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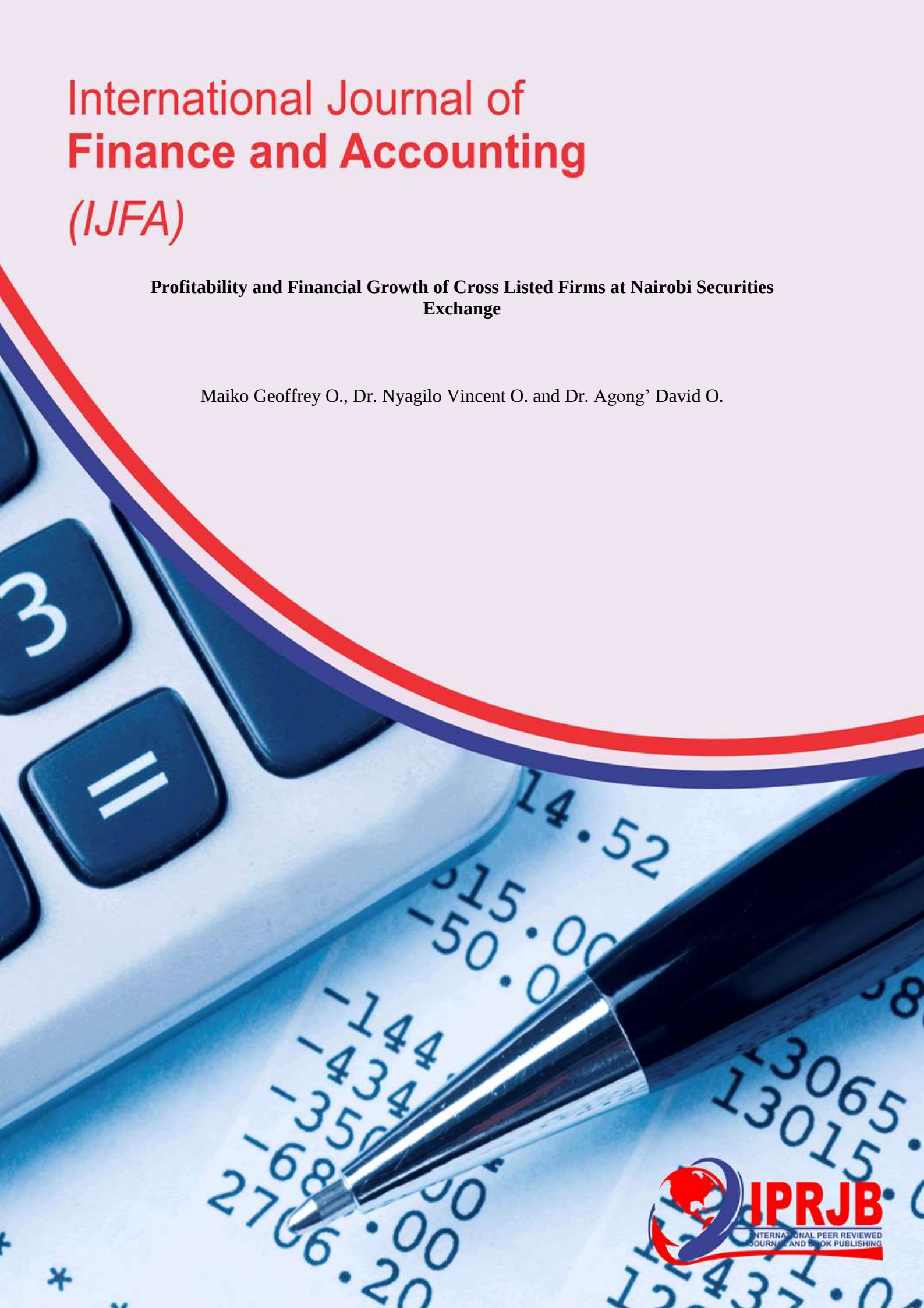

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Profitability and Financial Growth of Cross Listed Firms at Nairobi Securities Exchange

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Abstract

Purpose: Cross listing plays a significant role in the development of emerging capital markets through improved access to foreign capital, improved stock liquidity, access to new markets, and enhanced brand visibility which collectively contribute to improved financial growth for cross listed firms. The purpose of the study was to establish the financial effect of cross listing event by examining whether the changes in profitability had a statistically significant effect on the financial growth of cross listed firms at Nairobi Securities Exchange.

Methodology: The study adopted the event study methodology to undertake an impact analysis of the financial effect of cross listing focusing on a census survey of eight firms primarily listed at Nairobi Securities Exchange and cross listed in other East African Securities Exchanges. The scope of the study entailed cross listings that took place between 2000 and 2015. The study performed the classical tests of hypothesis using the paired t-test and variance-comparison test and inferential statistics using two-way fixed effects panel regression model.

Findings: The study established that cross listing had a statistically significant effect on the financial performance of the firms primarily listed at Nairobi Securities Exchange. Further, the study findings indicate that the observed changes in liquidity, profitability, operational efficiency, leverage, and firm valuation had a statistically significant effect on the financial growth of the cross-listed firms that was sustained up to five years post cross listing.

Unique Contribution to Theory, Practice and Policy: The study supplemented the static trade-off theory which posits that a firm's optimal capital structure is attained by creating a trade-off between costs and benefits of debt or equity financing, hence providing a better understanding of a firm's financing decisions. Further, the study augmented the pecking order theory which postulates that a firm maintains an optimal capital structure through establishing a hierarchical preference for cheaper sources of financing including retained earnings, debt, and equity. Consequently, the study complements the existing body of literature on maintaining an optimal capital structure and enhancing financial growth through regional cross listings.

Keywords: *Cross Listing, Financial Growth, Financial Integration, Financial Markets, Profitability, Primary Listing, Secondary Listing, Securities Exchange, Stock Markets*

JEL Codes: *F30, F39, G15, G23*

INTRODUCTION

Cross listing has emerged as a significant financial strategy for attracting foreign investments, enhancing the volume of shares traded, enhancing stock information through the reduction of information asymmetry, and enhancing corporate disclosures in which the firm operates. The integration of the global capital markets has enhanced access to new sources of foreign capital for companies that seek to raise capital outside their countries of origin through cross listing which entails the listing of ordinary shares in another foreign-based securities exchange market in addition to the primary securities exchange of the company's country of origin. The primary driver of a firm's cross listing decision entails access to lower cost of equity capital, enhanced brand visibility in the new foreign market, and access to foreign investors.

Nairobi Securities Exchange has recorded significant cross-border capital investments through cross listings due to integration of East African regional electronic settlement systems and smart order routing systems. The NSE has emerged as the leading regional capital market for individual and institutional investors due to advancements in capital markets ecosystem in Kenya including strengthened financial integrity of the securities market, real time clearing and settlement of transactions, and timely resolution of specified claims by investors arising from default of trading members. Despite the significant capital market developments and institutional strengthening capacity, the NSE faces significant challenges associated with over-reliance on foreign capital investments, adverse macroeconomic environment occasioned by rising inflation and weakening of the local currency against major world currencies which affects investor confidence while adversely impacting market performance.

