | 1.000 | **0.556** | 0.073 | 0.128 | **0.223** | **0.435** | **0.311** | **0.747** | **0.327** | 0.073 | **0.327** | **0.496** | 0.008 | 0.004 |
| **Q10b** | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.073 | 0.128 | 0.119 | **0.239** | 0.133 | **0.327** | **0.327** | 0.073 | **0.327** | **0.496** | 0.008 | 0.001 |
| **Q10c** | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.081 | 0.048 | 0.046 | 0.057 | 0.041 | 0.041 | 0.085 | 0.105 | 0.093 | 0.036 | 0.000 |
| **Q10d** | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | **0.201** | 0.150 | 0.054 | 0.074 | 0.074 | 0.009 | 0.074 | 0.118 | 0.003 | 0.000 |
| **Q10f** | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | **0.297** | 0.190 | 0.165 | 0.069 | 0.009 | 0.069 | 0.110 | 0.001 | 0.008 |
| **Q10g** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | **0.238** | **0.325** | 0.139 | 0.025 | 0.139 | **0.216** | 0.001 | 0.000 |
| **Q10h** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | **0.422** | 0.182 | 0.035 | **0.422** | **0.280** | 0.000 | 0.005 |
| **Q10i** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | **0.439** | 0.102 | **0.439** | **0.664** | 0.003 | 0.006 |
| **Q10j** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.102 | **0.439** | **0.664** | 0.003 | 0.006 |
| **Q10k** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.102 | 0.150 | 0.018 | 0.008 |
| **Q10l** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | **0.664** | 0.011 | 0.000 |
| **Q10m** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.004 | 0.002 |
| **Q11** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 | 0.009 |
| **Q12** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.000 |

The correlation coefficient of 0.607 indicates that most trading activities of respondents prior to reception of Sasol share options where related to financial trading while asset trading correlates poorly (r=0.21) with the respondent's trading activities. Furthermore, a correlation coefficient of 0.262 was obtained between previous trading activities and the respondents' perceptions of their trading experience as determined partly by their trading frequency. The impact of specifically financial trading activities (Question 2) on respondents' perception on their trading experience is visible in the coefficient of 0.335. This is not evident from respondents who traded in assets. A correlation of 0.301 was obtained between respondents' perception of their trading experience before receiving Sasol share options and their current perceptions of their trading experience.

A good correlation (0.556) was found between the selection option of the share price lower than the share option exercise price and the share price being too low to realise adequate capital gains in selling (the first 2 selections of Question 10). These two issues could both be classified as selections based on loss aversion. The loss aversion based on a share price lower than the exercise price was also correlated with the following selections: Institutional affinity ("loyalty to Sasol/sentimental value", (r=0.223)), Intention ("Share transaction published/signalling" (r=0.435)), market experience or lack thereof ("I am unsure/inexperienced regarding the option taking process", (r=0.311), "It entails too much paperwork, tracking of share prices, etc.", (r=0.747), "No need to diversify my portfolio as it is already well diversified", (r=0.327)), Status quo bias ("Once sold, I cannot / am unwilling to replace it", (r=0.327)), and Social context ("It has status value", (r=0.496)). Similar correlation coefficients were found for loss aversion based on a share price lower than the exercise price and intention ("Share transaction published/signalling" (r=0.239)), market experience (or lack thereof ("It entails too much paperwork, tracking of share prices, etc.", (r=0.327), "No need to diversify my portfolio as it is already well diversified", (r=0.327), Status quo bias ("Once sold, I cannot / am unwilling to replace it", (r=0.327)), and Social context ("It has status value", (r=0.496)). Loss aversion ("It is too risky, the share price is too uncertain) indicated a low correlation (0.201) with institutional affinity ("Loyalty to Sasol/sentimental value"), while institutional affinity ("Loyalty to Sasol/sentimental value") correlated with Intention ("Share transaction published/signalling" (r=0.297)).

