




# Determinants of choice between equity issuance, equity repurchase and debt issuance of South African companies listed on the Johannesburg Stock Exchange

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**Purpose:** The introduction of dual decisions (such as the issue of shares and the issue of debt; the repurchase of shares and the repayment of debt; and share issues and share repurchases) has provided an order of preference of financing decisions influenced by company-specific attributes. The aim of this study is to investigate determinants of choice of South African companies listed on the Johannesburg Stock Exchange (JSE) between different financing decisions.

**Design/methodology/approach:** Data were obtained from Integrated Real-time Equity System (IRESS), a reliable supplier of financial data. Data of 90 companies were analysed. A logistic regression model (fixed effect) was used, and multinomial logistic regression (fixed effect) was done using a generalised structural equation model.

**Findings/results:** The research findings highlight the significance of the trade-off theory, the pecking order theory and models based on asymmetric information in elucidating financing decisions in a developing country. The findings extend empirical evidence of determinants of choice between equity issuance, equity repurchase, the no-transaction alternative and debt issuance decisions in South Africa's emerging economy. The findings also suggest that South African companies listed on the JSE must evaluate company-specific variables and theories that correspond to such variables if they wish to make better financing decisions.

**Practical implications:** The findings will help corporate decision-makers decide between equity issuance, equity repurchase and debt issuance. The findings will also help shareholders make better investment decisions.

**Originality/value:** The article investigates the determinants of choice between four financing decisions and the no-transaction alternatives within the same framework.

**Keywords:** determinants of choice; equity issuance; equity repurchase; debt issuance; generalised structural equation.

## Introduction

An important and classic question faced by companies in looking for new finances is whether to raise debt or equity (Bharath, Pasquariello & Wu 2009; Chang, Dasgupta & Hilary 2006; Leary & Roberts 2010; Marsh 1982). The engagement in new investments, the payments of dividends or the maintenance of capital structure force companies to obtain funds in external capital markets to engage in investments, pay dividends or maintain capital structure. The most popular sources of finance include debt, equity and convertible debt.

In explaining financing decisions, researchers have developed theories to provide an explanation for the intuition behind capital structure decisions. The pecking order and the asymmetric information hypothesis explained the decision to issue shares (Sony & Bhaduri 2021). Within the pecking order theoretical framework, there is a preference for hierarchical order of finance, which is followed by companies. Furthermore, because of costs linked with external financing, companies will use the earnings retained, unless they need external sources of finance, in which case they prefer debt to equity issues, as debt attracts lower adverse selection costs than equity financing (Myers 1984; Myers & Majluf 1984).

Companies that wish to capitalise on valuable investment opportunities need internal cash flows that are readily available to them so that they do not have to turn to external capital markets. As

soon as internal funds have been exhausted, companies are encouraged to go for debt financing (Myers & Majluf 1984). In an asymmetric information environment, however, managers are more likely to prefer capital structure decisions that result in information that is positive for the market. Companies that expect an increase in liquidity are in a good position to go into capital markets, but high information asymmetry has a negative impact on such companies' prospects. As a result, high-valued companies are more likely than low-valued ones to issue debt to indicate a positive financial position, despite highly asymmetric information.

The empirical evidence on financing decisions comes from studies of corporate debt ratios (Graham 1996; Rajan & Zingales 1995; Titman & Wessels 1988) and studies of issuing companies' debt against equity financing choices (Bayless & Chaplinsky 1991; Jalilvand & Harris 1984; Jung, Kim & Stulz 1996; MacKie-Mason 1990; Marsh 1982). Unlike other studies, this study is aimed at investigating how company-specific variables affect companies' financing decisions as per transaction and financing decisions compared to other financing decisions (for example, debt versus equity) in an emerging market (South Africa), because the topic has been widely covered in developed economies. Furthermore, this study is focused on exploring instances where companies use dual financing decisions: for example, when they implement both share issues and share repurchases and do not implement the two decisions. Such analysis allows for the financing policy to be tested within a dynamic framework and provide an understanding of the factors at play, as managers will change the structure of capital only when benefits exceed costs (Gaud, Hoesli & Bender 2007). Furthermore, Hovakimian, Hovakimian and Tehranian (2004) highlighted the importance of single-transaction and simultaneous decisions (i.e. dual issues). They considered dual decisions to be events that are significant in changing the capital structure. As a result, the use of dual decisions in recent years has given researchers an opportunity to investigate the argument in South Africa's emerging market. The research specifically argues that companies' specific attributes tend to drive financing decisions on transactions and dual decisions.

The contribution of the present study to the ongoing debate on determinants of choice between financing decisions in developing markets is fivefold. Firstly, it examines how company-specific attributes affect share repurchases relative to no-share repurchases, share issuance relative to no-share issuance, debt issuance relative to no-debt issuance and debt repayments relative to no-debt repayments. Secondly, it examines how company-specific attributes affect share issues relative to share repurchases, debt repayments relative to share repurchases and debt issues relative to share issues. Thirdly, unlike other studies, it uses fixed-effect multinomial logistic regression, where companies' differences are controlled for. Fourth, from the practitioners' point of view, it contributes better knowledge on how single and dual financing decisions are chosen based on company-specific attributes. And finally, while research on capital structure

focuses on debt-to-equity choices made by South African companies, it incorporates all four decisions on transaction in logistic regression and simultaneously in multinomial logistic regression to further explain the idea behind capital structure theories.

The main findings of the research prove that company-specific attributes play a key role in the capital structure choices of South African companies listed on the Johannesburg Stock Exchange (JSE). Notably, the findings suggest that companies are less likely to issue than to repurchase shares as they increase in size, that they are less likely to repurchase than issue shares when they have more opportunities to grow and that they are less likely to issue than to repurchase shares if there is an increase in the current ratio. The introduction of dual decisions (such as the issue of shares and the issue of debt; the repurchase of share and debt repayments; and share issues and share repurchases) has established an order of preference of financing decisions influenced by company-specific attributes. The research findings prove the significance of the trade-off theory, the pecking order theory and models based on asymmetric information in elucidating financing decisions in developing markets. They also suggest that South African companies listed on the JSE must evaluate company-specific variables and the theories (trade-off theory, the pecking order theory and the asymmetric information) that correspond to such variables if they wish to successfully restructure their capital.