Cross-listings has been determined to be positively correlated with firm's financial performance in the emerging markets attributable to improved investor protection and robust capital market development. Regional cross listings in developing markets such as NSE contribute to an increase in return on assets ratio of cross-listed firms by up to 3.84, firm size by 4,420.38, cash flow to total assets ratio by 0.1100, sales to capital employed by 1.13, and Tobin's Q ratio by 1.12 (Onyuma et al., 2012; Temouri et al., 2016). Moreover, firms that cross list in more developed financial markets record higher financial growth compared to firms that cross list in less developed financial markets due to the existence of robust investor protection strategies. The level of integration of the securities exchange with regional financial markets and the extent of information asymmetry affects the effectiveness of a firm's cross listing strategy thus necessitating detailed market assessment.

A total of 64 firms are currently listed at NSE making the bourse the best performing securities exchange in the Sub-Saharan Africa region with an equities market capitalization of Kshs. 1,990 Billion and bonds market capitalization of Kshs. 2,170 Billion (Nairobi Securities Exchange, 2024). Additionally, 10 out of the 64 firms are cross listed of which 8 firms are primarily listed at NSE while 2 firms are primarily listed at the Uganda and Rwanda Stock Exchanges. The emergence of new product development such as the introduction of unquoted securities platform, the listing Income Real Estate Investment Trust by pension funds, and the launch of NSE 10 Share Index (N10) and the NSE Bond Index (NSE-BI) have enhanced market confidence which is key for attracting institutional investors through cross listings. However, the segmentation of regional capital markets affects market stability due to reduced liquidity, distorted securities pricing, and fragmented markets which rendering them less attractive to cross listing transactions.

Statement of the Problem

The Nairobi Securities Exchange plays a significant role in the country's economic growth and development by encouraging savings and investments and enabling local and international investors to access cost-effective capital. The bourse provides a liquid trading platform for investment and capital-raising services enabling international and domestic institutional and retail investors to trade in equities, debt, exchange traded products, unquoted securities, and real estate investment trusts. Currently, a total of sixty-four with a market capitalization of Kshs. 1,722 Billion are listed at NSE. Out of the 64 firms, 10 firms with a market capitalization of Kshs. 540 Billion are cross listed, of which eight firms with a market capitalization of Kshs. 488 Billion are primarily listed at the bourse while 2 firms with a market capitalization of Kshs. 52 Billion have secondary listing at the bourse. The demutualization of the securities exchange and enhanced regulatory oversight of the securities exchange by the Capital Markets Authority has enhanced portfolio diversification and improved market access.

Despite the growth prospects associated with cross listings including expanded market access and increased stock liquidity, NSE faces significant market and liquidity risks due to over reliance on foreign investors which exposes the bourse to significant volatility and capital flight during global economic shocks. Moreover, the low level of local investor participation in the bourse raises market vulnerability which hampers market depth and liquidity. NSE is yet to effectively leverage targeted regional alliances through cross-listing initiatives which restricts cross border capital flows and investment opportunities while reducing the product offerings and market reach for local retail investors. Consequently, firms primarily listed at NSE face significant challenges in listing their stocks in secondary markets due to long-standing market intermediary failures, inadequate participation amongst retail investors, inadequate alternatives for portfolio diversification, and restricted access to foreign markets with lower barriers to entry.

The firms that cross list in highly segmented emerging capital markets face significant technological and operational challenges in accessing foreign capital due to the high costs and complexity of legacy technology platforms. The effectiveness of cross listings within the regional securities exchanges is dependent on availability of resilient digital trading platforms, trading infrastructure, and post-trade settlement and clearing systems to facilitate real-time securities trading transactions. However, the significant under-investments in market data analytics, regulatory expertise, and proprietary digital tools has hampered direct market access particularly for institutional investors contributing to inefficient capital raising and investment experiences for issuers and investors. In addition, significant macroeconomic threats such as foreign currency fluctuations and rising inflation Consequently, the adverse institutional and macro-economic developments affect investor sentiment while hindering cross-border capital flows.

Subsequently, firms primarily listed at NSE face significant challenges in sustaining long-term financial growth due to significant price erosion in the equities market as evident in the Kshs. 6 Billion (6.35%) decline in equity market turnover to Kshs. 88.2 Billion in 2023 compared to Kshs. 94.2 Billion in 2022 despite a 6.4% increase in year-on-year trading volumes to 3.2 Billion from 3 Billion. In addition, sustainable financial growth of firms primarily listed at the bourse has been impaired by lower valuations of already issued bonds in the debt market segment as evident in the Kshs. 98 Billion (6.35%) decline in the NSE bond market turnover to Kshs. 643 Billion in 2023 compared to Kshs. 741 Billion in 2022. The benchmark NSE All

Share Index (NASI) also reduced by 35.22 points (27.62%) to 92.28 points in 2023 compared to 127.50 points in 2022 and an all-time high of 6161.46 points in 2007 hence indicating the adverse investor sentiment at the bourse (Nairobi Securities Exchange, 2024).

Despite the significant benefits associated with regional and international cross listings such as improved stock liquidity, higher valuations, and better access to capital; the existing empirical evidence on the effectiveness of cross listing, particularly for firms primarily listed on the NSE, remains scanty and inconclusive. The long term financial effect of cross listing in emerging capital markets such as Mugo (2010) and Kariuki (2015) yielded results that were statistically insignificant and focus on a shorter period of study around the cross listing event. Further, previous empirical studies on international cross listings have focused on the financial effect of global depository receipts and dual listings techniques which have not been integrated in emerging capital markets such as the NSE. Consequently, the current study seeks to fill this gap by evaluating the financial effect of cross listing on financial performance of firms primarily listed at NSE focusing on evaluation of the statistical significance of the changes in profitability of cross listed firms and their impact on financial growth covering a period of 5 years before and 5 years after cross listing.

Research Objectives

i. To examine the effect of changes in profitability after cross listing on the financial growth of firms primarily listed at Nairobi Securities Exchange.

Research Question

i. Do changes in profitability after cross listing have a significant effect on the financial growth of firms primarily listed at Nairobi Securities Exchange.

LITERATURE REVIEW

Theoretical Review

Modern Portfolio Theory

The Modern Portfolio Theory (MPT) was propagated by Harry Markowitz in 1952 as a framework for diversifying portfolio investments to maximize the expected returns at a certain level of risk. The MPT theory places significant emphasis on portfolio diversification as the primary approach to enhancing a firm's returns at the lowest level of risk and it takes into account the expected portfolio return, the weight of the asset in the portfolio, the asset's expected return, and the number of assets in the portfolio mix (Lindquist et al., 2022). Harry Markowitz emphasized that firms select assets that lie along the efficient frontier curve which ensure the maximum expected return for a specified level of risk. In addition, the market portfolio concept is a key concept of MPT theory where firms diversify the composition of assets in their portfolio investments by integrating risk free assets with the market portfolio.

The modern portfolio theory is relevant to the current study as it provides the rationale for portfolio diversification, risk and return trade-off, and asset allocation by institutional investors such as cross listed firms. For instance, the modern portfolio concept guides institutional investors to manage expansive portfolios that cut across equities, derivatives, bonds, and real estate investment trusts by enabling them to select assets with minimal portfolio variability and maximum returns. In addition, the modern portfolio concept enhances asset allocation decisions particularly for institutional investors that want to establish a balance between riskier equities or relatively stable bonds instruments with minimal portfolio volatility particularly for

securities spread across diverse capital markets. Consequently, institutional investors can adopt the modern portfolio concept to allocate assets within the diversified portfolio investments to ensure stable portfolio investments.

