

Do South African Public Universities Exhibit Zombie-Like Characteristics? An Empirical Analysis of Financial Sustainability Concerns

Rajendra Rajaram¹

Abstract: Objective: This paper discusses whether South African public universities resemble zombie institutions characteristics? That is, institutions that are still operating, in spite of financial stress and have poor economic health. **Approach:** The research utilizes panel data on 19 public universities to measure persistent financial distress. The research considers the main institutional variables like capital adequacy, size, age, cash payout capacity, and growth to test their influence on loss persistence using ordinary least squares (OLS) with robust standard errors. **Results:** The results indicate that age of the university is a major factor in determining the losses. Study underscores that persistent losses are observed in younger universities, and less in older universities, which indicates that maturity and experience contribute to the increase of financial stability and the decrease of the probability of zombie-like behavior. On the contrary, capital adequacy demonstrates a weak positive correlation with persistent losses, whereas such variables as the institutional size, the cash payout capacity, and growth do not have statistically significant impact on university losses. It suggests that being larger or growing does not always imply improved financial health of the public university. **Implications:** The research indicates that organizational maturity is a major determinant in minimizing the long-term financial distress, and that university size does not guarantee the sustainability. **Novelty:** Applying the notion of zombie institutions to the higher education sector in South Africa, the current study contributes to the existing research and provides valuable information to policymakers who aim to improve the financial stability and sustainability of South African universities.

Keywords: Capital Adequacy; financial distress; Higher Education; South African universities; Zombie Universities

JEL Classification: I22, I23, G32, H52, C23, M21, D22, L32

1. Introduction

The public higher education is a large and diverse sector in South Africa at the centre of economic and social development of the country (Cloete & Bunting, 2020). By 2025, it comprised 26 public universities, including 11 traditional universities, 9 comprehensive universities and 6 universities of technology. More institutions are planned to overcome skills shortages and increase access in the country (Sebola, 2023). This system has privilege of a prolonged rise in the number of

¹ Professor, Ph.D., Graduate School of Business, University of South Africa, Pretoria, South Africa, Address: Pretoria, Gauteng, 0003, South Africa, Corresponding author: rajarr@unisa.ac.za.



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students' enrolment: the total number of students in the public universities in 1994 had been about 495,356 students, which has risen to over 1,077,768 students in 2022, and the number is projected to continue growing under the National Development Plan targets (SAnews, 2023). In recent years, student enrollment in South Africa's higher education sector has remained above one million, with women representing the larger share, making up about 62–63% of the total. Universities such as the University of Cape Town have a population of approximately 29,000 students in various faculties, with a diverse variety of undergraduate, postgraduate, and research programs in STEM, commerce, humanities, and health sciences (UCT, 2018).

Concerning the staffing aspect, according to higher education statistics, in 2023, a total of about 65,943 permanent staff worked in public universities, both instruction and research staff and administrative and service staff, which reflect the magnitude and intricacy of human resource required to facilitate teaching, research, and community involvement (Higher Education Trends, 2025).

Regardless of the growth pattern, the university education sector is experiencing some financial strains as a result of the increased operating expenses, limited public funding, and escalating demand, which have raised policy issues as well as sustainability debate. These structural features of large and increasing enrolments, a wide variety of courses, and large staff complements give the empirical context of evaluating financial performance and sustainability challenges in South African public universities (Higher Education Trends, 2025). One of the major causes of this crisis is the chronic deficit of funding by the National Student Financial Aid Scheme (NSFAS) and government subsidies (Mlambo, 2024). The NSFAS showed a Rand 10.6 billion gap in the university funding budget in the 2025 academic year, which postponed the student registration and thousands of students were not able to receive the necessary financial assistance (Mabuza, 2020). Poor and slow release of NSFAS funds compel universities to be creditors to tuition and accommodation fees, which impacts their cash flows and operating budgets (Maimane, 2025). Student debt is also rising to peak levels in many institutions with the University of South Africa, reporting more than R830 million of historical unpaid fees and other institutions noticing sharp rises in gross student debt which is a blow to liquidity and risk of unpayable accounts (Matlala, 2022).

In addition to revenue issues, universities have to contend with increasing operational expenses such as salaries, utilities, infrastructure, and investment in digital learning that is inadequately matched by public funding increase thus forcing institutions to halt staff hiring and postpone infrastructure projects to balance with the budget requirement (Ogundu, 2022). This financial pressure has culminated into congested institutions, poor student support services and instability in governance, which underlines structural weaknesses in the sector (Rammbuda & Mudau, 2025). These chronic financial strains not only negatively affect the capacity of universities to provide quality education, but also spread doubts on their financial sustainability and capacity to withstand demographic and economic pressures (Mutongoza, 2025).

Through external funding, South African public universities are slowly becoming zombie institutions since they are still functioning without the ability to create sustainable surpluses (Byiers et al., 2021). Most of the institutions find themselves in a financial limbo situation, alive but economically vulnerable due to underfunding, overdependence on government schemes like NSFAS, rising costs, high student debt, and lack of diversification of their revenue streams (Yende, 2024). Universities are vital in economic growth, innovation, and human capital formation. Nevertheless, most higher education institutions in the world are experiencing financial strain because of the increasing operating expenses, limited government funding, and the growing competition (Srinivas et al., 2023; Peters,

2013). In this regard, issues have raised over the sustainability of the public (government) universities which are still in operation despite sustained losses in the form of financial losses in South Africa.

The term zombie institutions was first coined in the corporate finance literature and is used to describe organizations that are still in operation even when the profitability is low and the long-term viability is low (Upadhyay & Baag, 2024). Although this concept has been extensively used in corporate organizations and bank sector, its applicability in the higher education institutions is yet to be explored (Whelan et al., 2013). A zombie institution refers to a university or higher education institution that persistently experiences weak financial performance over an extended period, characterized by recurring operating deficits, inadequate internally generated resources, increasing dependence on external financial support, and a diminished capacity to sustain its core academic, research, and community engagement functions without continued government intervention or extraordinary financial assistance (Shrivastava & Shrivastava, 2014). It is especially significant to extend this framework to public universities in countries like South Africa where the public universities are the core of socio-economic development and depend on the government funding (Cloete & Maassen, 2015).

The current research aims to fill this gap by examining whether South African public universities have attributes of zombie institutions. In particular, the research employs the years of losses as a proxy of continuous financial distress and investigates the importance of capital adequacy, institutional size, institutional age, cash payout capacity, and growth in explaining the persistence of losses. Using the zombie-institution framework to higher education, this study will add to the literature in three ways. Firstly, it takes the zombie concept outside the corporate world. Secondly, it provides empirical results on the causes of chronic losses financial distress in universities. Thirdly, it offers managerial implications for strengthening the financial sustainability of South African public institutions in higher education.