In the sections that follow, the literature that is relevant on the determinants of choice is reviewed and the research hypotheses are outlined. Then, the research methodology is discussed, and the research findings are given. Lastly, implications and limitations of this study are discussed, and suggestions for future research are made.

## Existing literature and development of hypotheses

Over the years, three theoretical models have been tested to explain capital structure choices: the trade-off, the agency and the pecking order hypotheses (Gaud et al. 2007; Jarallah, Saleh & Salim 2019). According to the trade-off theory of capital structure, there is an optimal capital structure of companies (Singh & Kumar 2012). On the other hand, the pecking order theory, which was suggested first by Myers and Majluf (1984), says that there is not a well-defined debt target level which companies try to reach (Singh & Kumar 2012). In addition, when internal finance is not sufficient, companies will raise external finance.

In principle, according to Marsh (1982), companies that are above their target debt level should issue equity if the need for new finance arises, and debt should be issued if they are below the target level. Without flotation costs, an adjustment can be instantaneously and continuously made. However, the presence of significant costs of flotation suggests that companies must minimise the cost of flotation and deviation from their target debt ratio.

While many empirical studies have shown that some variables affect companies' decisions on capital structure, they fail to distinguish clearly between the theories and hypotheses mentioned earlier and fail to consider all four decisions to provide an order of preference that is clear for financing decisions driven by company-specific attributes. According to Gaud et al. (2007), it is more helpful to analyse companies' debt-to-equity decisions. Several studies on companies' debt-to-equity decisions have highlighted the importance of looking at company-specific attributes in financing decisions (Hovakimian et al. 2004; Hovakimian, Opler & Titman 2001; Jung et al. 1996; Lewis & Tan 2016; Mishra, Talukdar & Upadhyay 2020; Sony & Bhaduri 2021; Weber & Yang 2020).

Companies with cash stockpiles must use internal cash flows to finance investments in the presence of information asymmetry and must avoid external capital. Helwege and Liang (1996) confirmed the narrative that companies with higher cash surpluses must not look for funding in the external market. However, empirical findings by Helwege and Liang (1996) do not indicate that cash deficits force companies to turn to external finance markets. Consistent with the narrative about greater cash surpluses, it is expected that companies with higher levels of liquidity are less likely than ones with lower levels of liquidity to issue debt.

It is worth pointing out that asymmetric information does not do enough in explaining the pecking order theory, because highly asymmetric information is not successful in triggering equity financing. As Fama and French (2005) point out, equity issuers dominate external security financing that is not due to duress or cash deficit, as the theory suggests. In addition, companies that have before obtained external financing will probably turn to external markets again if they need additional funding. Similar to Shyam-Sunder and Myers (1999), Frank and Goyal's findings suggested that equity issues dominate debt issues unrelated to financial distress.

Examining whether managers time their debt-equity decisions to exploit market mispricing, Lewis and Tan (2016) indicate that managers issue more equity relative to debt when analysts are relatively optimistic about the company's long-term growth prospects. Moreover, equity issuers earn lower returns than debt issuers at subsequent earnings announcements.

Marsh (1982) examined how UK companies choose between financing sources at a given point in time. Empirical evidence suggests that companies are heavily influenced by market conditions and the history of security prices in choosing between debt and equity. In addition, companies appear to make their choice of financing instrument as if they have target levels of debt in mind, and these targets are a function of the company size, bankruptcy risk and asset composition. Marsh (1982) is silent on equity repurchases and debt repayments, however.

Highlighting the importance of single-transaction and simultaneous decisions (i.e. dual issues), Hovakimian et al. (2004) suggest that dual issues from companies in the United States of America (USA) seem to be larger than their equity and debt issues. Furthermore, they suggest that when companies require large sums of capital, debt and equity are issued.

Examining whether there are interactions between the appointment of a chief financial officer and a company's debt-equity decisions, Mishra et al. (2020) reveal that companies that hire chief financial officers (CFOs) internally issue more equity than ones that hire CFOs from external labour markets. Furthermore, the appointment of internal CFOs significantly reduces information asymmetry, which lowers market risk and the cost of financing through equity issues.

Sony and Bhaduri (2021) have examined the information asymmetry role in determining the capital structure decisions of companies in India's emerging market. Their results suggested that asymmetric information is an important determinant of security issue decisions. Specifically, equity issues are limited and conducted only by companies that face lesser information asymmetry, which in turn supports models based on the asymmetric information hypothesis. In addition, dual issues play an important role in Indian companies' capital structure decisions. Their research findings contrast with those of some authors (Chauhan 2016; Frank & Goyal 2003; Singh & Kumar 2012) on the role of information asymmetry. It is worth pointing out that Sony and Bhaduri (2021) did not consider share repurchases in their study.

In South Africa, Mouton and Smith (2016) used the debt-to-equity ratio as a proxy for capital structure, and their findings reveal that the most significant determinants of capital structure are risk, tangibility and profitability. They argue that these variables should be checked to perceive changes in financing decisions and in the valuation of the company. In the same vein, Chipeta and Mbululu (2013) have revealed that changes in capital structure are a function of company-specific attributes and macro-economic conditions. Chipeta and Deressa (2016) have indicated that profitability is the most common significant predictor in sub-Saharan Africa and that country-specific factors play an important role in the choice of debt. Sewpersadh (2019) has shown that company-specific attributes such as profitability, company size and age have a significant influence on the capital structure of JSE-listed companies. However, as Hovakimian et al. (2004) point out, these studies do not distinguish between the four financing decisions to identify the forces at play.

## Dependent variables: Financing options

The present study involves examining a wider range of transactions than the previous studies mentioned earlier: its scope includes equity issues, equity repurchases, debt issues,

debt reductions, equity issues versus equity repurchases, equity issues versus debt issues and equity repurchases versus debt reductions. As a result, it contains eight dependent variables: (1) equity issues, (2) share repurchases, (3) debt issues, (4) debt repayments, (5) equity issues versus equity repurchases, (6) equity issues versus debt issues, (7) equity issues versus debt reductions and (8) equity repurchases versus debt reductions.

