

Effect of Investments on Cash flow of Manufacturing Firms Listed at the Nairobi Securities Exchange

Damaris Mutindi Musembi, Sporta Fred

School of Business and Public Management, KCA University, Kenya
mutindidamaris@ymail.com, fochogo@kcau.ac.ke

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Abstract

The researcher in this study sought to establish the factors that affect cash flow in manufacturing firms in Kenya. The study was guided by the following specific objectives, to establish how investments affect cash flow in manufacturing firms listed in the Nairobi stock exchange, to find out how inventory controls affect cash flow in manufacturing firms listed in the Nairobi stock exchange, to determine how profitability affect cash flow in manufacturing firms listed in the Nairobi stock exchange. The researcher used descriptive research design to describe the factors affecting cash flow in manufacturing firms listed in the Nairobi stock exchange. A firm should be able to generate enough cash flows from its operations. If a firm is not able to cover its current liabilities with cash generated from operations, it will have cash challenges in financing its operations. A cash flow ratio of one shows that the firm has healthy cash flows and a ratio of less than one shows that the firm does not have enough cash flows to finance its operations. The study covered a period of five years from 2012 to 2017. The methodology for the study was descriptive research design. The study employed population census as the listed firms were very few for the researcher to employ sampling. The listed firms were nine. Analyzed data was presented using figures and tables. The study findings revealed that there is a positive relationship between cash flows and investments as measured by net capital expenditure, profitability as measured by return on assets. There is a negative relationship between cash flows and inventory control as measured by inventory turnover. The study also established that there is a positive relationship between cash flows and profitability of a firm as measured by return on Assets (ROA). Cash flows in all the firms have the same trend except for Eveready East African Ltd. The study concluded that manufacturing firms should exercise inventory control, invest wisely and also manage profitability of assets to ensure that the firm has enough cash flows to fund its operations.

Keywords: Cash flows, cash flow ratio, Manufacturing firms, Investments, Profitability, inventory control, inventory turnover, Return on Assets.

JEL CODE: M0, M11, M12**How to Cite:**

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1. Introduction

Most of the manufacturing firms in Kenya being small in size have been experiencing cash flow fluctuations and sometimes they record negative cash flows. The fluctuations have been associated with several factors which include but not limited to investments, inventory control and profitability of assets. Most of these manufacturing firms are not in a position to cover their current liabilities as a result of cash flow challenges (Quinn , 2011)

Cash flow is defined as the net difference between cash inflows and cash outflows in a firm. If a firm has Positive net cashflow, its an indication that the liquid assets of a firm are increasing. This means that the firm is able to pay its liabilities, pay dividends to shareholders, invest more in the business, fund its operations on time and also set aside reserves for future use if the firm has financial challenges. If the firms liquid assets are decreasing, the firm will have negative cash flows an indication that the firm will experience cash flow challenges. The importance of cash flow in any kind of business cannot be overlooked as without enough cash flows a business will collapse as it will not be able to fund its operations.

Most businesses state “cash is king”, but they do not have clear methods of projecting the amount of cash they will need for a specified period of time. Investment can be described as the current commitment of financial resources so that greater returns are achieved in the future. Various studies from different researchers have established that a relationship exists between Investments and cash flows. Jonathan and Katharina (2016) established that investments affect cash flow as investing includes usage of funds. Whited and Erickson (2012) studied on the relationship between investments and cash flow. He concluded that cash flow and investments are have a negative relationship. Almeida, (2010) conducted a study to establish how investments and cash flows are related for unbalanced panel of surviving firms between 1980 to 1999. They established that a negative relationship exists between investments and cash flow.