Cash Conversion Cycle Theory

The cash conversion cycle theory assumes that a firm strives to maintain an efficient working capital management through effective management of its cash flows as measured by the duration it takes to convert inventory into cash. The cash conversion cycle is essential for managing a company's working capital by enabling management to make appropriate financial and investment decisions and hence, it is applied as a measure of a company's operational efficiency (McPherson, 2018). The cash conversion cycle evaluates the efficiency of the firm's working capital management by focusing on the days inventories outstanding which covers the period it takes the firm to convert stock into sales, days payables outstanding which covers the period a firm takes to settle suppliers, and days sales outstanding which entails the period it takes for the firm to collect its receivables.

The cash conversion cycle theory is founded on the principle that firms with shorter cash conversion cycles have greater liquidity since they can settle their payables in a timely manner, prudently collect outstanding receivables, and maintain efficient working capital positions. Consequently, firms that are operationally efficient have robust supplier relationship management, effective inventory management systems that ensure minimal inventory handling costs, and effective credit recovery measures. The optimization of the firm's cash conversion cycle involves the reduction in extended supplier credit terms, maintaining low inventory levels, and reduction in the accounts receivables period (Gitman & Zutter, 2015). The cash conversion cycle is applicable to the current study since it provides the rationale for operational efficiency assessment where institutional investors may analyze the operational efficiency of cross listed firms thus providing cross-border market performance highlights and identify market-specific operational challenges.

Static Trade-off Theory

Modigliani and Miller's (1963) static trade-off theory defines the optimal financing level for a company that provides a tradeoff between the costs and benefits associated with debt financing in order to ascertain the optimal debt to equity ratio. A firms attains an optimal capital structure by establishing a trade-off between debt or equity since financing through debt provides a tax shield to the firm since interest payments are tax-deductible. Nevertheless, financing through debt elevates the firm's financial risk due to the risk of bankruptcy and inability to honor repayment obligations which may result in corporate reputational damage and going concern risk. On the other hand, equity financing is associated with maintaining ownership and control of the business hence lower risk of financial distress (Khan et al., 2021). Therefore, the static trade-off theory is premised on the assumption that firms with an optimal capital structure will establish a tradeoff between the costs and benefits of using debt in the capital structure by settling on an optimal debt level where the marginal benefit of the tax shield is equivalent to the marginal cost of financial distress.

The static-trade off theory is relevant to the current study since it provides a rationale for capital structure optimization across different cross-border markets. For instance, cross listed firms have enhanced market access across multiple capital markets where they can tap into equity financing thus lowering the need for debt financing while maintaining an optimal debt to equity trade off. Further, the static trade-off theory enables cross listed firms that operate in different

tax jurisdictions to evaluate the tax shield across the various capital markets particularly for firms that wish to cross list in high-tax markets (Cotei & Farhat, 2009). Cross listings provide access to capital by reducing the cost of debt and equity arising from enhanced stock liquidity and improved investor demand. Subsequently, the static trade-off theory enables institutional investors to adjust the debt levels in their capital structure while minimizing extreme financial leverage in order to optimize the tax shield.

Pecking Order Theory

The pecking order theory of capital structure propagated by Stewart Myers assumes an inverse relationship between the firm's growth, size, and profitability on the one hand, and an increase in leverage on the other. The theory postulates that corporations develop a preference for the source of financing for their investment programs, starting with retained earnings as the most preferred source of financing, followed by debt financing, and lastly, equity financing (Myers et al., 2023). The development of a pecking order arises from the concept of asymmetric information, where there exists an imbalance of the company's information among the stakeholders, such as creditors and shareholders. The external stakeholders, such as creditors, will, therefore, require a higher rate of return on their debt financing to counter the risks associated with the high levels of information asymmetry.

Stewart Myers argues that corporations prioritize internal sources of financing as the primary sources while debt financing is explored upon depletion of internal options. According to Budiarso & Pontoh (2021), organizations adhere to hierarchy of financing depending on the company's level of development and size. Organizational-specific factors such as organizational structure, organizational culture, and firm size influences corporate finance decision-making. The need for reduced information asymmetry and enhanced transparency compels firms to tap into cheaper sources of debt financing, such as venture capitalists and private equity operators that ensure optimal capital investment decisions. The pecking order theory is significant to the current study since it provides an understanding of corporate finance decisions including selection of the source of financing.

The pecking order theory has extensively been tested in emerging capital markets particularly within the Sub-Saharan Africa region owing to the distinctive institutional, financial, and economic characteristics. According to Sulistianingsih & Santi (2023), the financing decisions of small and medium enterprises in emerging capital markets effectively follow the pecking order pattern where they meet their financing needs from internal sources first before proceeding to external sources primarily due to high-risk preference. Therefore, under the pecking order theory, firms will select the most optimal source of financing that limits the need for external financing by first exploiting internal financing sources before external financing and any additional financing sources will only be tapped after minimizing the additional costs of asymmetric information. The choice of the financing source is dependent on the level of information asymmetry and firms will often select comparatively cheaper sources of financing such as internal sources as opposed to comparatively expensive external financing sources.

Conceptual Framework

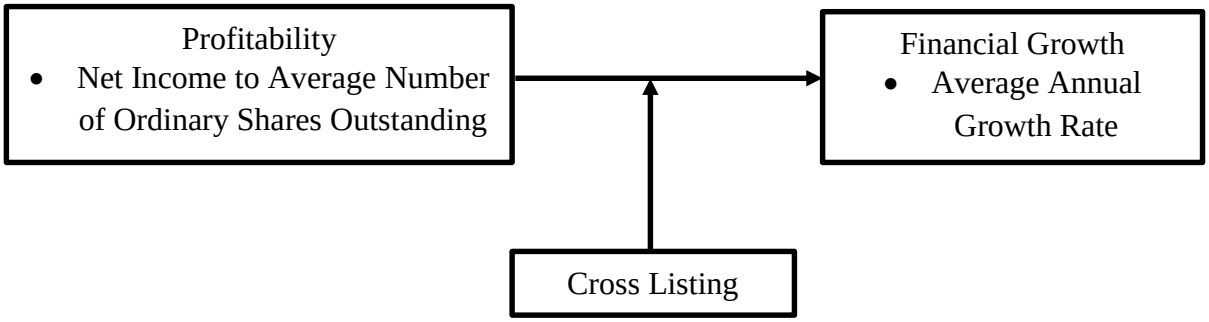

Figure 1: Conceptual Framework

Empirical Review

Firm's Profitability and Financial Growth

Lel & Miller (2006) evaluate the impact of cross listing on top-management turnover and the resultant financial performance. The study adopted a descriptive research methodology to evaluate cross-border listing and its impact on the overall performance of such firms. The study concluded that cross listing enhances the management structures within the company and contributes to improved revenue and profitability performance. In another study by King and Legal (2004) on the effect of international cross-border listing and share turnover, the findings indicate that cross-border events positively affect share turnover attributable to increased company valuation. The improvement in share turnover was attributable to the better profitability performance of such firms. However, the study's reliance on descriptive research methodology limited the findings as it could not establish a cause-and-effect relationship between the study variables.

