THE INTERNATIONAL JOURNAL OF BUSINESS & MANAGEMENT

Effect of Firm Performance on Lagged Investment Decisions of Firms Listed at the Nairobi Securities Exchange in Kenya

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Abstract:
This study sought to establish the effect of firm performance on lagged investment decisions of firms listed at the Nairobi Securities Exchange in Kenya. Descriptive research design was used and the sample consisted of twenty four firms. The study employed two estimations to the regression; inclusion of past lagged investment decisions followed by first differencing method to test model efficiency and firm fixed effects. The study established that return on assets and assets growth have a positive association with lagged investment decisions, whereas, cash flow negatively affect lagged investment decisions of firms listed at the Nairobi Securities Exchange. The study concludes that there exists an effect of firm performance on lagged investment decisions. The study further recommends that other measures of firm performance should be examined and longer periods should be used to further prove these study findings.

Keywords: *Lagged investment decisions, Firm performance, and Differencing method*

1. Introduction

Fundamental economic theory states that firms that are incurring losses exit the market and the ones that are performing well by being profitable stay in the market (Silverman, Nickerson, & Freeman, 1997). They suggested that a firm's performance is correlated with its survival, especially during tough economic times. Firm performance is a construct that relays firm's measurement as independent variable in financial literature; there's no definitive conclusion as to what factors determine or affect firm performance during any state of the economy (Rumelt, 1991). Therefore, performance of a firm is very important since it shows the results achieved by the firm over a time period (Hunjra, Chani, Javed, Naeem, & Ijaz, 2014). Investment is defined as the purchase of an asset or other items of value with an expectation of favorable future returns (Chau & Hirth, 2010). Whereas, decisions to investment are conventionally subject to some form of rate of return analysis, dependent on expected income flows from the investment, liable to risk and uncertainties, over future periods (Hunter, Elizabeth, & Anne, 2005).

Investment is a decision making process involving a sequence of actions with the identification of an investment related opportunity and ends in the approval of an investment project (Boonstra, 2003). Therefore, imperfection should be considered since it dominates the real world market setting and it may reduce firm capacity to fund investments (Rajan & Zingales, 2003). Hayek (1941) regards investment as an adjustment process towards equilibrium, thus, it is viewed as the path towards optimal capital stock. The ultimate yield of any particular investment is determined by many factors including a multitude of unrelated decisions taken by many individuals. Therefore, they suggested that the success of any particular investment depends upon how well each production plan fits within a structure to which every plan contributes.

Abel and Eberly (2012) found out that Lag in time provided the first device that was able to solve the multi-collinearity problem, they argued that any cause produces an effect only after some lag in time, and that this effect is not felt all at once, however it is distributed over a number of points in time. To analyze investment at firm level, lagged investment has been documented to be the best predictor of current investment decisions at the firm level (Wit, 1998).

Keynes (1936) argued that expected performance of a firm can only affect investment when the present value of future revenues equals cost of capital. Later, Meyer and Kuh (1957) found out that supply of funds might have an impact on investment, that's, the rate of investment may be constrained by the supply of funds. However, the Modigliani and Miller theorem (1958) under perfect market conditions postulated that there exists no relationship between financial structure and financial policy for real investment decisions. Afterwards, Tobin (1969) opposing Modigliani and Miller (1958) theorem, proposed that investment demand levels and behaviour can be predicted by the ratio of the market value of a firm's capital stock to its replacement cost under perfect market assumptions.

In times of poor financial performance, Jensen and Mekling (1976) found out that tangible assets provide collateral to lenders and act as security against debt. Adding to it, Clearly (1999) found out that firms with high financial health tends to be more sensitive to the available funds than less creditworthy firms, therefore, recession makes it harder for firms to get additional financing due to the increased risk of bankruptcy, in turn, management may forgo profitable investments in order to satisfy its short term debt obligations. Opler and Titman (1994) found consistent results that a large percentage of poor financial performance and bankruptcies occur during recessionary periods as money becomes tight and sales decline. Therefore, according to them, economic downturns could become an issue as revenues decline and the company's cash flow become uncertain, thus, affecting the firm's level of investment. Ruiz-Porras, Antonio and Lopez-Mateo (2011) found that the effects of firm size, cash flows, and investment opportunities are mostly positively significant on investment decisions.