Cash flow management activities in manufacturing firms listed in Nairobi securities exchange has an increasing Challenge to financial performance. This has been evidenced by the decrease in performance of manufacturing firms listed at the Nairobi securities exchange as attributed by cash flows issues, (Athanase, 2015). A recent report by the World Bank (2014) recognizes the importance of financial management practices towards economic development in both developing and developed countries. The study shows that through proper financial management practices, managers are in a position to make sound decisions on the financial position of an enterprise and their capability of achieving long term financial goals. Cash management practices are a key tool of ensuring that organizations profitability is stable while ensuring they do not become insolvent, World Bank (2014) In Kenya, the cases

of cashflow management are highlighted by various studies and reports. A report by the Kenya Economic Survey (2016) revealed that manufacturing firms have lower performance levels compared to organizations in other sectors with a slow growth rate of 4.3% per year. The main issues underlining their performance is uncertainty and lack of knowledge of cash flow management that under mines financial literacy. However, Harash et al (2014) asserted mismatch in any cash flow management practices hinders capability of manufacturing firms to achieve positive results. A study by Zulu(2014) indicated that the failure rate of manufacturing firms in south Africa lies between 70% and 80% as a result of cash flow problems.

Studies by Ngugi and Waweru (2014) on the effects of financial innovation in relation to how manufacturing firms perform revealed that financial innovation has an effect on how they perform. This happens if a firm is fast enough to embrace new financial innovations in the market. Another study by Kinyanjui, Kiragu, and Kamau (2017) on cash management on financial performance revealed that inappropriate skills to manage, plan and control cash flows leads to slow financial growth as the business may lack cash for expansion. Though the studies tackled importance of financial management, the studies failed to indicate the factors that affect cash flow. Most of the studies conducted locally and internationally most address the relationship between cash flows and firm's performance. The Main reason to conduct this study is to examine factors that affect cash flow in manufacturing firms leading to the high failure rate giving attention to manufacturing firms listed in the Nairobi stock exchange to address the identified gaps. This paper seeks to establish the factors that affect cash flow in manufacturing firms by establishing how investments, inventory control and profitability relate to cash flows. Firms listed in the Nairobi stock exchange were considered in this study. To establish how investments affect cashflow of manufacturing firms listed at the Nairobi securities exchange.

2. Literature Review

2.1 Introduction

In this chapter, the study focuses on empirical review, the theoretical aspect, and the conceptual framework explaining the relationship between the variables i.e. the dependent and independent variables. It discusses various theories that relate to cash flow. Empirical review of literature in relation to this topic and conceptual frame work are also analyzed.

2.2 Theoretical frame work

2.2.1 Trade-off Theory

This theory was put forward by Ditmar et al, (2003). According to this theory, in order to maximize the wealth of shareholders, Enterprises put into consideration the benefits and costs of holding cash. Cash flow management practices are aimed at ensuring that the firm has enough cash to fund its operations as well as for investment purposes. According to the tradeoff theory, firms only hold an optimum level of liquidity so that a balance exists between the costs and benefits of holding cash. Islam, (2012) Some of the costs associated to holding cash include low returns as a result of liquidity premium and to some extent tax disadvantage. Benefits associated with holding cash include reduced transaction costs in raising funds or in selling of assets to raise funds to settle obligations.

If sources of finances are expensive or unavailable, an enterprise can use its liquid assets available to make investments or to fund its operational activities. Cash inflows and cash outflows should be maintained at optimal levels. The theory is of great concern in this study because any cash flow management practice is to ensure that the business is liquid enough to fund its operations. In managing cash flows, the managers need to know the factors which are affecting cash flows so as to control them. As highlighted above, the owner gets to know which are the best practices to exercise so that he can maintain optimum levels of cash. In a study by Joseph (2016) on the impact of cash management practices on the performance of SMEs, he used this theory and emphasized on the importance of maintaining optimal cash flows to ensure smooth running of the business. Frank (2014) in his study on cash flow and corporate performance used this theory to emphasize on the importance of cash flow on the performance of corporates. He established that mismanagement of cash flows hindered the growth of manufacturing Firms in Nigeria. The benefits and costs of holding cash should be considered and necessary actions taken early in advance. Lack of cash to fund operations on time has its cost and having too much idle cash also has its disadvantages.