Jayeola et al. (2019) reviewed the effect of cross listing on the financial performance of firms listed at Johannesburg Stock Exchange focusing on the effect of cross listing on firm profitability. Further, Jayeola et al. (2019) discusses the notable drivers of cross listings within the Sub-Saharan region for JSE-listed firms. The findings indicate that JSE-listed firms engage in regional cross listings primarily due to qualitative factors since majority of the firms did not record a significant increase in profitability performance post-cross-listing. Nevertheless, the study was limited by insufficient financial data which led to inconclusive results and hence, the results could not be generalized to the entire population. Further, other recent studies by Kariuki (2015) and Kilimo (2018) resulted in spurious findings that were statistically insignificant due to limitation of scope of study and incorrect application of research methodology hence the results could not be generalized to the entire population.

Various researchers have identified firm profitability as the primary determinant of cross listing amongst firms primarily listed at NSE. Magento (2010) studied the factors influencing cross listing amongst companies listed at the Nairobi Securities Exchange using a theoretical research methodology. The study results indicate that firms primarily engage in cross-border listing to pursue regional expansion strategies through improved regional presence, risk diversification, and revenue growth. According to Onyuma et al. (2012), firms cross list in cross-border capital markets to enhance financial performance metrics such as profitability and dividend yield ratio. However, the previous studies relied on theoretical research methodology

which focuses on systematic review of abstract concepts and theories with minimal statistical analysis of the financial effect of cross listings hence susceptible to interpretation errors.

Waweru et al. (2012) used a descriptive research methodology to examine the important factors influencing cross listing among East African stock exchanges. The study adopted the factor analysis methodology to ascertain the underlying causes of cross listing and the notable factors identified include addressing competition, access to cost of capital, strengthening of investor protection measures, enhancing price discovery in the capital markets, and gaining entry to new markets through mergers and acquisitions. The findings indicate that Kenyan firms cross list in regional stock markets in Uganda, Tanzania, and Rwanda primarily to enhance their profitability by gaining extra market share. However, the study was limited by the statistical insignificance of the results due to the absence of correlation between the variables and hence, could not be generalized to the entire population.

The previous empirical studies rely on failure time analysis as the analytical framework which is constrained by limited validity of the findings which may not be statistically significant hence could not be generalized to the entire population. Further, the previous empirical studies evaluate the financial effect of cross listings focusing on a limited study period of days before and after the cross listing event which may lead to spurious findings. For instance, most studies evaluate the financial effect of cross listings by predicting earnings performance around the cross listing announcement date resulting in inconclusive and statistically insignificant results. Subsequently, the current study seeks to fill this research gap by expanding the scope of the study to entail a review of the financial effect of cross listings for a period of 5 years before and after the cross listing event hence accurately depicting market patterns and trends.

METHODOLOGY

The study applied the event study methodology to evaluate the relationship between cross listing and financial performance of firms with primary listing at NSE. The event study methodology is designed to evaluate the effect of an event on a specific dependent variable and it is widely adopted in financial research to evaluate the impact of key corporate announcements such as stock listings, product launches, corporate restructuring initiatives (El Ghoul et al., 2022). The event study methodology relies on the efficient market hypothesis which assumes perfect capital markets with no information asymmetry and where information is quickly reflected in the market. Therefore, the event study methodology enables analysis of economic effect of an event over a specified period.

The target population of the study comprised sixty-four (64) companies listed at NSE across twelve industry segments. The target population incorporates industry diversity since the companies are drawn from various sectors including automobiles and accessories, banking, commercial and services, construction and allied, energy and petroleum, insurance, investment, and investment services. Other sectors in which the companies operate include manufacturing and allied, telecommunication and technology, real estate investment trust, and exchange traded funds. The criteria for selecting the target population entails industry diversity based on the specific industry segment; firm size based on large, medium, small, and micro enterprises; and the listing duration. The target population comprises a well-defined and homogeneous set of elements that represent the entire set of study items with shared observable features. (Mugenda & Mugenda, 2003). The accurate identification of target population enhances the reliability of the research. The sampled firms are regulated by the CMA, which requires such

listed entities to publish audited financial statements that are prepared using International Financial Reporting Standards.

The study performed a census study of eight (8) companies primarily listed at NSE and cross-listed in Ugandan, Tanzania, and Rwanda stock exchanges. The sampling frame is representative of the entire population of 64 listed firms at NSE given that they are drawn from diverse industry segments. The selection of the sampling frame considered companies that are actively and primarily listed at NSE thus eliminating any firms that may have delisted from the bourse or those with secondary listing at the bourse. Consequently, the sample frame of eight (8) firms representing the firms primarily listed at NSE and cross-listed in foreign bourses is representative of the target population.

The sampling frame provides source materials from which the study subjects are drawn, which significantly impacts the study's quality and cost. According to Mugenda & Mugenda (2003), a sampling frame should have characteristics aligned with the research specifications including completeness, accuracy, and updated to reduce the risk of sampling errors. The 8 firms selected firms in the sampling frame have similar characteristics hence meeting the criteria for sampling since they are primarily listed at NSE and cross-listed in foreign bourses. Similarly, the 8 firms also make up the sample size considering the total population of 64 listed firms thus eliminating sampling errors and ensuring comprehensiveness in the sampling frame. The study adopted purposive sampling technique to select the sample of eight firms listed at NSE. Purposive sampling technique entails non-probabilistic and criterion-based approach to selecting the elements of interest from the target population. The sampling approach enhances the credibility, reliability, and accuracy of data by ensuring balanced panel data set for the research whose results may be generalized to the population.

Document review technique was adopted for collecting secondary quantitative data regarding the cross listing and financial performance of companies primarily listed at NSE and cross-listed in foreign bourses within East Africa. The research instrument adopted for the study is detailed in **Error! Reference source not found.** which enabled the researcher to collect key financial information of the companies covering the entire period of the study. The study adopted document analysis technique to collect and record key financial data of the sampled firms. The secondary data was obtained from audited accounts published in the respective companies' websites and publicly unavailable data was sourced from Capital Markets Authority repository. Data collation was done using the data collection tool as depicted in appendix 2 and then subjected to pilot tests to ensure its accuracy, consistency, and reliability.

RESULTS

Descriptive Statistics

The study performed descriptive analysis on the data set by calculating the measures of central tendency and dispersion to enable accurate and comprehensive visualization of the data. The notable tests that were conducted include the mean, variance, standard deviation, coefficient of variation, standard error of mean, median, skewness, and kurtosis. The descriptive statistics results were then used to identify patterns, depict trends, and explore relationships within the data set. The descriptive statistics for the paired observations covering a period of 5 years before and 5 years after cross listing are depicted in the compact table of summary statistics below.