1.1. Research Objective

This study sought to establish the effect of firm performance on lagged investment decisions of firms listed at the Nairobi Securities Exchange in Kenya.

1.2. Research Question

The major question for the study was: Does firm performance have an effect on lagged investment decisions of firms listed at the Nairobi Securities Exchange in Kenya?

2. Methods

The study employed a descriptive research design. The population of interest in this study was that of all sixty five listed firms at the Nairobi Securities Exchange as at end of year 2014. The sample consisted of twenty four firms. The study employed secondary data collection technique. Time series and cross-sectional balanced panel data of the variables were extracted from the audited financial statements of the sampled firms. Regression analysis was used for both time series and cross-sectional data to establish the nature and if any relationship exists between the study variables. To achieve the objectives of this study, a model was developed using lagged investment decision as the dependent variable and firm's performance components as the independent variables. Cross-sectional regression was used to enable time lags of annual observation in the investment decision. The lagged investment decision was used as an estimator to check its prediction to the consecutive annual lags of investment decisions at the Nairobi Securities Exchange.

2.1. Model Specification

A multiple regression model was preferred. The model is expressed implicitly as:

$Y_{it} = \alpha_i + \Sigma\, \beta_k X_{kit} + U_{it}$

and explicitly expressed as:

$Y_{t+1} = \alpha_i + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{5t} + \beta_6 X_{6t} + \beta_7 X_{7t} + e_t$

Where Y is a dependent variable, the firm's investment decision (ID), α is a constant, β_1, to β_7 are regression coefficients that explain the investment decisions of the firms, X_1 to X_7 are the independent variables, e_t is the error term and the subscript i, t, k indicates firms' time (years) and the number of explanatory variables respectively. The firm's performance variables were represented by: X_1 = Return on Assets (ROA), X_2 = Sales Growth (SG), X_3 = Asset Growth (AG), X_4 = Fixed Asset Intensity (FAI), X_5 = Cash-Flows (CF), X_6 = Firm's Leverage (FL) and X_7 = Earnings per share (EPS).

3. Results and Discussions

3.1. Determination of How the Model Fits

Table 1 shows the model summary table. This table shows the values of; R, R square, adjusted R square and the standard error of the estimate, which was used to explain how the regression model fits the data; that is, the effect of firm performance on the lagged investment decisions.

R	R Square	Adjusted R Square	Std. Error of the Estimate
.461[a]	0.21	0.149	0.188549

Table 1: Overall Model Summary

a. Predictors: (Constant), Earnings Per Share, Sales Growth, Assets Growth, Firm Leverage, Fixed Assets Intensity, Cash Flow, Return on Assets

b. Dependent Variable: Lagged Investment Decision

From the table R is 0.461 which imply a good level of prediction. The R square column represents the coefficient of determination which explains the proportion of variance in the dependent variable that can be explained by the independent variable, that's, the proportion of variation by the regression model. From the table above R square is 0.21, whereas, adjusted R square is 0.149 which implies that 14.9% of variability in lagged investment decision was explained by firm performance variables.

3.2. Standard Baseline Regression Analysis

Table 3 below shows the results of the regression coefficients which shows the relationship between the dependent variable and the independent or predictor variables.