1.1. Research Gap

Universities are crucial in national development in terms of human capital formation, research and innovation. In South Africa, tertiary institutions are increasingly faced with a tight financial climate marked by the increasing cost of operation, the need to increase access, and the excessive dependence on government funding (Walwyn & Cloete, 2016). Whereas there are few universities financially stable and others are still in operation despite making consistent losses. Such survival despite of sustained financial distress in the corporate finance literature is often termed as zombie behavior; however this theory has seldom been extended to the higher education sector (Pollard, 2022). The lack of empirical data reflects the possibility of universities to have zombie-like properties is one of the gaps in the literature. It is important to examine whether priority should be given to financially stable South African universities, since continued support for unsustainable institutions may divert scarce resources from more productive uses (Jansen, 2023). Therefore, a systematic study of chronic losses and their institutional predictors would be required to determine the sustainability of South African universities and to guide evidence-based policy interventions (Khumalo & Schutte, 2025). Although the literature on zombie institutions has been increasing, there is limited empirical research conducted on zombie-like behavior in institutions of higher education, especially in emerging economies. (Banerjee et al., 2018). This research bridges this gap by combining zombie theory with higher

education finance. Therefore, the basic research questions emerge to proceed with the current research:

- Whether South African public universities exhibit characteristics consistent with zombie institutions?
- How do capital adequacy, institutional size, age, cash payout capacity, and growth influence loss persistence in South African public universities?

1.2. Research Objectives

The main objective of this study is to examine whether South African public universities exhibit characteristics consistent with zombie institutions by analysing persistent financial distress and its institutional determinants. The following are the specific objectives in support of main objective:

- To examine whether the South African public universities exhibit persistent financial losses consistent with zombie-institution characteristics?
- To assess whether the capital adequacy, university size, university age, cash payout capacity, and university growth determine Zombie behaviour of persistent losses in South African public universities.

1.3. Significance of the Study

In corporate finance literature, zombie institutions are considered as those organisations that continue to exist despite a long history of losses (LOSSES), as continuing losses are a symptom of chronic financial weakness and failure to generate adequate internal resources (Upadhyay & Baag, 2024). The number of years with losses is the main proxy of zombie-like behaviour in this research.

2. Literature Review

2.1. Zombie Institution Literature

A Zombie institution refers to *an organization that persistently experiences weak profitability or repeated losses, lacks the capacity to cover operating or interest expenses from internal revenues, and survives primarily due to external financial support rather than economic viability* (Caballero et al., 2008; Banerjee & Hofmann, 2020). Zombie institutions are also characterized by low productivity, high leverage, and the inability to generate revenue that require to cover operating and financing expenses (Banerjee & Hofmann, 2020). Their inefficiency in resource allocation and can suffer the more productive organizations caused by their persistence losses, and their debts further limit financial flexibility and expose them to financial risks (Adalet McGowan et al., 2018; Acharya et al., 2019).

‘Zombie institution’ is a popular theoretical concept in economics and corporate finance research. The most influential study is conducted by Caballero et al. (2008), who examined the phenomenon of zombie lending in Japan and showed how banks continuously provided credit to the financially distressed firms in the 1990s, thus crippled the process of economic restructuring and productivity. The similar kind of studies later extended to Japan by Banerjee and Hofmann (2018) who reported that the increase in zombie institutions worldwide and explained their spread mostly by the long-term low

interest rates and monetary policies that would enable weak performing companies continue to existing even without financial success.

On the similar observation, McGowan et al. (2017) investigated the existence of zombie institutions in OECD countries and established that zombie features cause adverse impacts on productivity through entrapment of capital and labour in unproductive firms. Additional empirical data is presented by Acharya et al. (2019), who explored the actual impact of unconventional monetary policy in Europe and emphasized how easy credit conditions can contribute to the existence of unprofitable firms, thus, leading to the existence of zombie institution in the economic environment. In a similar work, Adalet McGowan et al. (2018) further supported the idea that the increasing proportion of zombie firms in developed economies may be a massive contributor to the stagnation of the overall productivity growth and efficient allocation of resources in markets.

Fukuda and Nakamura (2011) studied the process of the revival of zombie firms in Japan and discovered that restructuring of some of the distressed firms, including layoffs, asset sales, and operational efficiency, enabled them to restore their financial health. Likewise, Fontoura Gouveia and Osterhold (2018) demonstrated that the existence of zombie institution has adverse spill over effects due to its ability to absorb resources and restrict the ability of productive firms to grow further, which decreases the overall market efficiency and productivity. The combination of these studies constitutes the fundamental theoretical knowledge about zombie institution, its causes, prevalence, and economic impact in contemporary economies. Even though the zombie-institutions literature is mainly dedicated to the private firms, the conceptual framework can be extended to other organizational contexts, such as institutions of higher education that are faced with a consistent financial distress.

2.2. Theoretical Foundation

2.2.1. Zombie Institution Theory and Persistent Losses

Even though the Zombie institution theory is mainly applied to the private-sector firms, it can also be applied to the higher education institutions. Government subsidies or internal support mechanisms allow universities to persist in their operations in the face of operating losses and low internal revenue collection (Altbach et al., 2009). Therefore, the zombie institution theory offers the valuable approach to the analysis of university financial sustainability, emphasizing the chronic losses, ineffective internal resources allocation, and reliance on external assistance (Caballero et al., 2008; Banerjee & Hofmann, 2020). The years of financial losses in this research are used as an empirical proxy of zombie-like behavior.

2.2.2. Buffer Capital Theory and Capital Adequacy

The buffer capital theory of banking and corporate finance indicates that organizations need to keep additional capital resources beyond the minimum levels to absorb financial shocks and mitigate the risk of distress (Berger et al., 1995). Buffer capital in higher education institutions provides the institution with the ability to continue functioning during revenue fluctuations or uncertainty associated with it (Jokipii & Milne, 2011). Buffer capital in higher education institutions consists of accumulated reserves, endowment funds, and net assets, which enable the institution to continue functioning in case of revenue fluctuations or unexpected rises in expenditures (Massy, 2016). The institutions that have higher buffer capital can serve payment obligations and be stable without emergency external support (Johnstone, 2004). According to the zombie institution theory, the

lack of buffer capital further deteriorates financial conditions and relies on external source of financing (Banerjee & Hofmann, 2020). Thus, an increase in capital adequacy will decrease in the years of financial losses.