In his study Enyew (2016) on factors affecting cash holding of manufacturing share companies in Ethiopia used this theory to emphasize on the importance of holding optimal cash balances in manufacturing firms. He noted that firms that do not hold optimum cash flows have problems in financing their operations and thus may incur additional costs in trying to raise additional funds externally or in liquidating the current assets they have. Ogundipe et al. (2012) in their study on cash holding and firm characteristics for firms in the Nigerian emerging market recognized the importance of this theory. They highlighted that in holding optimum cash flows costs and benefits exist and a tradeoff should exist between the two. Firms with enough cash flows can take advantage of profitable business opportunities while firms which lack cash flows or have negative cash flows can miss profitable opportunities.

2.3 Empirical review

2.3.1. Investments and cash flow

A number of empirical studies have been conducted to address financial constraints of a firm with the aim of establishing the relationship between availability of funds and investment decisions of a firm. Availability of internally generated funds should not have an effect on investment decisions as perfect capital markets ensure that external and internal funds sources are substitutable. (Hardy et al. 2012). Jonathan and Katharina (2016) conducted a study to establish investment cash flow sensitivities. The main objective of the study was to establish if a link exists between cash flows and investments. They studied on United States firms from 1971 to 2009. They used both cross sectional and time series data in their study. From the sample of firm, investment regression using ordinary least squares showed that additional dollar of cash flow had an effect on working capital, investments and cash holdings. The research findings revealed that cash flows and investments are strongly linked when the investment opportunities for the firm are controlled.

Letenah, (2014) conducted a research on investment cash flow sensitivity as a measure of financial constraints. The study was conducted to explain the conflicting evidence on investment cash flow sensitivities by using proxies for both internal financial constraint and external financial constraint measures. Secondary data extracted from the financial statements

was used .The study concluded that firms of all category have a positive and significant investment cash flow Sensitivity.

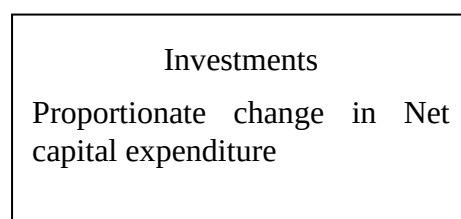
Imtiaz (2017) carried out a research on the relationship between investments and cash flow. The main objective of the study was to establish the relationship between investments and cash flows under high and low investment opportunities. The researcher used 167 non-financial manufacturing firms in Pakistan. Secondary data was used in this study ,which ranged between 2004- 2013 to investigate the relationship of cash flow ,sales and investment a panel regression model was used.The research revealed that in high investment opportunities firms, thereexistsa significant positive relationship between cash flow and investments.In low investment opportunities firms; the relationship between cash flow and investments is positive but insignificant. The research concluded that high investment opportunitiesfirms rely on internally generated cash flows unlike low investment opportunities firms which distribute their earnings as dividends.

Richard (2014) studied on investmentcash flow sensitivity under managementoptimism.The objective of the study was to test the investment cash flow sensitivity among panel data of industrial firms in America between 1999 to 2010.Q model of investment was used in the analysis. The research revealed that there is a positive and significant co efficient of investment to cash flow for the full sample.For fully constrained groups, sensitivity exists and is stronger. Whited and Erickson (2012) carried out a study to determine the link between investments and cash flow. The general objective of the study was to identify if a relationship exist between investments and cash flows in manufacturing firms. He compared 1,317 manufacturing firms .Secondary panel data was used in this study .It was established from the research findings that cash flows and investments have a significant relationship.

2.4 Conceptual frame work

A concept is a general idea or an abstract derived from specific instances.(Kombo & Tromp, 2009) and unlike a theory a concept can be understood by the reader without being discussed. (Durham & Stokes, 2015).According to ((shapira, 2011), a conceptual framework is a structure that represents empirical observations in a meaningful format.