Baseline Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	.018	.063		.277	.782
	Return on Assets (ROA)	.600	.283	.306	2.123	.037
	Sales Growth (SG)	.055	.091	.062	.601	.549
	Assets Growth (AG)	.363	.127	.285	2.849	.005
	Fixed Assets Intensity(FAI)	.048	.104	.049	.464	.644
	Cash Flow (CF)	-.190	.071	-.335	-2.662	.009
	Firm Leverage (FL)	-.035	.118	-.032	-.295	.769
	Earnings Per Share (EPS)	.000	.005	-.012	-.089	.929

Table 2: Regression Coefficients Results for the Baseline Regression Model
a. Dependent Variable: Lagged Investment Decision

Table 2 above reveals a positive relationship between LID, ROA, SG, AG and FAI, whereas, it also shows a negative relationship between Lagged Investment Decisions, CF and FL. Finally, EPS had no effect on the model. The established regression equation to predict the lagged investment decisions of firms was established as:

$Y = 0.018+0.600x_1+0.055x_2+0.363x_3+0.048x_4 –0.190x_5–0.035x_6+0.000x_7$

The regression results show that, when all predictor variables have zero values, the LID value would be 0.018. The unstandardized coefficients reveal how much the lagged investment decisions variable varies with the firm performance and its components when the other variables are held constant. For instance unstandardized coefficient, $\beta_1 x_1$ (ROA) is +0.600, this establishes that a unit increase in ROA would result an increase in LID by 0.600, for a unit increase in SG then LID would increase by 0.055, whereas, AG and FAI also show a positive relation with LID that's resulting increase in AG and FAI will also increase LID. From the table above the coefficient of CF and FL indicate a negative relationship with the LID, such that if any of these variables increase then market value will decrease. The T-values show that the coefficients for ROA, AG and CF are significant as their P-values are below 0.05, that's, with P-value of 0.037, 0.005 and 0.009 respectively. The remaining predictor variables are not significant as their P-values are above 0.05. This implies that among the significant predictor variables, ROA and AG positively and significantly influences the lagged investment decisions of firms listed in the Nairobi Securities Exchange. Whereas, CF negatively and significantly influence the LID of firms listed in the Nairobi Securities Exchange.

3.3. ANOVA Statistics for the Baseline Regression Model

The ANOVA statistics was performed to check the differences in the means of the dependent and independent variables and to show whether a relationship exists between the variables.

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	.842	7	.120	3.384	.003[b]
	Residual	3.128	88	.036		
	Total	3.971	95			

Table 3: Statistical significance for the Baseline Regression Model
a. Dependent Variable: Lagged Investment Decision
b. Predictors: (Constant), Earnings Per Share, Sales Growth, Assets Growth, Firm Leverage, Fixed Assets Intensity, Cash Flow, Return on Assets

The F-ratio in the ANOVA Table 3 as shown above tests whether the overall regression model is a good fit for the data. The P-value of 0.003 from the table above is revealed to be less than 0.05, implies that firm performance has a significant relationship with lagged investment decision at 95% confidence level, thus, it proves that the regression model is statistically a good fit of the data.

3.4. Correlation Analysis for the Baseline Regression Model

Table 4 shows the analysis of correlations among the variables, which shows the linear relationship between variables, thus, it depicts the relationship between the dependent and independent variables and also collinearity among variables.

		LID	ROA	SG	AG	FAI	CF	FL	EPS
	Lagged Investment Decision	1.000							
	Return on Assets	.164	1.000						
	Sales Growth	.136	.206	1.000					
	Assets Growth	.348	.181	.249	1.000				
	Fixed Assets Intensity	.102	-.199	-.023	.029	1.000			
	Cash Flow	-.148	.593	.160	.028	-.337	1.000		
	Firm Leverage	-.008	-.320	.127	-.051	.313	-.328	1.000	
	Earnings Per Share	.057	.667	.078	.145	-.331	.517	-.252	1.000

Table 4: Pearson's Correlation Coefficients Matrix for the Baseline Model

Correlation analysis in the above table (Table 4) shows that there are some direct relationships between the dependent and the independent variables (LID, ROA, SG, AG, FAI and EPS have positive connection). However, there are also some inverse relationships among these variables (LID, CF and FL have negative connections). Whereas in overall, out of all these variables 3 connections had values greater than 0.4 which suggest slight presence of multi collinearity (that's highest of 0.667 between ROA and EPS, followed by 0.593 between ROA and CF, and finally 0.517 between CF and EPS). Since there are no strong multi collinearity values of greater than 0.7, therefore, it was not a serious issue.