2.2.3. Economies of Scale Theory and Institutional Size

According to the economies of scale theory, the average costs are lower in large firms due to the better utilization of the resources and the distribution of the fixed costs (Panzar & Willig, 1977). Large firms are able to spread the administrative, infrastructural, and technological expenses in a wider activity to achieve the cost efficiency (Chandler, 1990). In universities, the large institutions usually have a variety of academic programs, a larger student population, and a greater level of research activities. These features allow diversifying revenue and distributing costs more efficiently than smaller institutions (Alshubiri, 2021). As a result, large universities appear to be more financially viable and less vulnerable to persistent losses (Johnes, 1997; Johnes & Johnes, 2016).

2.2.4. Organizational Learning, Life-Cycle Theory, and Institutional Age

According to the organizational learning theory, the performance of an institution can be enhanced by the experience that is acquired through learning processes (Levitt & March, 1988; Argote & Miron-Spektor, 2011). Likewise, life-cycle theory postulates that organizations undergo phases of start-up, growth and maturity, and in the case of higher education, older universities tend to have better governance systems, well established stakeholder networks and well established financial management systems (Shattock, 2010). These characteristics allow them to handle better financial risks and to perform more stable, whereas younger universities may not be developed these abilities to defend financial risks (Massy, 2016). Hence, institutional age will be a risk mitigating factor from incurring continuous financial losses.

2.2.5. Pecking Order Theory and Cash Payout Capacity

The theory of pecking order holds that organizations tend to first use internal financing, then debt financing, and lastly use external financing (Myers & Majluf, 1984). This level of hierarchy ensures that the transaction costs are minimized and there will be less reliance on external stakeholders. For the universities, preferred sources of financing are the internally generated reserves and surpluses. Those institutions that have larger internal cash generation are able to cover the operational requirements without depending on outside sources (DeAngelo & Roll, 2015). On the other hand, low internal cash generation leads to dependency on subsidies or debt, a situation that is typically related to zombie institutions (Banerjee & Hofmann, 2020; Caballero et al., 2008). Thus, an enhanced cash payout capacity will be likely to lower the loss persistence.

2.2.6. Resource-Based Theory and Institutional Growth

Resource-based theory states that organizational performance is determined by the usefulness of the valuable, rare and inimitable resources (Barney, 1991; Peteraf, 1993). These resources in universities are financial resources, academic staff, infrastructure, research capabilities, and institutional reputation, which are used effectively to increase the chances of attracting students, raising funds, and generating revenues (Massy, 2016). Expansion is thus an indication of increasing demand and better prospects of revenue in the future (Delmar, 2003). As a result, the institutions that grow more vigorously have lower chances to suffer continuous financial losses and zombie-like situations.

The Table1 represents the variable drawn from various theories to have research construct to explore into research objectives.

Table1. Variables drawn from theories

Sl.No	Variable	Theory
1	LOSS	Zombie Institutions
2	CAPAD	Buffer capital
3	SIZE	Economies of scale
4	AGE	Learning/ lifecycle
5	CASHPAY	Pecking order
6	GROWTH	Resource-based

3. Research Methodology

The quantitative research design is used in this study to determine the presence of zombie characteristics in South African public universities. Quantitative methods are preferred in empirical financial research since they provide the possibility to measure the relationships between the variables systematically and to conduct objective statistical tests (Creswell & Creswell, 2018). The empirical study is developed on the regression methods of the panel data, which enables the research to account both the cross-sectional and time-series changes in the financial performance of the South African public universities (Baltagi, 2021).

3.1. Data and Sample Description

The sample consists of 19 South African public universities, with financial panel data observed over a 10-year period from 2014 to 2023. The financial information is collected from the publicly available annual reports of South African universities and higher education statistics. Upon the elimination of incomplete observations, the sample size is reduced to 190 university-year observations. All continuous variables are converted to natural logarithms where necessary to minimize skewness and make them comparable across institutions. The reason why the log values are taken in empirical studies is to enhance the quality and interpretation of the statistical analysis (Wooldridge, 2019).

The logarithmic transformation reduces the skewness and reduces their impact of extreme values on statistical analysis and thereby makes the data normally distributed. It is useful in controlling heteroskedasticity, by stabilizing the variance among observations. The log transformation enables the coefficients to be in percentage terms which are more significant when comparing institutions of varying size, it transforms nonlinear relationships into a linear, which simplifies regression estimation and increases its reliability (Wooldridge, 2019).

The research design used in this paper has a number of characteristics that contribute to the strength and reliability of the empirical research. This research is based on objective financial information gathered through official university reports and publicly available institutional sources, which makes the data reliable and reduces the subjective bias. The study carried out a systematic analysis of the relationship between institutional characteristics and the persistence of financial losses is possible through the use of quantitative econometric methods, especially Ordinary Least Squares (OLS) regression, which allows conducting a transparent and repeatable analysis (Wooldridge, 2019). Mainly, the choice of explanatory variables, i.e., capital adequacy, institutional size, age, cash payout capacity, and growth, represents various aspects of financial sustainability and gives a holistic picture of assessing zombie-like behavior.

Regression estimation is preceded by descriptive statistics, correlation analysis and diagnostic tests. A number of robustness tests are carried out to determine the reliability and stability of the empirical findings. The lagged values of the independent variables are estimated to obtain alternative specifications of the model to capture the possible dynamic effects and to address the issue of reverse causality (Baltagi, 2021). All regressions are then re-estimated with robust standard errors to correct the possible heteroskedasticity in the error terms. The cases that are deemed as extreme outliers are dropped so that the results are not influenced by few influential cases (Hair et al., 2019). Finally, Variance Inflation Factor (VIF) diagnostics are used to ascertain that there is no serious multicollinearity between the explanatory variables (Hair et al., 2019). The coefficients estimated in all these alternative specifications and tests have the same signs and significance, which means that the findings are qualitatively consistent and robust.

The research has a strong presence of robustness as it uses a multi-variable analytic framework that reflects various aspects of financial sustainability. The analysis is concentrated on the persistence of losses, which enables the evaluation of the long-term financial vulnerability instead of the short-term changes. Hypotheses based on theories guarantee a great deal of consistency between the conceptual basis and empirical test. The utilization of publicly available secondary data contributes to transparency, replicability, and the validity of the model in general (Creswell & Creswell, 2018).

3.2. Conceptual Framework

The approach to this study is based on the Zombie institution theory that describes organizations that remain operational despite of perennial financial distress, poor profitability, and weak long-term viability. In the context of higher education sector, a university can be characterized as a zombie when it has been experiencing financial losses still managed to remain operate due to internal restructuring, outside assistance, or short-term financial cushions instead of long-term financial performance (Caballero et al., 2008; Banerjee & Hofmann, 2020; Massy, 2016; Barney, 1991).