Table 1: Descriptive Statistics Results

Paired Observation	Period	Mean	sd	cv	Se_Mean	p50	Skewness	Kurtosis
Pair 1 (Financial Growth)	Before	0.2856	0.4772	1.6709	0.0755	0.1718	1.2239	4.0785
	After	0.2553	0.4327	1.6948	0.0684	0.1423	2.4119	10.0808
Pair 2 (Profitability)	Before	0.2885	0.4113	1.4259	0.0650	0.1480	0.6898	5.8242
	After	0.2491	0.2294	0.9209	0.0327	-0.1701	0.7609	3.8245

The pair 1 descriptive statistics results for financial growth depicted in table 1 above indicate a decline in average annual growth to 0.2553 post-cross-listing compared to 0.2856 pre-cross-listing while standard deviation reduced to 0.4327 post-cross-listing compared to 0.4772 pre-cross-listing. The increase in skewness to 2.412 compared to 1.2239 before cross listing indicates positive skewness. The increase in kurtosis to 10.0808 compared to 4.0785 before cross listing reveals leptokurtic distribution in financial growth which is more peaked than normal post-cross-listing.

The pair 2 (profitability before and after cross-listing) descriptive statistics results reveal that the mean profitability reduced to 0.2491 after cross listing from 0.2885 before cross listing while standard deviation varied to 0.2294 compared to 0.4113 for the similar period under review thus indicating significant variability in profitability performance. Further, the significant variability is explained by the substantial decline in the coefficient of variation (sd/mean) to 0.9209 post-cross listing compared to 1.4259 pre-cross listing. Nevertheless, the profitability distribution is less leptokurtic given the minimal skewness of 0.6898 before compared to 0.7609 after cross listing.

Diagnostic Tests

The diagnostic tests that were conducted before subjecting the data to regression analysis include the Levin-Lin-Chu test of Stationarity, Wilcoxon rank-sum (Mann-Whitney) test for Normality, Breusch and Pagan Lagrangian Multiplier test for Homoscedasticity, Hausmann test for Endogeneity, Kao test for Cointegration, and Variance Inflation Factor test for Multicollinearity.

Levin-Lin-Chu Unit Root Test for stationarity

The study performed the Levin-Lin-Chu unit root test for stationarity to determine whether the panels contain a unit root. The null hypothesis of the study entails the panels contain a unit root and the alternative hypothesis entails the panels are stationary. The unit root test for stationarity results are depicted in table 2 below.

Table 2: Unit Root Test for Stationarity

Variable	No. of panels	No. of periods	Unadjusted t-stat	Adjusted t-stat	p-value
Financial Growth	8	10	-8.0584	-4.6407	0.0000
Profitability	8	10	-4.4293	-1.6513	0.0493

The Levin-Lin-Chu unit root test results depicted in table 2 above reveal absolute p-values that are less than 1 hence indicating that the time series data do not contain a unit root. The null hypothesis of a unit root is rejected when observed t-statistic is less than the observed p-value. The large absolute p-values for each variables are less than the critical value of 1 hence reject

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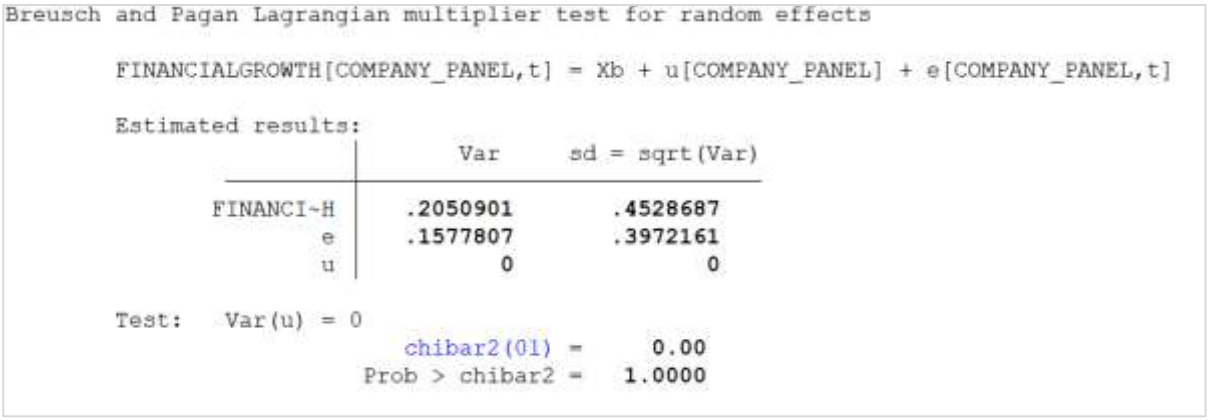
the null hypothesis and conclude that there is no unit root and the panels are stationary. Consequently, the adjusted t-statistics are modified to account for possible biases in the model arising from possibility of cross-sectional dependence and heterogeneity between the panel units in the model. The observed t-statistic values are derived from the residuals of the augmented Dickey-Fuller (ADF) regressions undertaken on each individual time series within the panel. Consequently, the observed large absolute values for the unadjusted and adjusted t-statistic values for each of the six variables provides significant evidence that supports rejection of the null hypothesis hence conclude that the panel series is stationary meaning that the statistical properties of the variables remain constant over time across the different panels.

Breusch-Pagan Lagrangian Multiplier Test for Heteroscedasticity

The Breusch and Pagan Lagrangian multiplier test was performed to ascertain the existence of heteroscedasticity in the residuals of the regression model. The test evaluates whether the variances of the regression model's errors are non-constant across the different observations which affects the reliability of confidence intervals. The null hypothesis entails the variance of random effects equals zero hence there exists no random effects in the panel series. The alternative hypothesis entails that the variance of the random effects is non-zero hence the model contains significant individual-specific effects.

The Breusch-Pagan LM test results are depicted in figure 2 below.



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Breusch and Pagan Lagrangian multiplier test for random effects

        FINANCIALGROWTH[COMPANY_PANEL,t] = Xb + u[COMPANY_PANEL] + e[COMPANY_PANEL,t]

        Estimated results:
                         |      Var     sd = sqrt(Var)
                ---------+------------------------------
                FINANCI~H|    .2050901        .4528687
                       e |    .1577807        .3972161
                       u |          0                0