### **Equity issues, share repurchases, debt issues and debt repayments**

This study explores (as individual decisions) the companies' propensity to issue equity, repurchase shares, issue debt and repay debt. Because the study investigates the probability of financing decisions, the dependent variable for each decision is a dummy (e.g. 1 for equity issues and 0 for nonequity issues).

### **Equity issues versus equity repurchases**

Considering that the study explores determinants of choice in decisions to issue equity, not to issue equity or repurchase shares (none), as well as to issue both equity and repurchase shares relative to share repurchases, the dependent variable is categorical: 1 for share repurchases, 2 for share issues and 3 for both share issues and share repurchases.

### **Equity issues versus debt issues**

Since the research explores determinants of choice in decisions not to issue equity or debt (none) and to issue equity and debt relative to equity issues, the dependent variable is categorical: 0 for no equity or debt issues, 1 for equity issues, 2 for debt issues and 3 for both equity and debt issues.

### **Equity issues versus debt reductions**

As the research examines determinants of choice in decisions not to issue equity or reduce debt (none) and to issue equity and reduce debt relative to share issues, the dependent variable is categorical: 0 for no equity issues or debt reductions, 1 for equity issues, 2 for debt reductions and 3 for both equity issues and debt reductions.

### **Equity repurchases versus debt reductions**

Because the study looks at determinants of choice in decisions not to repurchase equity or reduce debt (none) and to repurchase equity and reduce debt relative to equity repurchases, the dependent variable is categorical: 0 for no equity repurchases or debt reductions, 1 for equity repurchases, 2 for debt reductions and 3 for both equity repurchases and debt reductions.

## **Choice between equity issues (repurchases) and debt issues (repayments)**

The choice between equity issues (repurchases) and debt issues (repayments) is expected to be influenced by six

company-specific characteristics: (1) price-to-book ratio and dividend yield, (2) profitability and growth opportunities, (3) company size, (4) director shareholding benefits, (5) quick ratio and current ratio and (6) market volatility.

### **Price-to-book ratio and dividend yield**

According to the market timing theory, the misvaluation of a company's value indicates a mispricing that drives managers to issue overvalued and repurchase undervalued equity. Furthermore, from the market perspective, the price-to-book ratio encompasses a company's value (Elliott, Koëter-Kant & Warr 2008; Fama & French 1992). In line with some authors (Baker & Wurgler 2002; Dong et al. 2012), overvalued companies are more likely to sell equity, while undervalued ones are more likely to repurchase shares.

### **Profitability and growth opportunities**

According to Jensen (1986), free cash flow problems force profitable companies to issue debt capital. Furthermore, profitable companies are less likely to be financially distressed because they have high levels of internal funds. They are also more likely than less profitable companies to invest in research and development that generates growth opportunities. As a result, with growth opportunities, companies use less debt financing and record low debt levels. Such companies, according to the pecking order theory, are less likely to access capital debt markets for financing (Myers 1984). Therefore, profitable companies have low leverage levels.

### **Company size**

According to Kazmierska-Jozwiak, Marszałek and Sekuła (2015), many authors indicate that a company's main determinant of capital choice is its size. However, Kazmierska-Jozwiak et al. (2015) argue that results of the studies on the impact of the size on the structure of its capital are rather ambiguous. In accordance with the trade-off theory, larger companies are more likely to issue debt, while in accordance with the pecking order theory, smaller companies are more likely to issue equity. As a result, it is expected that large companies are more likely than small companies to issue debt relative to share issues.

### **Director shareholding benefits**

According to the agency cost theory or managerial entrenchment theory, companies with low levels of director ownership and debt are more likely to repurchase shares than companies with high levels of director ownership and debt (Jensen 1986; Ofer & Thakor 1987; Wesson et al. 2018). The repurchase of shares causes an increase in ownership by companies' directors, thereby better aligning directors' interests with other shareholders (Jensen & Meckling 1976; Sewpersadh 2019; Shleifer & Vishny 1997). However, on a cautionary note, high levels of stock options motivate CEOs to take big risks, which could lead to poor company

performance (Jensen 1993). This result is consistent with the trade-off theory under the asymmetric information model, where companies with high levels of director ownership have increased leverage to maintain a significant share of equity while reducing agency costs, although high levels of director ownership cause entrenchment problems. However, according to Sewpersadh (2019), the main objective of shareholder value maximisation may infer using less debt financing and more equity finance to avert financial distress. As a result, with an increase in director ownership, companies are more likely to repurchase and issue shares.

### Quick ratio and current ratio

Companies prefer internal to external financing, according to the pecking order theory. Therefore, reserves can be created from retained earnings. According to Niu (2008), if liquid assets are sufficient to finance investments, companies will have no need to raise external funds, suggesting that with an increase in liquidity, companies are less likely to issue debt and more likely to issue and repurchase shares.

### Market volatility

Volatility is a proxy for the probability of financial distress and is generally expected to be inversely correlated with debt (Niu 2008). With an increase in market volatility, companies may be forced to arrange funds at high costs to pay debts or to declare bankruptcy, in extreme cases. However, if financed by equity, companies can choose to forgo dividend payments during periods of high market volatility. This indicates that companies with high market volatility will borrow less and prefer equity to debt when facing external financing choices. The predictors of choice between the four financing decisions are defined in Table 1.