To facilitate the analysis, logarithmic transformations of selected variables were created. Persistent financial vulnerability, i.e., the number of years with losses (LOSSES) is the dependent variable in this study and it is the main measure of zombie-university behavior. The framework suggests the existence of a number of institutional characteristics that determine the probability and the continuation of losses. The important explanatory variables are capital adequacy (CAPD→CAPAD1), university size (SIZE→SIZE1), university age (AGE→AGE1), cash payout capacity (CASHPAY→CASHPAY1), and growth (GROWTH→GROWTH1). Table2 represents the variable measurement criteria adopted in the study to collect and analyse the data.

Table 2. Variable Measurement and their symbols

Variable	Measurement	Symbol	Logarithm Symbol
Number of years with losses(Dependent)	Count of years university reports negative operating income	LOSSES	-----
Capital adequacy (Independent)	Equity / Total Assets (log)	CAPAD	CAPAD1
University size (Independent)	Natural log of total assets	SIZE	SIZE1

University age (Independent)	Natural log of years since establishment	AGE	AGE1
Cash payout capacity (Independent)	Cash payments / Total assets (log)	CASHPAY	CASHPAY1
Growth (Independent)	Annual percentage change in total assets or revenues	GROWTH	GROWTH1

- *Capital adequacy* is the amount of financial buffer that can be used to absorb shocks and stay operating. Universities that have better capital status will tend to survive bad conditions hence less loss persistence (Berger et al., 1995; Jokipii & Milne, 2011).
- *University size* measures the effects of scale and diversification. The bigger the university is, the bigger the range of programs, the diversified revenue streams, and the economies of scale, the more the financial stability (Johnes & Johnes, 2016; Cohn et al., 1989).
- *University age* is a measure of organizational maturity and learning. The expected benefit of older institutions is that they are supposed to have experience, well-developed policies and reputation which makes them less vulnerable to losses (Argote & Miron-Spektor, 2011; Shattock, 2010).
- *Cash payout capacity* is the financial slack and discretionary resources are represented by CASHPAY. Universities with the ability to get excess cash should be more financially well-being and less likely to experience extensive losses (Myers & Majluf, 1984; DeAngelo & Roll, 2015).
- *University's growth* is the growth of revenues or operations, the future prospects of income. Universities that have higher growth potential will tend to increase their profitability and decrease the chances of going into a continuous loss (Delmar et al., 2003).

Collectively, all these variables account for differences in financial distress and enable to determine whether South African public universities exhibit characteristics of zombie institutions or financially sustainable.

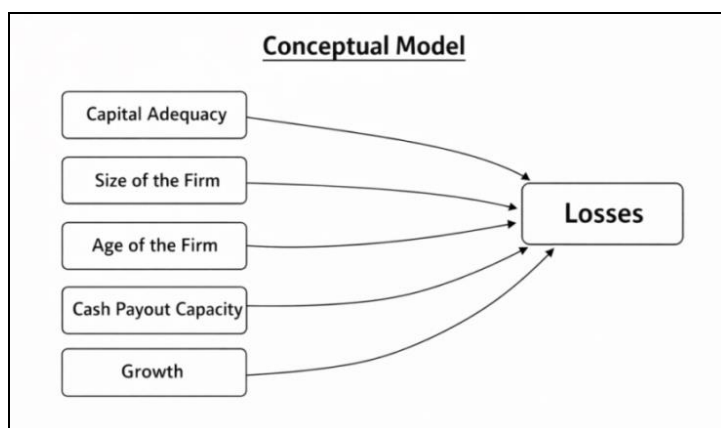


Figure1. Conceptual Model

Source: Developed from study

As represented in the Figure1, the Capital adequacy, institutional size, institutional age, cash payout capacity and growth are modelled as some of the determinants of loss persistence. These features of institutions internalize financial buffers, economies of scale, organizational maturity, financial slackness, and future income prospects respectively. The framework therefore connects the

institutional-level basics to financial fragility, which facilitates an empirical evaluation of whether South African public universities are zombies or sustainable financially (Caballero et al., 2008; Banerjee & Hofmann, 2020).

3.3. Hypotheses Development

On the basis of the theoretical framework and existing literature on the subject, the following directional relationships are suggested to link the institutional characteristics and the persistence of financial losses. The financial strength, organizational maturity and growth capacity make the expected contribution to long-term financial vulnerability reduction based on these relationships. More precisely, financial sustainability is expected to be improved through greater institutional fundamentals, which will consequently lower the risks of long time of loss-making behavior of zombie institutions (Caballero et al., 2008; Banerjee & Hofmann, 2020).

3.3.1. Capital Adequacy and Zombie Behaviour

It is observed that the correlation between capital adequacy (CAPAD) and capital losses will be negative since an increase in capital adequacy will show a high financial stability to absorb any shocks of an economic or operating nature. Companies that possess sufficient capital buffers can be in a better position to cope with temporary revenue losses, meet unforeseen expenses and sustain their operations without going into recurrent losses. High capital positions also contribute to the financial planning capacity and to the lack of reliance on outside funding or emergency funds (Berger et al., 1995; Jokipii & Milne, 2011). Capital adequacy is thus, how much a university has enough financial resources to absorb shocks and meet its obligations to operate in financially stressful times (Berger et al., 1995). The presence of sufficient capital reserves gives institutions the capacity to stabilize their operation and invest in productivity enhancing operations as opposed to depending heavily on external financing.

In the case of zombies-institution, firms turn into zombies where they keep on functioning even as they maintain a weak financial state and rely on external assistance as opposed to self-revenue generation (Caballero et al., 2008; Banerjee & Hofmann, 2020). It is thus assumed that universities that are better capital adequate would not need the emergency funding or soft budget greatly, they would be in a better position to restore financial equilibrium by making internal adjustments. Therefore, the adequate capital means that there will be non-existence of persistent financial losses.

Hypothesis 1: *Capital adequacy is negatively associated with persistent losses in South African public universities.*

3.3.2. University Size and Zombie Behavior

The correlation between the institutional size and loss will assume a negative role since the large institutional size usually is characterized by economies of scale, diversification of revenue, and more pronounced reputation benefits. The larger size of an institutional portfolio is traditionally linked to a wider range of programs and more revenue diversification (Johnes & Johnes, 2016; Cohn et al., 1989). Larger Universities usually generate revenue in many ways which include tuition fee, government subsidies, research grants, foreign students and business partners. This diversification will decrease the reliance on single source of revenue and promote financial stability.