        Test:   Var(u) = 0
                                  chibar2(01) =      0.00
                               Prob > chibar2 =    1.0000
```

Figure 2: Breusch-Pagan Lagrangian Multiplier Test

The Breusch and Pagan Lagrangian Multiplier test results reveal a p-value (chibar2) of 0.00 that is lower than the significant prob>chibar2 value of 1.0000. The results do not provide sufficient evidence to warrant the rejection of the null hypothesis hence conclude that there exists homogeneity of variance. The results indicate that the variability of the dependent variable is equal across the different values of the independent variable and the variance of residuals is constant across all the observed levels of the predictor variables hence the presence of homoscedasticity of the random variables.

The absence of heteroscedasticity in the regression model means that the error term does not systematically vary with different levels of the predictor variable thus ensuring that the estimates are best linear unbiased estimates. Consequently, the Generalized Least Squares model is the most appropriate regression model for the study since the estimates that are derived from the regression model are linear, unbiased, and with the smallest variance hence meeting the basic assumptions of Gauss-Markov theorem.

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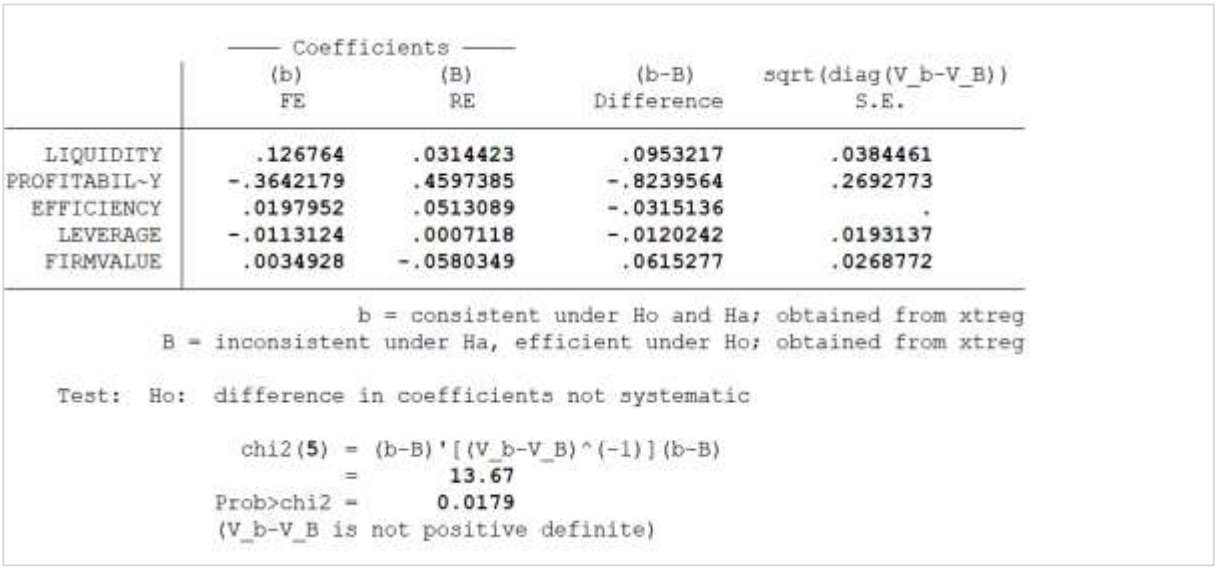
Hausmann Test for Endogeneity

The study performed Hausman's test for endogeneity to ascertain whether the explanatory variables are correlated with the error term. The endogeneity test is significant in determinising the most effective model specification between the fixed or random effects. The null hypothesis entails the individual-specific effects or random effects are not correlated while the alternative hypothesis entails the existence of correlation between the regressors and individual-specific effects. The Hausmann test results are depicted in figure 3 below.



	Coefficients (b) FE	(B) RE	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
LIQUIDITY	.126764	.0314423	.0953217	.0384461
PROFITABIL~Y	-.3642179	.4597385	-.8239564	.2692773
EFFICIENCY	.0197952	.0513089	-.0315136	.
LEVERAGE	-.0113124	.0007118	-.0120242	.0193137
FIRMVALUE	.0034928	-.0580349	.0615277	.0268772

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 13.67
Prob>chi2 = 0.0179
(V_b-V_B is not positive definite)

Figure 3: Hausmann Test for Endogeneity

The Hausmann test for Endogeneity results depicted above reveal a chi-squared test statistic value (chi2) of 13.67 and observed p-value (prob>chi2) of 0.0179 which is lower than the significance level of 0.05. Consequently, the null hypothesis of no correlation between the model regressors and the unique errors is rejected, hence, conclude that there exists significant correlation between the individual-specific effects and the model regressors. The fixed effects model is the most appropriate model specification for the study since it incorporates endogeneity between the individual-specific effects and the regressors thus providing more reliable estimates.

Kao Test for Cointegration

The research performed Kao test for cointegration to determine whether there exists a long-term relationship between the predictor and response variables by testing for stationarity in the pooled residuals. The Kao test for cointegration results is depicted in figure 4 below.

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Kao test for cointegration

Ho: No cointegration		Number of panels	= 8
Ha: All panels are cointegrated		Number of periods	= 8
Cointegrating vector:	Same		
Panel means:	Included	Kernel:	Bartlett
Time trend:	Not included	Lags:	1.88 (Newey-West)
AR parameter:	Same	Augmented lags:	1

	Statistic	p-value
Modified Dickey-Fuller t	0.8503	0.1976
Dickey-Fuller t	-3.3504	0.0004
Augmented Dickey-Fuller t	1.2292	0.1095
Unadjusted modified Dickey-Fuller t	-6.7537	0.0000
Unadjusted Dickey-Fuller t	-9.3456	0.0000

Figure 4: Kao Test for Cointegration

The Kao test for cointegration results in figure 4 above reveal a Dickey-Fuller t-statistic of -3.3504 which is less than the hypothesized p-value of 0.0004 hence the null hypothesis of no cointegration is rejected and conclude that the non-stationary variables are co-integrated. Consequently, the Kao cointegration test results indicate that there exists a significant long-run equilibrium relationship between the response and predictor variables in the panel data set.

Variance Inflation Factor (VIF) Test for Multicollinearity

The study performed the VIF test for multicollinearity to ascertain correlation amongst the independent variables in the regression model. Multicollinearity affects the reliability and overall significance of the regression model. The VIF test results are depicted in figure 5 below.

Variable	VIF	1/VIF
FIRMVALUE	1.23	0.813415
LEVERAGE	1.21	0.823531
LIQUIDITY	1.15	0.872975
PROFITABIL~Y	1.12	0.891560
EFFICIENCY	1.07	0.936243
Mean VIF	1.16	

Figure 5: Variance Inflation Factor Test

The VIF test results depicted in figure 5 above reveal a mean VIF of 1.16 which falls below the critical value of 4 hence reject the null hypothesis of multicollinearity in the data set and conclude that the independent variables are not linearly correlated. Further, the results indicate tolerance levels (1/VIF) exceeding the minimum threshold of 0.25 for each of the predictor variables hence ensuring the statistical significance of the regression coefficients estimates. Consequently, the VIF test results reveal that the variance of the regression coefficients is 16% higher than what could be expected in the absence of multicollinearity hence, the independent variables are not linearly correlated which enhances the reliability of the regression model.

Regression Equation Specification Error Test

The study performed the Ramsey Regression Equation Specification Error Test to ascertain the presence of specification errors in the regression model by evaluating the effect of non-linear

combinations of the regressors on the response variable. The Ramsey RESET test is useful in determining the existence of incorrect functional forms or omitted variables in the regression model hence determining the accuracy and reliability of the estimation model. The results of the Ramsey RESET test are depicted in figure 6 below.