Independent Variables



Dependent Variable

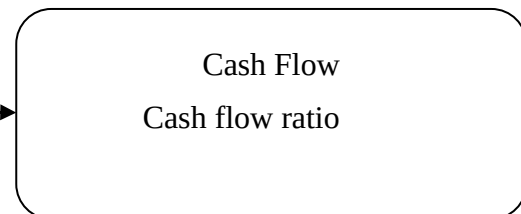


Figure 1

Operationalization of variables refers to the process of definingand describing the study variables into measurable factors. The process helps in defining fuzzy concepts and allows them to be measured, empirically and quantitatively (Ardelt, 2004). Various independent variables affecting cash flow were identified during the Literature review and investments identified to be one of them. Cash flow refers to the funds inflows and outflows in a firm.

Cash flow is measured as income before extraordinary items plus depreciation. It is measured using the cash flow ratio. A ratio of 1 indicates that a company is able to pay its current liabilities from cash flow generated from operations and vice versa. Cash flow from operations was extracted from the statement of cash flows while current liabilities figures are extracted from the statement of financial position.

$$\text{Cash Flow Ratio} = \frac{\text{Cash Flow from Operations}}{\text{Current Liabilities}}$$

Investment as an independent variable in this study referred to the commitment of fund with the aim of getting more returns in the future. Investments were measured as the net capital expenditure in the current year.

$$\text{Net Capital Expenditure} = \frac{\text{Capital Expenditure}_t - \text{Capital Expenditure}_{t-1}}{\text{Capital Expenditure}_{t-1}}$$

Table 1. Operationalization of variables.

Variable	Measurement	Formula
Investment	Proportionate change	Current year capital expenditure - previous year capital expenditure./Previous year capital expenditure

3. Research Methodology

3.1 Introduction

This chapter provides the details of the targeted population, research plan to use, data sampling plan, how to collect data and how to analysis collected data. Research method to be used by a researcher is of great importance. This is because scholars and other researchers consider the method that was used to define the quality of qualitative reports (Kirkman, Hammerer and De Lacey 2016). Poor research methods lead to poor research reports.

3.2 Research Design

A research design is described as the outlined plan showing how the whole research process will be carried out. It shows how the activities to be carried out in the study will be organized. (Mugenda & Mugenda 2003). Polit, Beck, and Owen (2003) defines a research design to be an overall plan for obtaining answers to the research questions in a given study and for solving some of the challenges a researcher faces during the research process. The research design used in this study was descriptive research design.

3.3 Sampling frame and sampling design.

In this study the researchers sampling frame for the target population was all the 9 listed firms in the Nairobi securities exchange which is regulated by the capital markets Authority as at June 2019. Lavrakas (2014) defined a sampling frame to be a list of target population

where a sample is derived from and that a sampling frame comprises of a finite population. Kothari (2010) defined a sampling frame to be a list that includes all the names of elements in a universe. A sample is a list of selected participants from a population (Polit & Beck, 2010). Kothari (2004) defined a sampling frame as a structured plan used to obtain a study sample from a given target population. The plan shows the technique and the procedure the researcher will use in his study in selecting items for the sample which should be a representative of the entire target population. A Census of the listed manufacturing firms in the Nairobi stock exchange was considered in this study. This is because the target population was small and thus easy to use census than sampling. All the manufacturing firms listed as manufacturing and Allied under the capital market authority as at June 2019 were analyzed.

3.4 Data Collection

Miles, Huberman and Johnny (2014) described data collection in a study to be the process of collecting and measuring information relating to study variables to enable the researcher to formulate relevant questions and project the outcome. Secondary data analysis is more preferred in a Quantitative research to primary data analysis. The analysis of secondary data from existing research is increasingly being used unlike primary data analysis. Secondary data has much clearer categorization because it avoids confusion. (Johnston (2014).