Besides this, larger institutions tend to have a better reputational capital, high bargaining power, and an enhanced access to funding opportunities (Altbach et al., 2009). These benefits make the financial resilience higher, and reduce the chances of long-term financial distress. According to the theory of zombie institutions, financially viable universities ought to be capable of leverage on their institutional size to ensure that they continue to operate at a positive level instead of mere surviving based on external support. Thus, it is likely that the financial losses of larger universities will be reduced.

Hypothesis 2: Size of the university is negatively associated with persistent losses in South African public universities.

3.3.3. University Age and Zombie Behavior

According to the organizational learning theory, as the institutions grow, they acquire managerial experience, operational knowledge and institutional capabilities, which enhance efficiency in decision making and minimize operational errors (Argote & Miron-Spektor, 2011; Levitt & March, 1988). Established reputation, steady stakeholder relations, and access to more financial resources are the added advantages of mature organizations, which mean that they can easily survive in the fluctuating environment.

In the context of public universities in South Africa, its Age is a measure of organizational maturity and institutional knowledge. Older universities generally have well established governance frameworks, stable administrative and long-standing ties with governments, donors, alumni and industrial partners (Shattock, 2010). Such attributes lead to better financial discipline and strategic capability. Older universities are therefore better placed to foresee the financial problems and take the corrective actions. On the contrary, younger institutions might have more problems with creating sustainable financial models, and they can be more susceptible to ongoing losses. Hence the following hypothesis is formulated for testifying its reality.

Hypothesis 3: Age of the university is negatively associated with persistent losses in South African public universities.

3.3.4. Cash Payout Capacity and Zombie Behavior

The cash payout capacity will have a negative correlation with losses since those institutions that can produce enough internal cash flows will have the ability to pay their operational costs, service their financial commitments and to remain financially stable without having to heavily depend on external financing. It is a high cash-generating capacity that demonstrates the efficiency of operations, the management of revenues, and financial discipline (Myers & Majluf, 1984; DeAngelo & Roll, 2015). Those institutions that have a greater cash payout potential are thus in a better position to absorb any short-term financial shocks and deal with the liquidity pressure effectively.

Universities that have higher internal cash flows have more financial slack allowing them to be flexible in response to unanticipated spending or short-term revenue losses. In the zombie-institution perspective, the financially strong organizations must be able to create internal cash flows to enable them to operate without depending on external support all the times (Banerjee & Hofmann, 2020). On the other hand, those institutions that have low cash payout capacity can have financial liabilities, postpone required spending and rely on bailouts, which are usually related to zombie behaviour. In this regard, the ability to payout cash will lead to the minimization of the continuity of financial losses, thus the following hypothesis is framed.

Hypothesis 4: *Cash payout capacity is negatively associated with persistent losses in South African public universities.*

3.3.5. Growth and Zombie Behaviour

The institutional growth will be expected to have negative relationship with losses since, growing organizations, have rising revenues, better markets, and more effective resource use. Growth is usually an indication of increasing demand, operational efficiency and effective strategic decisions that reinforce financial performance (Davidsson & Gartner, 2003). In the context of South African public universities, the Growth can be viewed as an increase in student enrolment, expansion of programs, research output, or revenues of the institution in the context of higher education. Any university that grows sustainably can expect to benefit from increased tuition revenue, increased academic programs and better institutional publicity, which in turn leads to financial sustainability in the long term (Altbach et al., 2009). Conversely, zombie institutions tend to stagnate or have unproductive growth that cannot be reflected into better financial performance. The sustainable growth with the proper management and the efficient use of the resources would consequently reduce the persistent financial losses thereby evade zombie institution features. Thus the discussion reduces to the following hypothesis.

Hypothesis 5: *Growth of the university is negatively associated with persistent losses in South African public universities.*

4. Data Analysis

4.1. Descriptive Statistics

The study utilizes a balanced panel dataset comprising 190 observations from 19 universities over a 10-year period spanning 2014 to 2023. Table 3 shows descriptive statistics of all study variables and their mean, standard deviation, minimum, maximum, and quartile values. The statistics indicate that there is a significant heterogeneity in financial performance, capitalization, liquidity, growth, institutional size, maturity and macroeconomic conditions. This kind of variation is necessary to have a good econometric estimation and substantial inference in panel-data analysis (Baltagi, 2021; Wooldridge, 2010).

Table 3. Descriptive statistics of key variables

Variable	Minimum	Maximum	Median	IQR (Q3–Q1)	Mean	Std Dev
CAPAD	-0.22	2.13	0.18	0.34	0.22	0.27
CAPAD1	-10	0.76	-1.51	1.63	-2.04	2
SIZE	0	18.76	15.54	1.17	15.45	1.76
SIZE1	0	2.93	2.74	0.08	2.72	0.29
AGE	2	119	55	81	57.33	38.45
AGE1	0.69	4.78	4.01	1.75	3.71	0.94
CASHPAY	0	10.17	0.85	1.55	1.49	1.66
CASHPAY1	-4.54	2.32	-0.13	1.59	-0.17	1.17
GROWTH	-0.66	10.18	0.09	0.11	0.17	0.78
GROWTH1	-8.5	2.32	-2.03	1.4	-1.74	1.28
LOSSES	0	1	0	0.11	0.11	0.17

Capital Adequacy: The mean of capital adequacy (CAPAD) is 0.22 with a standard deviation of 0.27 with a minimum of -0.22 and a maximum of 2.13. The median is 0.18, and the interquartile range is

between 0.02 and 0.36, indicating that the majority of universities have rather lean capital buffers. Negative values represent incidences of negative equity or gross financial imbalance (Berger, et al., 1995; Jokipii & Milne, 2011). However, there are few universities with very high capitalization that increases the mean. The mean of the logged capital adequacy ratio (CAPAD1) is -2.04, SD= 2.00 and the range is -10.00 to 0.76. The negative values being predominant indicate that the capital adequacy ratios are less than one, which creates concern over long term solvency of a section of universities.

Total Assets: The mean of the total assets (SIZE) is 15.45 and the standard deviation is 1.76 with the range value 0-18.76. The mean of 15.54 is close to the median, which is a relatively symmetric distribution. These statistics indicate that there is significant size heterogeneity in the sample as there are both small and large universities. The university size is thus an important control variable to explain financial performance and stability. The mean of the logged size variable (SIZE1) is 2.72, the standard deviation is 0.29 and the range is small (between 0 and 2.93), which means that after transformation, the size differences are more compact and are approximately normally distributed thus eliminating the scale distortions in the regression analysis (Wooldridge, 2010).