```
Ramsey RESET test using powers of the independent variables
       Ho:  model has no omitted variables
                  F(15, 59) =      1.53
                   Prob > F =      0.1229
```

Figure 6: Regression Equation Specification Error Test

The Ramsey RESET test results depicted above reveal an F-value of 1.53 with a p-value of 0.1229 which is greater than 0.05. Therefore, the model has no omitted variables. The results do not provide sufficient evidence to conclude that the regression model is not properly specified. Consequently, the generalized linear regression model is correctly specified such that its functional form accurately depicts the relationship between the predictors and the response variable, and it incorporates all best possible and relevant predictor variables which ensures consistent and unbiased estimates.

Inferential Statistics

The study performed univariate analysis on each of the variables to ascertain the nature of the changes in financial performance of the firms and whether such changes were statistically significant. The univariate analysis comprised of classical tests for hypothesis and non-parametric tests for hypotheses as detailed below.

Classical Tests for Hypotheses

Paired t-test

The paired t-test was applied to ascertain whether mean differences in financial performance of the firms was statistically significant. The null hypothesis of no significance is rejected when the observed t-statistic is greater than the critical t-value of 1.990 obtained from the Student's t-distribution table at a two-tailed alpha level $\alpha=0.05$ and degrees of freedom df=79. Further, the difference in means is considered to be statistically significantly different from zero when the observed p-value is less than or equal to the hypothesized p-value of 0.05. On the other hand, the null hypothesis under the paired t-test is not rejected when the observed t-static is less than the critical t-statistic of 1.990 obtained from the student's t-test distribution table at a pre-specified two-tailed alpha $\alpha=0.05$, df=79, and observed p-value exceeds the hypothesized p-value of 0.05 thus indicating that any observed differences in means may be attributed to sampling error or chance. The paired t-test results are summarized in Table 3 below.

Table 3: Paired T-Test Results

Paired Observation	t-tatistic	Mean	Std Err.	Std Dev.	p-value	95%CI$_L$	95%CI$_U$
Profitability Before & After Cross Listing	-3.3418	0.0393	0.0362	0.3314	0.0013	0.1950	0.3425

The paired t-test results for profitability depicted above reveal an observed t-statistic of -3.3418 which is greater than the two-tailed critical t-static value of -1.910 at 0.05 level of significance. The results reveal a p-value of 0.0013 which is less than the p-value of 0.05 thus reject the null hypothesis. Therefore, the difference in means of profitability before and after cross listing is significantly different from zero hence statistically significant.

Variance-Comparison Test

The study performed the variance ratio test to evaluate the equality of standard deviations of the paired observations for each variable and ascertain whether the paired observations were drawn from a population with similar distribution characteristics. The variance ratio test results reinforce the student's t-test classical test of hypothesis that assumes equality of variances across the paired observations of the study. The variance ratio test evaluates equality of variances between the paired observations thus preventing the risk of type 1 error and enhancing the accuracy of the classical hypothesis testing applied in the study.

The null hypothesis under the variance ratio test entails equality of variances between the groups while the alternative hypothesis entails non-equality of variances across the groups. The null hypothesis is rejected when observed F-statistic is greater than the critical F-static obtained from the F-distribution table at 0.05 significance level and specified degrees of freedom. Further, rejecting the null hypothesis of no significant differences in the standard deviations between the two groups may indicate incorrect or biased results. Conversely, the null hypothesis is not rejected when observed F-statistic is lower than the critical F-static at the pre-specified alpha level of 0.05 indicating that the standard deviations between the two groups are not significantly different from each other.

The variance ratio test results for the paired observations are indicated in Table 4 below.

Table 4: Variance-Comparison Test Results

Paired Observation	Mean	Std. Err.	Std. Dev.	F-stat	P-value	95% CI_L	95% CI_U
Profitability Before & After Cross Listing	0.2687	0.0370	0.3314	3.2157	0.0004	0.1950	0.3425

The variance ratio test results for profitability reveal an observed F-statistic of 3.2157 which is less than the Critical F-value of 4.091 obtained from the F-distribution table at 0.05 significance level. Further, the two-sided p-value of 0.0004 is lower than the hypothesized p-value of 0.05 indicating that the probability of obtaining an extreme F-value given the null is true. However, since the observed F-statistic is lower than the critical F-value at the pre-specified alpha level of 0.05, the null hypothesis is not rejected, hence conclude that the standard deviations of profitability before and after cross listing are not significantly different from each other.

Non-Parametric Tests for Hypothesis

The study performed the Wilcoxon rank-sum test and the Kolmogorov-Smirnov test for equality of distribution functions to compare the differences between the independent groups comprising of financial performance before and after cross listing. The non-parametric tests were aimed at determining whether the independent samples statistically differed from each other thus enabling the researcher to make inferences regarding the population of the study.

Wilcoxon Rank-Sum Test

The study performed the Wilcoxon rank-sum non-parametric test to determine whether the independent samples were drawn from a population with similar distribution characteristics. The test was aimed at determining whether the observed differences in paired observations for each predictor variable were statistically significant at 95% confidence interval and the test results are depicted in Table 5 below.

Table 5: Wilcoxon Rank-Sum Test Results

Independent Variable	Rank_Sum Before	Rank_Sum After	Adj. Var.	Obsv. t-statistic (z)	p-value
Profitability	1554	1686	10800	- 0.6350	0.5254

The results depicted in table 5 above reveal observed t-statistics of - 0.3080, - 0.6350, 0.5200, - 1.6650, and - 0.9620 respectively for the five independent variables of liquidity, profitability, efficiency, leverage, and firm value respectively. Further, the observed p-values of 0.7581, 0.5254, 0.6033, 0.0960, and 0.3359 for the five respective variables are greater than the hypothesized p-value of 0.05, hence fail to reject the null hypothesis and conclude that the difference in the rank sums before and after cross listing are not significantly different. Therefore, the results indicate that the independent samples are drawn from a population with similar distribution characteristics.

Kolmogorov-Smirnov Test for Equality of Distribution Functions

The study performed the two-sample Kolmogorov-Smirnov test for equality of distribution functions to ascertain whether the independent samples of the observations before and after cross listing were drawn from a population with similar distribution characteristics. The two sample Kolmogorov-Smirnov test evaluates the equality of distribution functions by determining whether the paired observations were drawn from a population with similar distribution characteristics and the results are highlighted in Table 6 below.

Table 6: Kolmogorov-Smirnov Test Results

Variable	D-Statistic Before	P-value Before	D-Statistic After	P-Value After	Combined K-S D-statistic	p-value	Exact p-value
Financial growth	0.1250	0.535	-0.1250	0.535	0.1250	0.913	0.919
Profitability	0.1500	0.407	-0.1000	0.670	0.1500	0.759	0.766

The Kolmogorov-Smirnov test results for financial growth revealed a combined K-S D-statistic of 0.1250 which indicates the maximum difference between the cumulative distribution functions of the paired observations with an observed p-value of 0.535, combined p-value of 0.913, and exact p-value of 0.919. Further, profitability had a D-Statistic value of 0.1500, p-value of 0.759, and exact p-value of 0.766. The observed p-values are greater than 0.05 level of significance indicating that the difference in the distributions of the paired observations of before and after cross listing are not significantly different hence, the independent samples were drawn from a population with similar distribution characteristics.

Regression Analysis

The study performed regression analysis on the data set using the generalized least squares regression model. The regression analysis relied on Wald Chi-Squared test to evaluate the

statistical significance of the regression coefficient and the results are depicted in Table 7 below.

Table 7: Regression Analysis Results

Variable	Coefficient	Std. Err.	z	P>|z|	95% Conf. Interval (Lower)	95% Conf. Interval (Upper)
Profitability	0.459739	0.151779	3.03	0.003	0.1622575	0.757219
_cons	0.185706	0.061902	3.00	0.005	0.0627149	0.298000
R-sq	0.9050	Prob >	0.0047			
Wald chi2(5)	16.87	chi2				
Corr (u_i, x)	0 *(assumed)*					
sigma_*u*	0					