In this study, the researcher used Secondary panel data as it was easier to collect it for past years and also it's more reliable than primary data. The data was easily available from the company's websites as well as the capital market Authority website. Panel data has more variability and there is less collinearity between the study variables as compared to time series and cross sectional data. Panel data limits heterogeneity and identifies effects that cannot be highlighted in pure time series and cross sectional data and thus can be used to study complicated issues of changing nature. (Baltagi, 2005; Greene, 2002; Gujarati, 2012).

The data was extracted from financial statements which included statement of financial position, statement of cash flows and statement of comprehensive income for the five years under the study. The collected data covered a period of 5 years from 2013 to 2017. The data was collected through the use of data collection sheet.

3.5. Data processing and Analysis

The researcher adopted both quantitative and qualitative methods of analyzing data. According to Cooper & Schindler (2003), analysis of data is a long and continuous process initiated immediately after data has been collected and stops when the data is processed and interpreted. Data processing includes editing, coding, classification, tabulation and graphical presentation, Blumberg, Donald Cooper and Schindler (2014). The researcher extracted secondary data and the data was analyzed quantitatively through a mathematical and regression equations and this was solved by using a statistical tool (STATA). According to Olweny (2012) multiple regression techniques give both quantitative and qualitative result that is conclusive and clear. STATA analyzed descriptive statistics and multiple linear regression analysis between dependent variables (cash flow) and independent variables which included investments, inventory control and profitability.

The research used panel data model of the form.

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \varepsilon_{it}$$

Where: Y = Cash flow

X_1 =investments (Net proportionate change in capital Expenditure)

β_0 = Constant co- efficient of change.

β_1 , = regression co efficient of change of the independent variables.

ε =Error term.

3.6 Test of significance.

To test significance of regression model, the study used the F-statistics while the p – statistics will be used to test significance of regression coefficients. Both statistical tests were tested at 95% confidence interval.

4. Result and Discussion

4.1 Descriptive analysis of study variables.

The researcher examined the descriptive pattern of the independent and the dependent variable and the study findings were summarized as shown in table 4.1 and table 4.2 below.

The descriptive statistics for the independent variables were analyzed as follows.

Table 2. Descriptive statistics for the study variables.

. xtsum cashflow investments inventorycontrol profitability					
Variable	Mean	Std. Dev.	Min	Max	Observations
cashflow overall	.2048889	.2701315	-.44	.84	N = 45
between		.2331911	-.132	.668	n = 9
within		.1534157	-.1211111	.7668889	T = 5
invest~s overall	.0002222	.2967206	-.97	.51	N = 45
between		.1849823	-.406	.26	n = 9
within		.2386115	-.7697778	.6462222	T = 5

Cash flow which was the dependent variable and was measured as a ratio (operating cash flows to current liabilities) had a mean of 0.205. This implied that the manufacturing firms could only cover 20.5% of their current liabilities during the period under the study. The firms did not generate enough cash flows during this period and it is evident that they had cash flow challenges especially Eveready East Africa Ltd. The mean of cash flow was -0.44 which implied that some of the firms generated negative cash flows thus having a challenge to fund their current liabilities. The maximum was 0.8 which was close to one which is the standard ratio meaning that firms with this ratio tried to fund their operations but were not able to generate enough cash flows. This report is in agreement with the KAM,(2011) report which revealed that most of the manufacturing firms are stagnant or failing due to lack of enough cash flows.

Investments had an overall mean of 0.002 and a variation of 0.296, a minimum of -0.97 and a maximum of 0.51. The variation between the firms was 0.184, a minimum of -0.406 and a

maximum of 0.26. Investment variation within the firms was 0.239 with a minimum of - 0.770 and a maximum of 0.65. This showed that on average, some of the firms increased their capital expenditure in terms of getting new machines and equipment up to 51% while other firms decreased their capital expenditure by disposing some of their equipment up to 97%. The increase in capital expenditure had a significant positive relationship on cash flows. This conclusion is in agreement with Jonathan and Katharina, (2016), Zahid, (2017) and Wale, (2014) who concluded in their studies that a positive relationship exists between investments and cash flow.