**TABLE 1:** Predictors of choice definition.

Variable	Definition
Company size (size)	Log of total assets
Growth opportunity (GW)	Change in sales
Price-to-book value (PB)	((Share price at company financial year end)/(ordinary shareholders' interest/no. of ordinary shares in issue at year end) * 100)
Return on equity (ROE)	(Profit after taxation/total owners' interest) * 100
Quick ratio (QR)	(Total assets – total stock)/total current liabilities
Current ratio (CR)	(Total current assets/total current liabilities)
Dividend yield (DY)	((Ordinary dividend/no. of ordinary shares in issue at year end)/(share price at company financial year end/100) * 100)
Net asset value per share (NAV)	(Total owners' interest/no. of ordinary shares in issue at year end) * 100
Director shareholding (DS)	Sum of director shareholding (beneficial and nonbeneficial)
Market volatility (MVO)	Annual standard deviation of market price per share
Research and development expenses (RDDUM)	Dummy variable: 1 for research development expenses and 0 for no research and development expenses
Debt-to-equity ratio (DE)	Total long-term loan capital + total current liabilities/total owners' interest
Debt-to-asset ratio (DA)	Total long-term loan capital + total current liabilities/total assets

From the theoretical framework, the following hypotheses are generated to investigate the impact of company-specific attributes as determinants of choice between financing decisions:

**H1:** Company-specific attributes are predictors of single financing decisions.

**H2:** Company-specific attributes are predictors of dual financing decisions.

## Data and methodology

### Research sample

This study tested the capital structure decisions of companies listed on the JSE that face adverse selection costs due to external financing. According to Sony and Bhaduri's (2021) conditions on external financing, companies adjust their capital structure by issuing debt, equity or a mix of both and repaying debt, repurchasing equity or a mix of both in a given financial year. Decisions on these matters are made only after careful consideration. As stated in the previous section, the dependent variables are binary and categorical (for example, debt, equity and dual issues). Because the dependent variables are binary and categorical, a good way to identify the impact of company-specific attributes is to use logistic and multinomial logistic regression to predict the probabilities of multiple possible outcomes of categorical, dependent variables given a set of independent variables (Long & Freese 2006; Sony & Bhaduri 2021). The present study used fixed logistic and multinomial logistic regression to identify company-specific effects, assuming that companies in the sample are heterogeneous.

The present study examined a sample of 90 companies (making debt issues [repayments] and equity issues [repurchases] to explain financing behaviour) listed on the JSE over the period 1999–2019. Financial companies were excluded from this sample, as recommended by Fama and French (1992), because their share and debt issuance decisions are likely to differ greatly from the financing decisions of companies in other sectors. From this initial sample, only companies that issued equity (repurchased equity) and issued debt (repaid debt) in a given financial year were considered. The financing decisions were obtained from the statement of financial position, the statement of cash flow and the notes. If a company issued debt as well as equity in the same financial year, the study treated it as a dual issue. In addition, the present study included decisions where companies issued equity and repurchased equity, repaid debt and repurchased equity. Using these criteria, the research identified 1035 share issues, 826 share repurchases, 840 debt issues and 901 debt repayments. To reduce the problem of outliers, winsorisation was used at the 5th and 95th percentiles. All the data were sourced from the IRESS database. Data on share repurchases were not readily available. As a result, the data had to be collected directly from companies' annual financial statements. However, most annual financial statements also did not explicitly report the number of shares repurchased. To overcome this challenge, the study used notes to financial statements to

ensure that all repurchases in rand value were captured accurately for the period 1999–2019.

## Research method

Following earlier studies (Hovakimian 2004; Hovakimian et al. 2004; Marsh 1982), this study investigated factors that influence companies' decisions between equity issues, equity repurchases, debt issues and debt repayments. Because the dependent variables are binary and categorical, a logistic regression (fixed effect) and a generalised structural equation (multinomial fixed effect) was applied. The models were chosen based on the idea that unobserved company heterogeneity is likely to be present in longitudinal data where there are multiple observations for the same company. The fixed-effect models have the ability to control for all fixed characteristics (time independent) of companies. All statistical work was conducted using Stata 16.

The fixed-effect logistic model is defined by the logistic probability of  $Y_{it}$ :

$$\Pr(y_{it} = 1) = \frac{e^{\alpha_i + \beta'X_{it}}}{1 + e^{\alpha_i + \beta'X_{it}}} = L(\alpha_i + \beta'X_{it}) \quad [\text{Eqn 1}]$$

where  $\beta$  is the  $(M \times 1)$  parameter vector of the  $M$  regressors  $x_{it}$ ,  $i = 1, \dots, N$ , and  $t = 1, \dots, T$ . The parameter  $\alpha_i$  is an individual effect, which is constant for the given company in the sample (i.e. constant across the series). For the multinomial logistic regression across time with unobserved heterogeneity (fixed effect), the following model was used following prior research (Chamberlain 1980; Pfaff 2014):

$$\Pr(Y_{it} = j) = \frac{\exp(\alpha_{ij} + X_{it}\beta'_j)}{1 + \sum_{k=1}^j \exp(\alpha_{ik} + X_{it}\beta'_k)} \quad \text{for } j \neq B \quad [\text{Eqn 2}]$$

$$\Pr(Y_{it} = j) = \frac{1}{1 + \sum_{k=1}^j \exp(\alpha_{ik} + X_{it}\beta'_k)}$$

## Findings and discussions

### Descriptive statistics

Table 2 depicts the mean values, the standard deviation and the maximum and minimum for each variable used in this study without winsorisation. As shown in Table 2, the average share repurchases, share issues, debt repayments and debt issues were 361436.2, 294185.9, 337542.46 and 701903.58, respectively. The mean value for size was 6.397 in the form of the natural logarithm of the total assets. The average growth level of the companies, measured based on the increase in sales, was 123.685%. For director shareholding benefits, the mean value was 28070.763. The mean value for the price-to-book ratio was 2.78. The mean value for research and development expenses was 28912.612. Extreme outlier observations in all variables were identified and eliminated through winsorisation. Consequently, all observations of data below the 5th percentile were set to the 5th percentile and all observations of data above the 95th percentile were set to the 95th percentile.