University Age: The mean of the University age (AGE) is 57.33 years with a standard deviation of 38.45 years with a minimum of 2 years and a maximum of 119 years. Its median age stands at 55 years, with the first and third quartiles at 17 and 98 years, respectively, which means that there are institutions as young as possible and as mature as possible at the same time (Levitt & March, 1988; Argote & Miron-Spektor, 2011). Older universities might have a reputational capital, alumni networks, and predictable funding, and younger institutions might have a higher growth opportunity and more financial uncertainty.

The log of university age (AGE1) has the mean of 3.71, with the standard deviation of 0.94 and the range of 0.69 to 4.78. The transformation compresses the upper tail and focuses more on proportional differences in maturity, which can be analyzed more carefully to examine the effects of life cycles (Gujarati & Porter, 2009).

Cash Payment Ratio: The mean of the cash payment (CASHPAY) ratio is 1.49 and the standard deviation is 1.66 and the values are within the range of 0 to 10.17. The median is 0.85 and the interquartile range is 0.39 to 1.94, which means that the majority of universities are moderately liquid but some of them possess exceptionally high cash balances (Myers & Majluf, 1984; DeAngelo & Roll, 2015). The mean of the logged liquidity measure (CASHPAY1) is -0.17, standard deviation is 1.17 and the range of the measure is -4.54 to 2.32. The distribution indicates that liquidity positions are fairly concentrated after transformation at moderate values.

Growth in Assets: Asset growth (GROWTH) has a mean of 0.17, standard deviation of 0.78 and a range of -0.66 to 10.18. This growth rate of 0.09 indicates that most universities are growing at a relatively slow rate (Delmer et al., 2003), which means the sector is growing but unevenly and is concerted in a few universities. The mean of the logged growth variable (GROWTH1) is equal to -1.74, the standard deviation is equal to 1.28 with the largest expansions being relatively small (between -8.50 and 2.32).

Loss History Ratio (LOSSES): The mean of the loss history ratio is 0.105, which means that on average, universities incur losses during 10.5 per cent of the years that are observed. The median is 0 and the maximum is 1, which implies that there are universities that make a loss in all years considered. The continuous loss-making behavior is a common indicator of financial distress and potential zombie-institution characteristics in the empirical research (Caballero et al., 2008; Banerjee

& Hofmann, 2020). These statistics hence indicate that even though most universities are financially sound throughout most of the years, a sub-group is financially weak for a continuous period.

4.1. Correlation of Key Variables

The correlation analysis matrix presented in Table 4 reflects that there are statistically significant relationships between the variables. The correlation coefficient between capital adequacy (CAPAD1) and institutional size (SIZE1), age (AGE1), cash payout capacity (CASHPAY1), growth (GROWTH1), and the years of losses (LOSSES) are presented in a pairwise manner. Overall, the coefficients are not large in magnitude, which implies the weakness of the linear relationships and the low probability of multicollinearity between the explanatory variables.

Table 4. Correlation matrix

Variable	CAPAD1	SIZE1	AGE1	CASHPAY1	GROWTH1	LOSSES
CAPAD1	1					
SIZE1	-0.13	1				
AGE1	0.1	-0.03	1			
CASHPAY1	0.01	-0.07	-0.06	1		
GROWTH1	-0.01	-0.16	-0.14	-0.03	1	
LOSSES	0.07	0.04	-0.42	0.04	-0.05	1

CAPAD1 and LOSSES have a correlation of 0.07, which means that the relationship is weakly positive. This implies that universities that are more capital adequately have a few years of losses. Even though small, the positive value can be a sign that capital buffers are built after the bouts of financial vulnerability and not just prevention of losses, which is also in line with the zombie-institution argument that capital injections can keep operations going without re-establishing profitability. The SIZE1 and LOSSES have a very weak positive correlation at 0.04. This means that bigger universities do not have fewer years of losses. The fact that the magnitude is almost zero, implies that institutional size is not an assurance of financial sustainability, which means that efficiency and governance could be more important than scale. The relationship between

AGE1 and LOSSES is moderate with a negative correlation of -0.42 which is the most significant in the matrix. This shows that older universities are likely to have significantly less years of losses. The scale implies that the maturity of organizations, the experience of organizations, and the established governance systems are significant in the minimization of the chronic financial distress. The correlation of CASHPAY1 and LOSSES is 0.04 which is a very weak positive interrelationship. This implies that long-term loss persistence is not highly correlated with liquidity, which is quantified as cash payout capacity, and hence liquidity may not be the adequate solution to structural financial weaknesses.

GROWTH1 and LOSSES have a negative correlation of -0.05 which means that there is a weak negative relationship. This implies that the universities that grow faster are likely to have a few years of losses, which is in line with the fact that growth is likely to increase the revenue potential and minimize financial vulnerability. The explanatory variables also have low correlations (between 0.10 and -0.16), which implies that they represent different institutional features. As an illustration, SIZE1 has weak negativity with GROWTH1 (-0.16) and CAPAD1 (-0.13), indicating that bigger universities do not always grow at a faster rate or have a correspondingly larger capital buffer. AGE1 is positively

related to CAPAD1 (0.10) and negatively related to SIZE1 (−0.03) and GROWTH1 (−0.14), which means that older universities are not systematically larger or faster-growing.

4.2. Regression Analysis

This study explores whether South African government universities exhibit characteristics of zombie institutions by analyzing how institutional factors such as capital adequacy, size, age, cash payout capacity, and growth—influence the number of years they experience financial losses (LOSSES). The regression equation is as follows:

$$\text{LOSSES}_{it} = \alpha + \beta_1 \text{CAPAD1}_{it} + \beta_2 \text{SIZE1}_{it} + \beta_3 \text{AGE1}_{it} + \beta_4 \text{CASHPAY1}_{it} + \beta_5 \text{GROWTH}_{it} + \varepsilon_{it}$$

Where:

- $i=1,2,\dots, n$ denotes the university
- $t=1,2,\dots, n$ denotes the year (time period)
- LOSSES_{it} represents the number of years in which university i record financial losses in year t
- α is the intercept (constant term)
- $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ are the coefficients of the explanatory variables
- CAPAD1_{it} denotes capital adequacy
- SIZE1_{it} denotes institutional size
- AGE1_{it} denotes institutional age
- CASHPAY1_{it} denotes cash payout capacity
- GROWTH_{it} denotes institutional growth
- ε_{it} represents the error term capturing unobserved influences on loss persistence.