3.5. Past Lagged Investment Decision Regression Results

Inclusion of past lagged investment decision (PLID) into the regression model excludes 24 observations of the first LID which results to 72 observations of 3consecutive observation in the 24 firms. Use of PLID was to check if the past investment levels affect lagged investment decisions.

N	R^2	Adjusted R^2	Std Error	F	Sig
72	0.375	0.296	0.145846	4.729	.000[b]

Table 5: Model Summary and ANOVA Statistics with Inclusion of PLID

Adding PLID into the baseline regression model does improve the model by reducing the P-value by 0.3% from 0.003 to 0.000 and increases the variability among the variables by 14.7% with an increase in adjusted R square from 0.149 to 0.296.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	-.045	.059		-.756	.453
	Return on Assets	.539	.252	.337	2.138	.036
	Sales Growth	.028	.086	.037	.323	.748
	Assets Growth	.558	.179	.501	3.124	.003
	Fixed Assets Intensity	.136	.095	.167	1.426	.159
	Cash Flow	-.230	.069	-.455	-3.323	.001
	Firm Leverage	-.003	.103	-.003	-.025	.980
	Earnings Per Share	.001	.004	.039	.267	.790
	Past Lagged Investment Decision	-.179	.137	-.204	-1.309	.195

Table 6: Regression Coefficients Results with Inclusion of PLID
a. Dependent Variable: Lagged Investment Decision

Table 6 above reveals a positive relationship between LID and ROA, SG, AG, FAI and EPS, whereas, it also show negative relationships between LID and the remaining predictor variables. The established regression equation to predict the lagged investment decisions of firms was:

$Y = -0.045+0.539x_1+0.028X_2+0.558X_3+0.136X_4 -0.230X_5-0.003X_6+0.001X_7-0.179Y_{t-1}$

The regression results show that, when all predictor variables have zero values, the LID value would be –0.045. The table also reveals that only EPS has changed it signs from being neutral to a +0.00. Significant P-value of less than 0.05 was reported to be ROA, AG and CF with improved P-values of 0.036 reduced by 0.1%, of 0.003 reduced by 0.2%, and 0.001 reduced by 0.8% respectively from the ones resulted from the original regression model.

4. Discussion of Findings

4.1. Effect of Financial Performance Measure on Lagged Investment Decision

Financial performance was measured using return on assets and the results of the baseline regression from Table 2 established that return on assets as +0.600 with P-value of 0.037 such that a unit increase in return on assets would result in a positive and statistically

significant increase in lagged investment decisions by 0.600. The regression coefficients with inclusion of past lagged investment decision from Table 6 established that return on assets is +0.539 with P-value of 0.036 such that a unit increase in return on assets would result in a positive and statistically significant increase in lagged investment decision by 0.539.

4.2. Effect of Growth Performance Measures on Lagged Investment Decision

Growth performance was measured using three variables, sales growth, assets growth and fixed assets intensity. The results of the baseline regression from Table 2 established that sales growth is +0.055 with P-value of 0.549 such that a unit increase in sales growth would result in a positive and statistically insignificant increase in lagged investment decision by 0.055. The coefficient of the second variable assets growth is +0.363 with a P-value of 0.005 this established that a unit increase in assets growth would result in a positive and statistically significant increase in lagged investment decisions by 0.363 and finally fixed assets intensity was revealed to be +0.048 with a P-value of 0.644 such that a unit increase in FAI would result in a positive and statistically insignificant increase in lagged investment decisions by 0.048. With inclusion of past lagged investment decisions, the coefficients results from Table 6 revealed that sales growth was +0.028 with a P-value of 0.748 such that a unit increase in sales growth would result in a positive and statistically insignificant increase in lagged investment decisions by 0.028, assets growth was +0.558 with a P-value of 0.003 which established that a unit increase in assets growth would result in a positive and statistically significant increase in lagged investment decisions by 0.558, fixed assets intensity was +0.136 with a P-value of 0.159 such that a unit increase in fixed assets intensity would result in a positive and statistically insignificant increase in lagged investment decisions by 0.136.