**TABLE 2:** Descriptive statistics without winsorisation.

Variable	Obs	Mean	SD	Minimum	Maximum
DE	1888	1.423	7.852	-79.941	298.6
DA	1888	0.503	0.55	0	14.235
DY	1890	3.166	4.974	-0.072	110.838
NAV	1887	3299.015	6507.232	-2542.316	89183.057
MVO	1890	48.976	43.093	0	579.567
RD (in rand)	1890	28912.612	138523.83	-800	2014404.5
GW	1883	123.685	4608.307	-99.379	199 900
SIZE	1890	6.397	1.132	0	9.272
ROE	1890	3.661	640.044	-17127.848	17063.158
QR	1890	1.738	7.159	0	163.885
CR	1890	2.268	7.163	0	163.885
DS	1890	28070.763	74045.982	0	1 382 678
SR (in rand)	1890	361436.2	3 181 926	0	78 143 307
SI (in rand)	1888	294185.9	2650396.7	0	92 844 000
DR (in rand)	1890	337542.46	3107920.4	0	73 488 502
DI (in rand)	1890	701903.58	4445941.4	0	73 323 994
PB	1890	2.78	12.108	-25.663	481.111

DE, debt-to-equity ratio; DA, debt-to-asset ratio; DY, dividend yield; NAV, net asset value per share; MVO, market volatility; RD, research and development expenses; GW, growth opportunities; SIZE, company size; ROE, return on equity; QR, quick ratio; CR, current ratio; DS, director shareholding benefits; SR, share repurchases; SI, share issues; DR, debt repayments; DI, debt issues; PB, price-to-book ratio.

The findings shown in Table 3 suggest that the net asset value per share is positively correlated with the four choices of financing decisions as per transaction but negatively correlated with the debt-to-equity and debt-to-asset ratios; the price-to-book ratio is positively correlated with the debt-to-equity ratio, the debt-to-asset ratio, share repurchases, share issues and debt issues but negatively correlated with the repayments; the dividend yield is positively correlated with share repurchases, debt repayments and debt but negatively correlated with share issue; growth opportunities are positively correlated with share issues but negatively correlated with debt repayments and share repurchases; return on equity is positively correlated with share repurchases and negatively correlated with share issues, debt repayments and debt issues; market volatility is negatively correlated with all four financing choices; research and development expenses are positively correlated with all four financing choices; director shareholding benefits are negatively correlated with debt repayments but positively correlated with share repurchases, share issues and debt issues; company size is positively correlated with all four financing choices; and liquidity is negatively correlated with all four financing choices.

This study analyses the financing decisions as per transactions and vis-à-vis to each other during the sample period of 1999–2019. Figure 1 illustrates that share repurchases have become more prevalent as a mechanism to manage capital structure choices for companies listed on the JSE. In addition, it helps to provide a comprehensive picture of the unique transactions and variations in choices in the financing decisions of South African companies listed on the JSE.

### Logistic regression (conditional fixed-effect logistic regression)

Table 4 gives the estimation results for the choice between financing decisions per transactions. The models are estimated

TABLE 3: Matrix of correlations.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1) DE	1.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(2) DA	0.646	1.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(3) SR	-0.031	-0.011	1.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(4) SI	-0.022	0.006	0.456	1.000	-	-	-	-	-	-	-	-	-	-	-	-	-
(5) DR	-0.033	-0.058	0.215	0.156	1.000	-	-	-	-	-	-	-	-	-	-	-	-
(6) DI	0.008	0.034	0.437	0.266	-0.068	1.000	-	-	-	-	-	-	-	-	-	-	-
(7) PB	0.283	0.125	0.050	0.050	-0.012	0.011	1.000	-	-	-	-	-	-	-	-	-	-
(8) DY	-0.053	-0.123	0.080	-0.080	0.039	0.066	-0.018	1.000	-	-	-	-	-	-	-	-	-
(9) NAV	-0.160	-0.270	0.306	0.110	0.381	0.438	-0.086	0.072	1.000	-	-	-	-	-	-	-	-
(10) ROE	-0.153	-0.027	0.033	-0.094	-0.010	-0.022	0.133	0.246	-0.005	1.000	-	-	-	-	-	-	-
(11) MVO	0.066	0.118	-0.075	-0.024	-0.019	-0.068	-0.089	-0.177	-0.186	-0.261	1.000	-	-	-	-	-	-
(12) GW	0.047	0.044	-0.022	0.053	-0.025	-0.035	0.077	-0.019	-0.086	0.064	0.000	1.000	-	-	-	-	-
(13) QR	-0.379	-0.508	-0.051	-0.053	-0.032	-0.055	-0.123	0.098	0.047	0.034	0.006	-0.024	1.000	-	-	-	-
(14) CR	-0.394	-0.559	-0.057	-0.064	-0.025	-0.059	-0.163	0.115	0.109	0.009	-0.013	-0.049	0.898	1.000	-	-	-
(15) DS	0.085	0.108	0.078	0.124	-0.055	0.079	0.020	-0.066	-0.174	-0.025	0.127	0.083	-0.053	-0.076	1.000	-	-
(16) SIZE	0.067	-0.053	0.336	0.249	0.330	0.369	0.132	0.128	0.489	0.113	-0.331	-0.058	-0.159	-0.101	-0.042	1.000	-
(17) RD	-0.068	-0.104	0.379	0.035	0.330	0.351	-0.017	0.226	0.437	0.015	-0.073	-0.039	-0.019	0.014	-0.081	0.377	1.000

DE, debt-to-equity ratio; DA, debt-to-asset ratio; SR, share repurchases; SI, share issues; DR, debt repayments; DI, debt issues; PB, price-to-book ratio; DY, dividend yield; NAV, net asset value per share; ROE, return on equity; MVO, market volatility; GW, growth opportunities; QR, quick ratio; CR, current ratio; DS, director shareholding benefits; SIZE, company size; RD, research and development expenses.