Institutional affinity ("Loyalty to Sasol/sentimental value") correlated slightly (r=0.297)with Intention ("My share transactions are published/signalling"). Intention ("My share transactions are published/signalling") showed low correlations with market experience ("I am unsure/inexperienced regarding the option taking process", (r=0.238), "It entails too much paperwork, tracking of share prices, etc.", (r=0.325), and social context ("It has status value", (r=0.216)). Market experience ("I am unsure/inexperienced regarding the option taking process") also showed correlations with another market experience variable: "It entails too much paperwork, tracking of share prices, etc.", (r=0.422), as well as Status quo bias ("Once sold, I cannot / am unwilling to replace it", (r=0.422)), and to a lesser degree, Social context ("It has status value", (r=0.28)).

The market experience variable "It entails too much paperwork, tracking of share prices, etc.", correlated with another market experience variable, namely "No need to diversify my portfolio as it is already well diversified", (r=0.439), Status quo bias ("Once sold, I cannot / am unwilling to replace it", (r=0. 439)), and Social context ("It has status value", (r=0.664)). Respondents with well diversified portfolio's correlated well with Status quo bias ("Once sold, I cannot / am unwilling to replace it", (r=0. 439)), and Social context ("It has status value", (r=0.664)). No correlation was found between the use of share options as a retirement package and any other variables. The Status quo bias ("Once sold, I cannot / am unwilling to replace it", correlated well with the Social context of the share option issue ("It has status value", r=0.664).

*Hypothesis Testing*

Dependent Measure: Endowment effect

*A decreased endowment effect will be observed for individuals with significant market experience.*

1. Employees with significant market experience, who receives share options tend to keep their shares for a shorter duration than the average employee.

1a. Employees with significant market experience who receives share options tend to keep their shares for the same duration as the average employee.

No correlation could be determined between the holding period of share options after vesting and the degree of market experience of the respondents. As a result, the null hypothesis is rejected. The holding period of

vested shares by experienced traders is not significantly shorter than that of the other groups with lower experience levels.

**Conclusions**

*Market Experience*

While the response to the e-mail distributed questionnaire within the company provided a much higher than anticipated response rate, representation of all levels of market experience was significantly skewed in the sample. This fact contributed to a general lack of correlation and the subsequent rejection of the null hypothesis. Similarly, the ethnicity of the respondents as well as their tertiary qualifications were heavily skewed towards white males with a scientific or engineering background.

The average holding period for share options was calculated at 13 months. The average holding period of experienced and frequent share traders was 28 months. However, this group of experienced traders constituted only 2% (6) of the respondent total (248) of which only one respondent's average holding period could be calculated. Of the six experienced and frequent traders, only 2 have engaged in more than 5 trades with Sasol share options. One respondent in this group has never traded his share options while another's share options have not vested as yet. As a result, no correlation could be obtained between market experience and any other variables.

*Ownership Duration*

Only 7.3% of respondents' share options have not vested. It was interesting to find that 13.2% of respondents who's shares have vested have opted not to sell their shares to date. The primary reason for this lack of trading was found to be expectations of a rising share price (50% of respondents who have never traded their share options). Another reason cited for not trading Sasol share options was its use as a retirement package (30% of respondents). The company policy regarding share options dictates that the full share option issue should be traded within nine years after the issue. It may be argued that respondents who have expectations of a rising share price exhibit the endowment effect as their theoretical reference price (anchor) for their shares is higher than current market asking price. Strahilevitz and Loewenstein (1999:25, 276-289) proposed that the acceptable selling price of an object increases with length of ownership. This is in concordance with anchoring whereby the share option participant selects some initial value as a starting point and adjusts this value in response to economic or other changes (Samuelson and Zeckhauser, 1988: 1, 7-59).