sigma_*e* (e_i)	.39721613					
rho	0	*(fraction of variance due to u_i)*				

Subsequently, the regression model for the study is expressed in the following equation;

$$\mathbf{Y = 0.1857 + 0.4597X_{1it} + 0.0807X_{2it} + 0.0558X_{3it} + 0.0169X_{4it} - 0.0970X_{5it}}$$

The regression analysis reveal a coefficient of determination of 0.9050 indicating that at least 0.9050 of the variations in financial growth are explained by the independent variables of profitability, liquidity, operational efficiency, leverage, and firm valuation changes post-cross listing. The coefficient of determination of 0.9050 is close to 1 indicating a higher goodness of fit since most of the variations in the response variable are explained by the five regressors. The regression model returns a p-value (Prob>chi2) of 0.0047 which falls below the 0.05 level of significance leading to rejection of the null hypothesis of no relationship between the dependent and independent variables. The results are further reinforced by the wald chi-squared value of 16.87 which is greater than the critical value of 11.07 at 0.05 level of significance, hence concluding that the independent variables have a statistically significant effect on the dependent variable of financial growth.

The results reveal that profitability has a beta coefficient of 0.4597385, which indicates that a unit change in profitability results in a 0.4597385 change in financial growth. The beta coefficient is reasonably precise given the low variability given a standard error of 0.1517788. The observed z-score of 3.03 is greater than the critical z-score of 1.96 and the observed p-value of 0.003 falls below the 0.05 significance level hence indicating that the beta coefficient has a significant effect on the dependent variable of financial growth. Moreover, the paired t-test reveal an observed t-statistic of -3.3418 which is greater than the two-tailed critical t-static value of -1.9100 and a two-tailed p-value of 0.0013 that falls below the 0.05 level of significance, thus indicating that the mean differences in paired observations for profitability pre and post-cross-listing significantly differ from zero, hence statistically significant.

The regression model properly accounts for individual-specific variations due to a relatively low residual standard error given an individual-specific error term (σe) of 0.39721613. The coefficient of correlation (corr u_i, x) of zero indicates that the individual-specific error term (u_i) is uncorrelated with the explanatory variables thus ensuring that the model has no omitted variable bias and incorporates all the possible explanatory variables. The observed sigma_u (σ_u) value of zero indicates that there no unobserved individual-specific effects in the model. Therefore, the total variance in the dependent variable of financial growth is explained entirely

by the independent variables (x_i) and the idiosyncratic error term (e_i). The predictors in the regression model are exogenous hence uncorrelated with individual-specific error term (u_i) hence ensuring best linear unbiased estimators. The group-level error term (σ_u) of zero means no variation in the individual-specific error term (u_i) and the fraction of variance due to ui (rho) of zero means that the variations in financial growth can only be attributed to time-varying factors. Consequently, the observed variations in the response variable of financial growth are attributable to the combined effect of the regressors and not as a result of chance.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study evaluated the financial effect of cross listing for firms with primary listing at NSE and secondary listing in other East African Securities Exchanges. The study conducted a census study of eight firms that cross listed between 2000 and 2015 by evaluating the pre and post-cross listing changes in profitability and the resultant impact on financial growth covering a period of 5 years before and 5 years after cross listing. The study performed the classical tests of hypothesis using the paired t-test and variance comparison test to evaluate whether the changes in financial growth were statistically significant. The study further performed the Wilcoxon rank-sum test and Kolmogorov-Smirnov test for equality of distribution functions to evaluate whether the pre and post cross listing paired observations were drawn from a population of similar distribution characteristics. The study concluded that profitability changes as a result of the cross listing event had a statistically significant effect on the financial growth of firms primarily listed at NSE. In addition, the study concluded that profitability is a key determinant of financial growth of cross-listed firms as evident in the strong coefficient of determination in addition to other factors such as firm's liquidity, operational efficiency, leverage, and valuation.

Recommendations

The study recommends that firms that are primarily listed at NSE should undertake cross listings with the emerging regional capital markets to raise capital from international investors, gain access to new cross-border markets, and enhance their brand image. Listed firms should enhance their profitability performance through implementation of revenue growth strategies in the new cross border markets and optimization of cost efficiency through cost containment measures that contributes to sustained financial growth in the long term through the annualized annual growth rate. Moreover, listed firms should implement optimal capital structures by establishing a balance between internal sources of financing through retained earnings, equity financing, and debt financing by leveraging regional cross listings to reduce the cost of capital, enhanced corporate governance structures, and reduced information asymmetry which contributes to enhanced stock liquidity.

The East African regional securities exchange associations should develop uniform trading rules including harmonization of listing requirements to enhance investor confidence in the region's financial markets, attract significant cross-border investments, augment stock market visibility, and contribute to rapid regional capital markets harmonization. Subsequently, the harmonization of the regional securities exchanges through the enlisting of more stocks onto the East Africa Exchanges Market Index will enhance market transparency while offering a robust regional market performance benchmark. The regional securities exchange platforms should encourage cross listings of innovative index-linked financial instruments other than equities such as exchange-traded funds and real-estate investment trusts that can be traded

continuously beyond the exchange hours hence enhancing capital markets activity while attracting more regional and international investors.

The East African regional capital markets regulators should streamline develop integrated regulatory framework and guidelines that will strengthen financial markets integration, mutual assistance, and improved information sharing. The integrated financial markets infrastructure comprises linked automated securities trading platforms, central securities depositories and clearing houses which will encourage timely settlement of transactions across the region's capital markets. Further, to address stock illiquidity challenges, regional securities exchanges should attracting listings by pension funds and establish liquidity-enhancing mechanisms such as market-making that enhance stock volume transactions. In addition, public policy makers should enact investor protection regulations with specific regard to corporate governance and reporting guidelines to safeguard investors and enhance investor confidence, deter foreign capital flight, and enhance capital markets transparency.

Limitations of the Study

The study was restricted to eight firms that had cross listed in different periods across all the four East African securities exchanges hence he companies could not be studied at the same time period since they did not cross-list concurrently and not all firms listed across all the four securities exchanges. The study relied on historical data to estimate the impact of cross listing on financial performance which is sensitive to changes in the markets including investor sentiment and this could render the historical data less reliable. The study adopted the event study methodology that is premised on the assumption of efficient market hypothesis where stock prices instantly reflect all publicly available information about the event. However, the existence of information asymmetry and possibility of insider trading may prevent the markets from accurately reflecting all relevant information hence resulting in incomplete measurement of the true impact of the cross listing event..

Recommendations for Further Study

The study focused on companies primarily listed at Nairobi Securities Exchange, future studies can evaluate the financial effect of cross listing on firms with primary listing in other sub Saharan Africa regional stock markets. The scope of study was for a period of 10 years narrowing down to 5 years before and 5 years after the cross listing event. Future studies can vary the study period and explore diverse variables to evaluate the financial effect of cross listing in the regional capital markets.

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