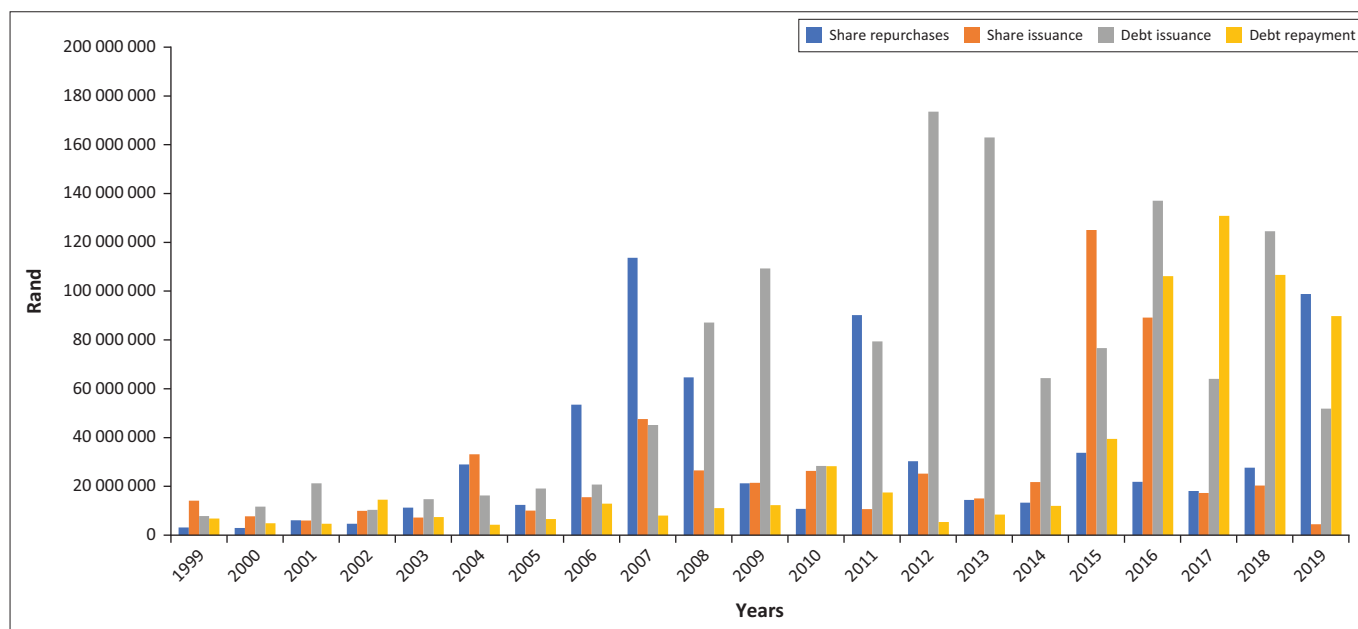


FIGURE 1: Variations in financing decisions.

using conditional, fixed-effect logistic regression on pure debt issues (repayments) and pure share issues (share repurchases).

The research findings in Table 4 show that the debt-to-equity ratio is positively correlated with debt issue; the dividend yield is negatively correlated with debt repayments; and the price-to-book ratio is positively correlated with share issues, share repurchases and debt issues, while it is negatively correlated with debt repayments. The positive and significant relationship between the price-to-book ratio and share issues is in keeping with the findings of Hovakimian et al. (2004). With an increase in the net asset value per share, companies are more likely to issue shares. Companies with an increase in growth opportunities are less likely to repay debt and more likely to issue debt and equity. Companies that are profitable are more likely to repurchase shares and less likely

to issue shares. This finding is in line with that of Sony and Bhaduri (2021). Larger companies are more likely to repurchase shares and issue debt and less likely to issue shares. The positive relationship between size and debt issues contradicts the findings of Hovakimian et al. (2004). Companies with higher liquidity are less likely to issue debt. Companies with an increase in director shareholding benefits are more likely to repurchase and issue shares. Companies that spend money on research and development are more likely to issue shares and debt. This finding is consistent with that of Hovakimian et al. (2004).

### Multinomial logistic regression (fixed effect)

Table 5 presents the results of the multinomial logistic regression (fixed effect) done using a generalised structural

**TABLE 4:** Determinants of companies' choices between financing decisions per transactions.

Dependent variables/ Equations	(1)	(2)	(3)	(4)
	SR	SI	DI	DR
Debt-to-equity ratio	-0.047 (0.072)	-0.007 (0.072)	0.14** (0.068)	-0.1 (0.068)
Dividend yield	0.029 (0.02)	0.023 (0.02)	0.017 (0.018)	-0.031* (0.018)
Price-to-book ratio	0.071** (0.029)	0.073** (0.03)	0.067** (0.027)	-0.059** (0.027)
Net asset value per share	0 (0)	0** (0)	0 (0)	0 (0)
Market volatility	0.001 (0.002)	-0.002 (0.002)	0.001 (0.002)	0.002 (0.002)
Growth opportunities	0 (0.002)	0.01*** (0.003)	0.007*** (0.002)	-0.006*** (0.002)
Return on equity	0.004* (0.002)	-0.004* (0.002)	0.001 (0.002)	0 (0.002)
Size	1.151*** (0.164)	-0.44*** (0.156)	0.355*** (0.135)	-0.18 (0.131)
Quick ratio	-0.078 (0.088)	-0.083 (0.077)	-0.207*** (0.078)	-0.036 (0.073)
Director shareholding benefits	0* (0)	0*** (0)	0 (0)	0 (0)
Obn.RDDUM				
1.RDDUM	0.392 (0.239)	0.548** (0.264)	0.366* (0.217)	-0.253 (0.217)
Observations	1838	1817	1880	1880
Pseudo R <sup>2</sup>	0.044	0.051	0.025	0.014

SR, share repurchases; SI, share issues; DR, debt repayments; DI, debt issues; RDDUM, the research and development dummy variable.

Standard errors are in parentheses.

\*\*\*,  $p < 0.01$ , \*\*,  $p < 0.05$ , \*,  $p < 0.1$ .

equation model to estimate determinants of choice between the following transactions: firstly, between the no-transaction alternative, share issues and both the no-transaction alternative and share issues relative to share repurchases; secondly, between the no-transaction alternative, debt repayments and both the no-transaction alternative and debt repayments relative to share repurchases; and finally, between the no-transaction alternative, debt issues and both the no-transaction alternative and debt issues relative to share issues.