4.3. Effect of Liquidity Performance Measure on Lagged Investment Decision

Table 2 of baseline regression revealed that cash flow coefficient was –0.190 with a P-value of 0.009 establishing that a unit increase in cash flow would result in a negative and statistically significant decrease in lagged investment decision by –0.190. Inclusion of past lagged investment decision, as shown in the Table 6 resulted to cash flow of –0.230 with a P-value of 0.001 which establishes that a unit increase in cash flow would result in a negative and statistically significant decrease in lagged investment decision by –0.230.

4.4. Effect of Debt Management Performance on Lagged Investment Decision

Financial leverage in Table 2 has a coefficient of –0.035 with a P-value of 0.769 established that a unit increase in financial leverage would result in a negative and statistically insignificant decrease in lagged investment decision by 0.035. With inclusion of past lagged investment decision shown in Table 6, financial leverage was –0.003 with a P-value of 0.980 which established that a unit increase in financial leverage would result in a negative and statistically insignificant decrease in lagged investment decisions by 0.003.

4.5. Effect of Valuation Performance Measure on Lagged Investment Decision

Results of Table 2 of the baseline regression revealed that earnings per share coefficient was 0.000 with a P-value of 0.929 established that a unit increase or decrease in earnings per share would result in no change and it is statistically insignificant on lagged investment decisions. With inclusion of past lagged investment decisions as revealed in Table 7, earnings per share was 0.001 with a P-value of 0.790 such that a unit increase in earnings per share would result in a positive and statistically insignificant increase in lagged investment decisions by 0.001.

4.6. Effect of Past Lagged Investment Decision on Lagged Investment Decision

Past Lagged Investment Decision coefficient was –0.179 as revealed in Table 6 which established that a unit increase in past lagged investment decision would result in a negative and statistically insignificant decrease in lagged investment decision by 0.179. Past Lagged Investment Decision coefficient had a statistically insignificant P-value of 0.195 that was above 0.05. However, with its inclusion it statistically improved the overall model with a reduction of P-value by 3.0% and increased the variability among the variables by 14.7% as shown in the Table 6.

4.7. Conclusion

The study findings revealed that firm performance affects lagged investment decisions of firms listed at the Nairobi Securities Exchange in Kenya. Use of first differencing method and inclusion of past lagged investment decisions further improved the model efficiency and achieved the research objective in all consecutive years of observations. The study results also revealed that, three predictor variables of firm performance cash flow, return on assets and assets growth were statistically significant in the determination of lagged investment decisions at firm level for firms listed at the Nairobi Securities Exchange. The cross sectional result also showed that sales growth also affect lagged investment decisions at the Nairobi Securities Exchange in Kenya. The study concluded that cash flow was the key determinant of lagged investment decisions of firms listed at the Nairobi Securities Exchange in Kenya, followed by return on assets, assets growth and finally sales growth.

4.8. Recommendations

The results of this study have significant policy implications at the firm and industry levels. That is; practitioners and investment managers charged with the responsibility of identifying viable projects to invest in should be able to establish which centres to improve on so as to ensure increased investment decisions at firm level. Cash flows reported negative values which could have arisen due to information asymmetries in the Kenyan Capital Markets, leading to financing constraints. Thus, the Kenyan Government through the Capital Markets Authority and other relevant authorities should come up with policies to improve the Capital Markets

Authority development and financial systems as well as improvement of the exchange of information between firms and banks. Firms need capital to finance their investments, with either internal or external funds, therefore, firms need to have transparent information and reported financial statements to enhance shareholders' confidence level which can enable investors to make good investment decisions. To attain external financing for investments, asset base should be improved at firm levels.

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