Table 5. Regression statistics

Regression Model	
R ²	190
Adjusted R ²	0.2019
F-statistic	0.1802
Max VIF	9.311***
R ²	1.05

The empirical results provide several important insights. On the model level, the regression is statistically significant ($F = 9.311$, $p < 0.001$), which implies that the combination of explanatory variables can be used to explain variations in loss persistence. The model presented in the Table 5 can explain the variation in the number of years with losses of about 20.2 percent ($R^2 = 0.2019$) and this is understandable considering that university financial sustainability is a complex and multifaceted phenomenon. In addition, all VIF are near to 1, which proves that the data does not contain multicollinearity and the estimated coefficients can be reliable.

Table 6. Determinants of Number of Years with Losses

Variable	Coefficient	Std. Error	t-value
Intercept	0.3518***	0.1151	3.058
xCAPAD1	0.0094*	0.0055	1.706
xSIZE1	0.0139	0.0393	0.355
xAGE1	-0.0782***	0.0118	-6.639
xCASHPAY1	0.0016	0.0094	0.166
xGROWTH1	-0.0143	0.0087	-1.637

Table 6 presents the key factors influencing the persistence of financial losses among South African public universities. The results suggest that the number of years with losses is negatively and statistically significantly related to institutional age (AGE1) ($\beta = -0.078$). In simple terms, older universities appear less likely to experience prolonged periods of financial losses when compared to younger institutions. One possible explanation is that, over time, institutions tend to build experience, strengthen organizational learning, and develop more stable governance structures. In addition, a well-established reputation may also play a role in enhancing financial resilience, thereby reducing the chances of long-term financial distress.

The capital adequacy (CAPAD1) shows a positive but statistically insignificant relationship with loss persistence ($\beta = 0.009$, $p < 0.10$). At first glance, this might seem counterintuitive, as stronger capital buffers are generally expected to reduce financial vulnerability. However, the results indicate that universities with higher capital reserves may still go through periods of financial losses. This could mean that such reserves are not necessarily preventive in nature; rather, they may be accumulated in response to financial stress, either through external support or internal adjustments. In this context, the pattern somewhat resembles what is often described as zombie behavior, where institutions continue to operate despite weak financial performance, supported by available capital buffers.

The university size (SIZE1) does not appear to have any statistically significant relationship with loss persistence ($\beta = 0.014$, $p = 0.723$). This finding suggests that being larger does not automatically translate into greater financial stability. In other words, scale alone may not be sufficient to ensure better financial outcomes. It seems more reasonable to infer that factors such as operational efficiency and the quality of management practices are likely to play a more decisive role than sheer size.

Whereas cash payout capacity (CASHPAY1) also shows no significant relationship with losses ($\beta = 0.002$, $p = 0.869$). This indicates that while short-term liquidity is undoubtedly important for day-to-day functioning, it does not substantially explain recurring or long-term financial difficulties. Put differently, having sufficient cash flow in the short run does not necessarily protect institutions from persistent financial stress over time. Finally, growth (GROWTH1) exhibits a negative but statistically insignificant relationship with loss persistence ($\beta = -0.014$, $p = 0.103$). Although the direction of the relationship hints that growth might help in reducing the duration of financial losses, the lack of statistical significance makes it difficult to draw a strong conclusion. It is therefore reasonable to suggest that expansion alone may not be enough to resolve deeper structural financial challenges.

Therefore the results point out clearly that the university age as a key factor in reducing persistent financial vulnerability. By contrast, other characteristics—such as size, liquidity, and growth—do not seem to exert a decisive influence. Taken together, these findings provide some support for the

presence of zombie-like behavior among certain South African public universities, particularly in cases where institutions continue to operate despite recurring losses and rely on capital buffers rather than achieving sustainable financial performance.

5. Discussion

This study investigates the determinants of the number of years in which firms experience losses, focusing on South African public universities' financial and structural characteristics. Table 7 provides the summary of hypotheses testing results. The findings indicate that university age plays a significant role in explaining loss persistence. The strong and negative relationship between university age and losses suggests that older universities benefit from accumulated experience, refined operational processes, and established market presence, which enhance their ability to manage costs and generate stable revenues. This result is consistent with organizational learning and life-cycle theories, which posit that universities improve efficiency as they mature.

Table 7. Hypotheses Testing Summary

Hypothesis	Statement	Result
H1	Capital adequacy is negatively associated with persistent losses in South African public universities.	Weakly supported . (at 10% level)
H2	Size of the university is negatively associated with persistent losses in South African public universities.	Not supported
H3	Age of the university is negatively associated with persistent losses in South African public universities.	Supported
H4	Cash payout capacity is negatively associated with persistent losses in South African public universities.	Not supported
H5	Growth of the university is negatively associated with persistent losses in South African public universities.	Not supported

Capital adequacy shows a low positive correlation with losses with 10 percent level of significance. This finding suggests that capital buffers are strengthened when universities experience financial distress not because capital adequacy is directly deterring losses. This behaviour is consistent with precautionary motive of capital holding and the zombie institutions literature that demonstrates that capital infusion or financial aid can enable distressed institutions to keep operating without regaining profitability (Caballero et al., 2008; Acharya et al., 2019). There is no significant effect of university size on loss, indicating that mere size of the university does not determine the financial stability. Although these larger universities can have the benefits of diversification and economies of scale, there is a possibility that increased administrative expenses and organizational inefficiency that can counter these advantages. The findings reiterate that resources need to be well utilized to create competitive advantage as compared to depending on university size alone (Penrose, 1959; Barney, 1991).

Cash payout is statistically non-significant vis-à-vis Losses, which indicates that the decisions on cash payout do not systematically influence the financial losses. This observation conforms to pecking order theory which holds that universities are interested in internal financing and have financial policies that are long term oriented than short-term performance fluctuations (Myers & Majluf, 1984). The growth opportunities show a negative and not significant correlation with losses, and it means that growing

universities may be in better positioned to enhance profitability; however the impact is not considerable in this sample. Previous studies indicate that institutional growth has the potential power to increase revenue and future performance, although such advantages are purely depends upon good management and resource allocation (Delmar et al., 2003).

5.1. Managerial and Policy Implications

The findings of the study have considerable managerial and policy implications that enhance the financial sustainability of the South African public universities and minimizing the chances of universities becoming zombies. As university age is greatly related with the number of years of losses, policymakers and higher education authorities need to offer special financial assistance to the new universities with well-organized mentoring programs, capacity-building programs, and transitional funding systems that reinforce financial management in the initial years of progress. The more experience an institution gains, the more it is likely to build efficient governance frameworks that increase operational and financial stability.