The findings of the no-transaction alternative relative to share repurchases and share issues in Table 5 suggest that companies with higher dividend yields are more likely to repurchase shares relative to the no-transaction option. Companies with higher price-to-book ratios are more likely to repurchase and issue shares. This finding supports the argument that the issue and repurchase of shares are costlier than the no-transaction alternative. Companies that are more profitable are more likely to engage in share repurchases. One finding of interest for the research is that companies with an increase in director shareholding benefits are more likely to engage share repurchases and share issues. This finding supports the idea that directors are more likely to align their interests with those of shareholders. Larger companies are more likely to engage in share repurchases. Companies with higher growth

opportunities are more likely to engage in share issues. The current ratio is a positive and significant predictor, indicating that companies with higher liquidity are more likely to engage in the no-transaction alternative relative to share issues. Research and development expenses are a negative and significant predictor, suggesting that companies that spend money on research and development are more likely to engage in share repurchases and share issues.

The results of share issues relative to share repurchases, debt issues relative to share issues and debt repayments relative to share repurchases suggest that the debt-to-equity ratio is a positive and significant predictor, indicating that companies with higher debt-to-equity ratios are more likely to issue debt relative to share issues. This finding is consistent with the findings of Hovakimian et al. (2004). Companies with higher dividend yields are less likely to repay debt relative to the repurchase of shares. Companies with higher price-to-book ratios are less likely to issue debt relative to share issues. This finding suggests that, when companies' stock price is overvalued relative to its assets, companies are more likely to issue shares. This finding is in line with that of Hovakimian et al. (2004). Companies that are more profitable are less likely to issue shares relative to share repurchases. Director shareholding benefits are a negative and significant predictor, indicating that with an increase in director shareholding benefits, companies are less likely to repay debt relative to share repurchases. Company size is a negative and significant predictor in share issues relative to share repurchases and debt repayments relative to share repurchases, indicating that larger companies are less likely to issue shares relative to share repurchases and repay debt relative to share repurchases. However, company size is a positive and significant predictor in the debt issues relative to share issues, suggesting that larger companies are more likely to issue debt relative to share issues. This finding is consistent with the findings of Sony and Bhaduri (2021) and Hovakimian et al. (2004). Companies with higher growth opportunities are more likely to issue shares relative to share repurchases. Companies with higher dividend yields are less likely to repay debt relative to share repurchases. Profitable companies are less likely to repay debt relative to share repurchases. Companies with an increase in director shareholding benefits are less likely to repay debt relative to share repurchases. Companies with an increase in growth opportunities are more likely to issue shares relative to share repurchases. Companies that spend more money on research and development are less likely to issue debt relative to share issues. This finding is consistent with that of Hovakimian et al. (2004).

Now moving to dual transactions relative to share repurchases and share issues, the empirical findings show that companies with an increase in director shareholding benefits are more likely to engage in the dual transaction alternative (share issues and share repurchases) relative to share repurchases only.



**TABLE 5:** Determinants of choice between share issues versus share repurchases, debt repayments versus share repurchases and debt issues versus share issues.

CH	(1)			CH	(2)			CH	(3)		
	SI versus SR				DR versus SR				DI versus SI		
	Coef.	t	Sig.		Coef.	t-value	Sig.		Coef.	t	Sig.
None				None			None				
DE	0.082	0.640	-	-	0.064	0.640	-	-	0.123	1.100	-
DY	-0.103	-2.500	**	-	-0.051	-1.440	-	-	-0.014	-0.410	-
PB	-0.261	-4.090	***	-	-0.070	-1.510	-	-	-0.156	-3.250	***
ROE	-0.013	-1.830	*	-	-0.017	-2.820	***	-	0.002	0.320	-
DS	-0.000	-1.260	-	-	-0.000	-2.210	**	-	-0.000	-3.150	***
SIZE	-1.355	-7.230	***	-	-0.982	-7.290	***	-	0.107	0.810	-
GW	0.009	1.510	-	-	0.004	0.900	-	-	-0.018	-3.870	***
CR	-0.221	-1.640	-	-	0.181	1.620	-	-	0.186	1.810	*
ORDDUM											-
1.RDDUM	-0.543	-1.780	*	-	0.128	0.550			-1.017	-3.980	***
CONSTANT	10.158	7.910	***	-	6.712	7.200	***		-0.533	-0.600	-
SI				DR				DI			
DE	0.032	0.260	-	-	-0.130	-1.190	-	-	0.409	3.740	***
DY	-0.034	-0.860	-	-	-0.073	-1.990	**	-	-0.033	-0.880	-
PB	0.065	1.260	-	-	-0.076	-1.540	-	-	-0.117	-2.350	**
ROE	-0.013	-1.830	*	-	-0.010	-1.540	-	-	0.006	0.920	-
DS	0.000	1.480	-	-	-0.000	-1.800	*	-	-0.000	0.860	-
SIZE	-1.156	-6.180	***	-	-0.941	-6.500	***	-	0.245	1.890	**
GW	0.019	3.740	***	-	-0.005	-1.080	-	-	-0.008	-1.650	-
CR	-0.210	-1.600	-	-	0.008	0.070	-	-	0.064	0.570	-
ORDDUM											
1.RDDUM	0.254	0.880	-	-	0.095	0.380			-0.435	-1.780	*
CONSTANT	8.331	6.470	***	-	7.093	7.100	***		-2.212	-2.520	**
BOTH				Both				Both			
DE	-0.133	-1.050	-	-	-0.233	-2.180	*	-	0.279	2.990	***
DY	-0.017	-0.410	-	-	-0.034	-0.910	-	-	0.011	0.340	-
PB	0.085	0.053	-	-	-0.041	-0.910	-	-	0.045	1.150	-
ROE	-0.008	-1.150	-	-	-0.003	-0.400	-	-	-0.004	-0.830	-
DS	0.000	3.260	***	-	-0.000	-0.270	-	-	0.000	0.860	-
SIZE	-0.645	-3.480	***	-	-0.121	-1.010	-	-	0.204	2.080	**
GW	0.027	4.950	***	-	-0.004	-0.920	-	-	0.010	2.510	**
CR	-0.586	-4.060	***	-	-0.019	-0.160	-	-	-0.156	-1.570	-
ORDDUM											
1.RDDUM	0.219	0.750	-	-	0.234	1.110	-	-	-0.098	-0.530	***
CONSTANT	4.957	3.830	***	-	1.065	1.260	-	-	-1.830	-2.690	***
No. of obs.	1883	-	-	-	1882	-	-	-	1883	-	-
No. of groups	90	-	-	-	90	-	-	-	90	-	-
Log likelihood	2168.85	-	-	-	-2380.63	-	-	-	-2336.64	-	-
Base outcome	Share rep	-	-	-	Share rep	-	-	-	Share iss	-	-