Share option participants may take any of three different approaches to anchoring. Firstly, the share option participant may not select an anchor or reference price for the share option. Rather, the participant may prefer to postpone the decision to the point where there is a need for trading (i.e. need for cash or ending of the nine year option period). Secondly, upon issue and exercising of the share option offer, the participant may select a fixed mental anchor (reference price) which would exemplify a good or excellent monetary profit when traded. This fixed anchor could, but does not need to include a time frame. Thirdly, a participant may select an initial anchor point, which is adjusted as market conditions change. This method demands that the share option participant is actively adjusting his/her mental anchor in relation to economic and market information obtained. It implies a much more active management of the share options as compared to the first approach. The results obtained where respondents reported a reluctance to trade due to expectations of a rising share price may therefore be related to the approach of the individual share option participant to anchoring.

*Learning*

While List (2003, 118, 41-72) concluded that evidence of learning was mixed in his field experiments, he concluded that such learning builds up slowly (possibly over years) and would therefore not be visible over the short time span of his experiment. There is clear evidence of learning in this study. The self-perception of respondents regarding their level of trading experience improved significantly (Graph 7). Closer inspection indicated that ten (4%) of share option holders who have engaged in more than 5 trades, still considered themselves non-traders. Some 66.3% of respondents reported that they have engaged in trading as defined in the questionnaire, before receiving Sasol shares.

Previous trading experience was subdivided into the trading of financial instruments (shares, unit trusts, currency, etc.) and assets (real estate, art, vintage cars and other valuable items). Respondents reported that 90.1% have previously engaged in trading financial instruments, while 49.7% of respondents also previously traded in assets. It may be argued that learning in the case of share option recipients is limited to the share option structures internal and specific to that company and may not be applicable in external share trading markets.

Twenty seven percent of respondents indicated that receiving Sasol share options motivated them to start trading, resulting in

the shift in self-perception regarding respondents' trading skill level. Similarly, 54.8% of respondents claimed that receiving Sasol share options motivated them to diversify their financial portfolio. This type of behaviour would be expected from employees who have been exposed to financial markets and share option schemes. This exposure seem to encourage a macroeconomic interest and more specifically an interest in financial markets and the underlying drivers of those markets.

*Social Meaning and Institutional affinity*

While not the focus of this research, the results of the study failed to indicate wether the social meaning attached to share option offers moderate the endowment effect. Similarly, the effect of institutional affinity on share option participant behaviour could not be determined. This may be primarily due to the small percentage (13.2%) of respondents who's shares have vested, but who have not traded the vested share options. A clearer understanding of the potential impact of social meaning, source dependence and institutional affinity would be gained from personal interviews of a specific group within the population who have not traded in their vested share options.

Most behavioural scientist have managed to prove the presence of loss aversion and the endowment effect in controlled settings. In this study however, the researcher departs from the traditional experimental investigation by observing actual real world market behaviour. The study examines behaviour in only one market, namely the share option environment within a single organisation. The endowment effect is primarily a problem for sellers. Kahneman and Knetsch (1990: 98, 1325-1348) argued that an owner will not be reluctant to sell if the object, in this case share options, is easily replaced. In the case of share options, top-up share option issues are given yearly as a bonus as well as with a promotion. Therefore, share options should not be seen as unreplaceable.

Share option recipients approach to the share options that they received may greatly influence their treatment of the endowment. Share options can be viewed either as a windfall or as a reward which should be maximised (or alternatively, losses are found to be unacceptable). This may be the origin of substantial disparities in the valuation of the individuals share options. In the first instance, a share option issue (seen as a windfall) would not exhibit as strong an endowment effect as in the case where the aim it to maximise the reward. In this latter case share options sold at a selling price which is slightly lower than what a colleague

obtained, will be experienced as a loss. This is referred to as the hedonic reference point and is largely determined by the objective status quo ands will as expectation and social comparisons (Kahneman and Tversky, 1984: 39, 341-350). A mismatch between decision values and experience values is common and introduces an element of uncertainty in many decisions. This is a reminder that people judge their well-being through a prism of interpersonal relationships, and that these effects can be extended to every-day financial decisions.