Another important aspect that should be stressed by the university management is experience-based governance and professionalization of financial leadership through investing in managerial training, adopting best-practice financial controls, and knowledge-sharing among institutions because effective governance is the key to transforming institutional resources into sustainable performance. Moreover, the good relationship between capital adequacy and loss persistence points to the necessity to pay more attention to capital structures.

The regulators and governing councils are supposed to decide whether capital buffers are proactive financial fortification or reactions to current distress and any capital injections are to be linked to clear turnaround plans and performance targets to prevent the perpetuation of inefficient universities. Lastly, the findings suggest that university growth is not an absolute determinant for achieving better financial performance, thus the university administrators are recommended to embark on balanced growth strategies that can match the growth in enrolment, program development, and investment in infrastructure with the ability to generate revenue and the labour-market demand. Growth without efficiency or diversified revenue can increase financial strain instead of reducing it. Overall, strong financial management, good governance, and clear strategy are essential to prevent zombie universities and ensure a resilient higher education system.

5.2. Academic Implications

The research has significant academic and theoretical implications for the areas of financial vulnerability, organizational sustainability, and higher education economics. Using the zombie institution theory to South African public universities, the research generalizes a concept already embedded in the corporate and banking literature to the higher education sector by drawing publicly funded and non-profit institutions which exhibit zombie-like characteristics. Using persistent losses as a proxy for zombie behavior provides a practical and theoretically sound way to assess the extent of financial distress among South African public universities. The significant negative correlation between institutional age and loss persistence provides a solid evidence of organizational learning and life-cycle theories, which could mean that the experience gained over the years, institutional knowledge, and well-established governance structures contribute to financial safety. Similarly, a

positive correlation between capital adequacy and years of losses moderate buffer capital theory, indicating that increased capital buffers can be responsive to financial distress instead of preventive in nature, which is in line with soft budget constraints and zombie dynamics.

The fact that size, cash payout capacity, and growth are not very significant challenge the universal applicability of the economies of scale, the pecking order theory, and the resource-based theory in the context of higher education, meaning that size, liquidity, and expansion are not enough in order to have secure financial sustainability. As a whole, these results can be used to advance the theory by emphasizing the significance of institutional maturity (Age) and structural conditions, to refine the existing financial theories, and to provide a method to interpret the long-term financial distress and viability in universities.

5.3. Limitations of the Study

This research has a number of limitations which are worth mentioning despite its contributions. To begin with, the analysis is based mostly on financial indicators and fails to consider non-financial aspects like the quality of governance, leadership, institutional strategy, or academic performance all of which can also be influential in determining financial sustainability of universities. Second, the number of years with losses is used in the study as a proxy of zombie behavior. Even though this measure implies a long-term financial stress, it might not accurately represent other significant aspects of zombie institutions, such as stagnation of productivity, inefficiency, or excessive reliance on external subsidies and bailouts. Third, the sample is limited to the South African public universities, which might not be generalizable to the higher education systems of other countries with varying funding regimes and regulatory environments. Fourth, the research uses ordinary least squares (OLS) estimation, which can be affected by endogeneity issues caused by simultaneity or omitted variable bias.

5.4. Implications for future Research

This study can be further advanced in a number of ways in the future. To begin with, addition of non-financial variables like governance quality, leadership effectiveness, institutional strategy, academic performance and research productivity would give a more holistic picture of financial sustainability in higher education. Second, a longitudinal and dynamic panel, such as fixed-effects, GMM, or instrumental variable, design would be more effective to overcome endogeneity issues and may help to account for the time-persistence of financial distress. Third, future research can make the measurement of zombie behavior more precise by creating multidimensional indices including indicators such as debt-servicing capacity, government subsidy dependence, liquidity, productivity, and efficiency instead of using loss persistence as the only indicator.

Comparative cross-country studies would also be useful in establishing whether the behavior of zombie-like among universities is context-dependent or systemic across various funding and governance systems. In addition, policy interventions and funding reforms might be assessed to gain more causal information about the reduction of financial distress strategies. Lastly, qualitative and mixed-method designs, such as case studies and interviews with university officials and policymakers, can be used to supplement quantitative studies by exposing institutional behaviors and situational dynamics that contribute to the formation and maintenance of zombie universities.

The evaluation is mainly based on financial measures and fails to include the quality of governance, changes in the funding policy and political factors that can influence the sustainability of institutions. Moreover, the LOSSES as zombie behavior proxy can be somewhat inadequate to represent every aspect of institutional distress. There are also constraints in the data and variables like debt structure, dependence on government subsidies, liquidity ratios, and efficiency measures, which can further enhance the analysis, are not included.

6. Conclusion

This study explores whether public universities in South Africa show signs of becoming zombie institutions that is, institutions that continue to operate despite ongoing financial difficulties and weak internal sustainability. To capture this, the study uses the number of years university reports losses as an indicator of zombie-like behavior. It then examines how factors such as capital adequacy, institutional size, age, cash payout capacity, and growth shape the persistence of these losses.

The findings suggest that institutional age plays the most important role in financial sustainability. Older universities tend to experience fewer years of losses, likely because of their accumulated experience, more stable governance systems, and stronger relationships with stakeholders. In contrast, younger institutions appear to be more exposed to prolonged financial stress. The results also point to a weak positive relationship between capital adequacy and loss persistence, indicating that financial reserves may often build up as a response to distress rather than acting as a safeguard against it. This highlights the need for policymakers to look beyond short-term financial support and focus more on strengthening long-term financial management and accountability within universities.

At the same time, the study finds that institutional size, cash payout capacity, and growth do not significantly reduce the persistence of losses. In other words, simply being larger, having more liquidity, or expanding operations does not automatically ensure financial stability. Overall, the results provide partial evidence that some South African public universities exhibit features of zombie institutions, continuing to operate despite repeated losses and relying on financial buffers instead of sustainable performance. These insights point to the importance of improving financial governance, offering more targeted support to younger and financially vulnerable institutions, and placing greater emphasis on sustainable growth and diversified revenue sources to strengthen long-term resilience in the higher education sector.

Data Availability Statement

The authors confirm that the data supporting the findings of this study are available within the article [and/or] its supplementary materials.

Conflict of Interest

The authors have no conflicts of interest to declare that are relevant to the content of this article.

Institutional Review Board Statement

Ethical approval is obtained for this study under the title “Financial Stability of South African universities” from Graduate School of Business Leadership, University of South Africa Vide Reference No: 2025_SBL_AC_029_Ex_8654 dated 06/06/2025.

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