Ch, choice; DE, debt-to-equity ratio; SI, share issues; SR, share repurchases; DR, debt repayments; DI, debt issues; NONE, when no financing policy is implemented; BOTH, when two financing policies are implemented simultaneously; DY, dividend yield; PB, price-to-book ratio; GW, growth opportunities; ROE, return on equity; CR, current ratio; SIZE, company size; RDDUM, the research and development dummy variable; DS, director shareholding benefits.

\*\*\*,  $p < 0.01$ , \*\*,  $p < 0.05$ , \*,  $p < 0.1$ .

An extended summary of the statistics of the multinomial logistic regression fixed for the choices is presented in Appendix 1.

Larger companies are less likely to engage in the dual transaction alternative (share issues and share repurchases) against share repurchases only. However, larger companies are more likely to engage in debt and share issues simultaneously than in share issues only. This finding is like that of Sony and Bhaduri (2021). Companies with an increase in growth opportunities are more likely to implement share issues and share repurchases in tandem relative to share repurchases only and are more likely to implement both debt issues and share issues relative to share issues only. The current ratio is a negative and significant predictor, indicating that companies

with higher liquidity are less likely to engage in share issues and share repurchases than in share repurchases only.

### Implications, limitations and suggestions for future research

The present study examined predictors of choice between the financing choices of South African companies listed on the JSE. It was found that growth opportunities, company size, market volatility, dividend yield, the liquidity ratio, return on equity, director shareholding benefits and the price-to-book ratio significantly influence financing decisions.

The study provides important information to boards of directors for deriving, revising and predicting financing choices by considering company-specific attributes that are proven to

significantly influence share issues (share repurchases) and debt issues (debt repayments). If the managers are considering choosing share issues, the no-transaction alternative, a combination of a dual choice (share issues and share repurchases) or debt issue relative to share repurchases, the factors of size, growth opportunity, liquidity, director shareholding benefits and the price-to-book ratio must be given careful attention. This is important because financing choices are important in retaining existing shareholders as well as attracting new shareholders. In addition, a capital structure that is driven by company-specific attributes prevents bankruptcy cost.

The study also provides guidance to shareholders who must make decisions that are related to investment. In particular, it is of interest for shareholders to look at director shareholding benefits and other company-specific attributes, because these variables minimise agency cost problems and risk and drive decisions to issue equity and debt.

This study is not without its limitations. Firstly, it is focused solely on South African companies listed on the JSE for which there are data for the period 1999–2019. To ensure that the findings are easier to generalise and to better reflect the predictors of choice between the four financing decisions, future studies could include other companies by changing the sampling period. Secondly, the study was based on secondary data. A combination of quantitative and qualitative methods may produce more comprehensive results. Finally, this research assumed director shareholding benefits as the only proxy for managerial entrenchment. Future research may want to examine the effect of various forms of ownership, such as insider, financial institution or state-owned ownership, as predictors of choice. Regardless of its limitations, this research fills the gap on the important issue of company-specific attributes that affect the choice between share issues (share repurchases) and debt issues (debt repayments).

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The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

### Authors' contributions

M.F.M. was responsible for conceptualisation, methodology, software, formal analysis review and editing, while L.M.B. and J.H.H. were responsible for supervision, review and writing.

### Ethical considerations

This article followed all ethical standards for research without direct contact with human or animal subjects.

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## Data availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

## Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

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Appendix 1 starts on the next page→

## Appendix 1: Summary statistics

**TABLE 1-A1:** Summary of statistics for fixed-effect multinomial logistic regression done using generalised structural equation model.

Share issues vs. share repurchases	Coef.	SE	Z	P > z	95% conf.	Interval
var (R10[c_id])	2.377	0.601	-	-	1.448	3.901
var (R12[c_id])	3.017	0.678	-	-	1.942	4.686
var (R13[c_id])	2.676	0.632	-	-	1.68	4.252
cov (R10[c_id], R12[c_id])	1.820	0.552	3.300	0.001	0.739	2.902
cov (R10[c_id], R13[c_id])	0.796	0.481	1.660	0.098	-0.146	1.738
cov (R12[c_id], R13[c_id])	2.478	0.607	4.080	0.000	1.289	3.667
<b>Debt repayments vs. share repurchases</b>						
var (R10[c_id])	1.029	0.273	-	-	0.611	1.731
var (R12[c_id])	1.392	0.332	-	-	0.872	2.220
var (R13[c_id])	0.324	0.147	-	-	0.133	0.789
cov (R10[c_id], R12[c_id])	1.029	0.271	3.800	0.000	0.498	1.561
cov (R10[c_id], R13[c_id])	-0.066	0.141	-0.470	0.641	-0.343	0.211
cov (R12[c_id], R13[c_id])	0.237	0.172	1.370	0.170	-0.101	0.575
<b>Debt issues vs. share issues</b>						
var (R10[c_id])	1.623	0.371	-	-	1.037	2.540
var (R12[c_id])	1.152	0.288	-	-	0.705	1.881
var (R13[c_id])	0.285	0.112	-	-	0.132	0.615
cov (R10[c_id], R12[c_id])	1.244	0.293	4.250	0.000	0.670	1.818
cov (R10[c_id], R13[c_id])	-0.261	0.146	-1.790	0.074	-0.546	0.025
cov (R12[c_id], R13[c_id])	-0.005	0.130	-0.040	0.970	-0.260	0.251

SE, standard error; CI, confidence interval.