The data suggest that there is an overall endowment effect present in the share option recipient sample. Also, there is some indication that individual behaviour converges to the neoclassical prediction as trading experience increases. Due to the extremely small portion of experienced and frequent traders in the organisation, the possibility that the endowment effect will be negated, is unlikely. It is also suggested that, while learning do take place and market experience in share option trading may increase over time, due to the specificity of the share option trading experience, this market experience cannot be extended to national or international financial markets.
The study highlights the multiple factors which could potentially influence the behaviour of share option participants. While in the majority of share option participants, the endowment effect seem to be present, the underlying motivation for the behaviour may be very diverse. The role of anchoring or reference pricing have not been investigated and may play an significant role in the share option participant behaviour.

The study could be expanded to include share option recipients' reference price (anchor) which each individual attaches to their share option issue as well as determining the reasoning behind it. This may give an indication of the extent of the instantaneous endowment effect as noted by Kahneman and Knetsch (1990: 98, 1325-1348). In a longitudinal study, the change in reference price (anchor) can be tracked to determine if and by how much share option recipients adjust their reference point in response to changing personal and market circumstances.

Similarly, the effect of the fixed period prior to a portion of share options vesting (in this case 2 years for every third of the share option issue) could be determined hypothetically. The effect of the fixed holding period on the strength of the endowment effect could, unfortunately, only be determined theoretically in this case. The length of the fixed holding period is clearly

dependent on the growth rate of the share value (Graph 5).

The source dependence, where the level of attachment to an object depends on the method by which it was acquired, was not tested explicitly in this study. Future research could include a comparison between the trading behaviour exhibited by share option participants trading their share options versus personal shares acquired by the participant with a diversified share portfolio. This could also provide insights into the effect of institutional affinity and the use of share options to motivate such affinity.

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**Appendix 1:**

**Cover Letter**

Dear participant,

You have been selected to participate in a research study regarding share options. I am a MBL student at Unisa and busy with my final year thesis. The topic is: *Share options: transaction familiarity as a moderator of share option recipient behaviour.*

It has long been recognised that people do not behave as rationally as believed by most neoclassical economists. Instead, several factors influence the decisions people make. One of these factors can be described as 'loss aversion'. This is related to the 'endowment effect', where people place a higher value on things they already own than the market is willing to pay. On the other hand, trading experience may moderate or negate this attachment, known as the endowment effect.

The attached questionnaire aims to determine the influence of transaction familiarity on share option recipient behaviour. Please take ten minutes to complete the following questionnaire. Your participation in this study will be greatly appreciated.

Kind regards,

Heidri Saayman

**Disclaimer:** This is not an official Sasol study. The results of this study is for the stated MBL course requirements and will not be used for Sasol remuneration policy. All participant names and information obtained in this study is confidential.

**Research Questionnaire**

Biographical data:

Please select the appropriate block:

| | | |
|---|---|---|
| Gender | 1 | Female |
| | 2 | Male |
| | | |
| Age | 1 | 25-30 years |
| | 2 | 31-40 years |
| | 3 | 41-50 years |
| | 4 | 51-60 years |
| | 5 | Above 60 |
| | | |
| Race | 1 | Black |
| | 2 | Indian/Asian |
| | 3 | White |
| | 4 | Coloured |
| | | |
| Field of major tertiary Qualifications | 1 | Scientific (Engineering/ Science) |
| | 2 | Financial (Commercial, Accounting, Economics, MBA) |
| | 3 | Both Scientific and Financial |
| | 4 | Human sciences |
| | 5 | Other |
| | | |
| Years of service with Sasol | 1 | 0-5 years |
| | 2 | 6-10 years |
| | 3 | 11-15 years |
| | 4 | 16-20 years |
| | 5 | More than 20 years |
| | | |
| Month and year of *receiving* first Sasol share option: | | |
| | | |
| Month and year of *trading* first Sasol share option: | | |
| | | |
| Approximate total number of Sasol share option trades: | 1 | Never |
| | 2 | One or two trade occasions |
| | 3 | Three to five trade occasions |
| | 4 | More than 5 trade occasions |

| | | |
|---|---|---|
| **Question 1:**<br>Financial trade can be described as the purchase of valuables (shares, assets) for the explicit goal of resale.<br>Have you ever engaged in financial trading BEFORE receiving Sasol share options? | YES | NO |
| **Question 2:**<br>If YES to Q1, select the appropriate type of financial trade you engaged in from the list below: | | |
| -buy & resell shares (share trading) | | |
| -buy and resell assets including real estate, vintage cars, art, or other valuable items | | |
| -Other (please specify): | | |

**Question 3:**
At the time of your first Sasol share option issue, would you consider yourself one of the following (please mark appropriate block):

| Non-trader | Novice trader (few trades) | Experienced but Infrequent trader | Experienced and Frequent trader |
|---|---|---|---|
| | | | |

| | | |
|---|---|---|
| **Question 4:**<br>Did receiving Sasol share options motivate you to start with other share trading (buy and sell)? | YES | NO |
| **Question 5:**<br>Did receiving Sasol share options motivate you to diversify your financial portfolio? | YES | NO |
| **Question 6:**<br>Have you ever engaged in financial trading AFTER receiving Sasol share options and BEFORE selling your first share options (taking up your options)? | YES | NO |
| **Question 7:**<br>Are you a Sasol share option holder who has not reached the first vesting period (2 years lapsed)? | YES | NO |
| **Question 8:**<br>If NO to Q7, have you sold Sasol share options (taken up the share offer) since your options became available for trade? | YES | NO |
| **Question 9:**<br>What is/was your motivation for selling or taking up your share options? (select from list below): | | |
| -To use the gains realising from the sale to diversify my investment portfolio (strategic re-investment in other areas) | | |
| -Purchase of assets (car, boat, property, etc.) | | |
| -Purchase of consumables (gifts, holiday, university fees) | | |
| -Income constraints/debt payment | | |
| -Other (Please specify) | | |

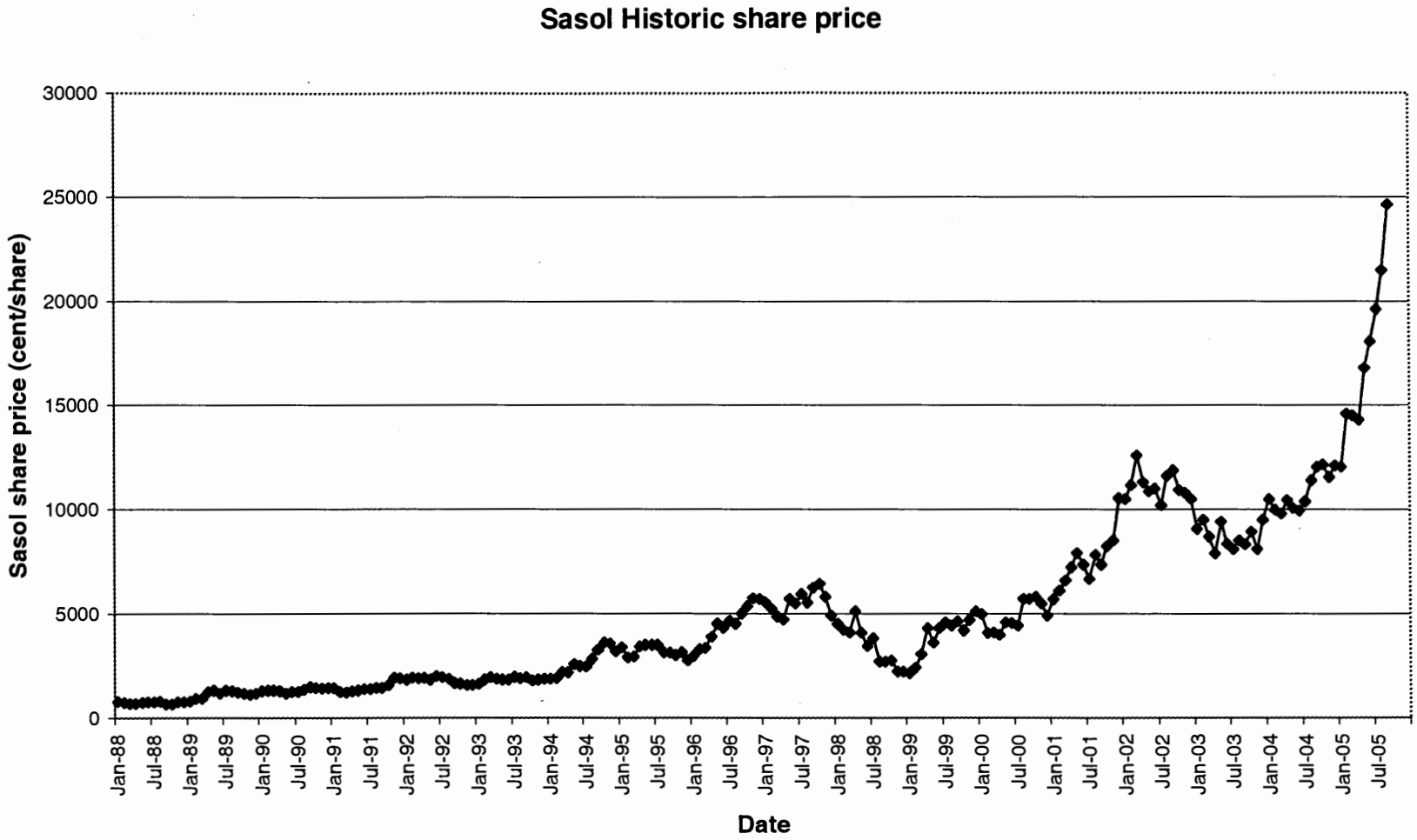
| **Question 10:**<br>If NO to Q8, please select a reason(s) for NOT taking up your available options from the list below: | |
|---|---|
| -Current share price lower than my exercise price – I would lose money by taking up the shares (transaction costs) | |
| -The current share price is too low for me to realise an adequate capital gain (transaction costs) | |
| -I have expectations of a rising share price | |
| -It is too risky; the share price is too uncertain | |
| -No use/need for capital at present | |
| -Loyalty to Sasol/ sentimental value | |
| -My share transactions are published (signalling) | |
| -I am unsure/inexperienced regarding the option taking process | |
| -It entails too much paper work, tracking of share prices, etc. | |
| -No need to diversify my portfolio as it is already well diversified | |
| -It is my retirement package | |
| -Once sold, I cannot / am unwilling to replace it | |
| -It has status value | |
| -Other (please specify) | |

| **Question 11:**<br>Have you engaged in other financial trading AFTER selling your first share options (taking up your options)? | YES | NO |
|---|---|---|

| **Question 12:**<br><u>At present</u>, would you consider yourself one of the following (please mark appropriate block): | | | |
|---|---|---|---|
| Non-trader | Novice trader (few trades) | Experienced but Infrequent trader | Experienced and Frequent trader |
| | | | |

Thank you for your honesty and time in answering these questions.

**Appendix 2:**


Sasol Historic share price
Sasol share price (cent/share)
30000
25000
20000
15000
10000
5000
0
Jan-88
Jul-88
Jan-89
Jul-89
Jan-90
Jul-90
Jan-91
Jul-91
Jan-92
Jul-92
Jan-93
Jul-93
Jan-94
Jul-94
Jan-95
Jul-95
Jan-96
Jul-96
Jan-97
Jul-97
Jan-98
Jul-98
Jan-99
Jul-99
Jan-00
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