Inventory control overall mean was 5.068 and a variation of 2.336, a minimum of 1.66 and a maximum of 12. The between firm variation of inventory control was 1.592 with a minimum of 3.302 and a maximum of 7.436. The within firm variation was 1.776 with a minimum of 2.750 and a maximum of 13.096. From this analysis it was established that most of the firms replenished their firms on Average five times in a year. This implied that the firms held a lot of stocks which tied up their cash flows thus causing cash flow challenges in the firms. The overall minimum of the firms was 1.66 which implied that some of the firms replenished their firms twice a year. This could have been a reason why most of the firms experienced cash flow challenges. The overall maximum was 12 implying that some of the firms were efficient in replenishing their stocks. This findings are in agreement with Mwangi, (2014) who concluded in his study that a relationship exists between inventory control and cash flows.

Profitability overall mean was 0.042 and a variation of 0.329, a minimum of -0.89 and a maximum of 0.46. The between firm variation was 0.272 with a minimum of -0.638 and a maximum of 0.348. The within firm variation was 0.201 with a minimum of -0.514 and a maximum of 0.367. The implication of the overall mean is that the firms had a mean cash flow ratio of 0.2. The overall mean of 0.042 implied that the profitability of the assets was on average 4.2%. In some of the firms the return on assets was as high as 46% which was the maximum during the period under study. Some of the firms did not utilize their assets well and thus ended up making losses up to 89% which was the minimum for the firms on average.

Table 3 Descriptive statistics for the dependent variable.

```
. xtsum cashflow
```

Variable	Mean	Std. Dev.	Min	Max	Observations
cashflow overall	.2048889	.2701315	-.44	.84	N = 45
between		.2331911	-.132	.668	n = 9
within		.1534157	-.1211111	.7668889	T = 5

From the study findings it was established that on average all the firms had a cash flow ratio of 0.20 with an overall variation of 0.27, over a minimum of -0.44 and a maximum of 0.84. The standard deviation between firms was 0.23 with a minimum of -0.13 and a maximum of 0.68. The within firm variation of cash flow (standard deviation) was 0.15 with a minimum of -0.12 and a

maximum of 0.77. Cash flow which was the dependent variable and was measured as a ratio (operating cash flows to current liabilities) had a mean of 0.205. This implied that the manufacturing firms could only cover 20.5% of their current liabilities during the period under the study. The firms did not generate enough cash flows during this period and it is evident that they had cash flow challenges especially Eveready East Africa Ltd. The mean of cash flow was -0.44 which implied that some of the firms generated negative cash flows thus having a challenge to fund their current liabilities. The maximum was 0.8 which was close to one which is the standard ratio meaning that firms with this ratio tried to fund their operations but were not able to generate enough cash flows. This report is in agreement with the KAM, (2011) report which revealed that most of the manufacturing firms are stagnant or failing due to lack of enough cash flows.

4.3 Exploratory data analysis.

Heterogeneity was examined across the listed firms for five years using exploratory data analysis. This analysis was essential in the determination of whether to use the panel data models or simply to use pooled data regression models. The analysis was done using graphs to examine the general trend of cash flows within and across manufacturing firms listed in the Nairobi stock exchange. Growth plots were used to study the within firm behavior of cash flow. Figure 4.1 below shows the empirical growth of cash flow over a period of five years under the study. From the growth plot, it was revealed that for most of the firms cash flows did not change much during the period under study. However, there are two firms in which cash flows behave differently from the others i.e. 4 and 7. These two outliers did not suggest the existence of significant time-related fixed effects.

Within individual firms' behaviour of cash flows over time.

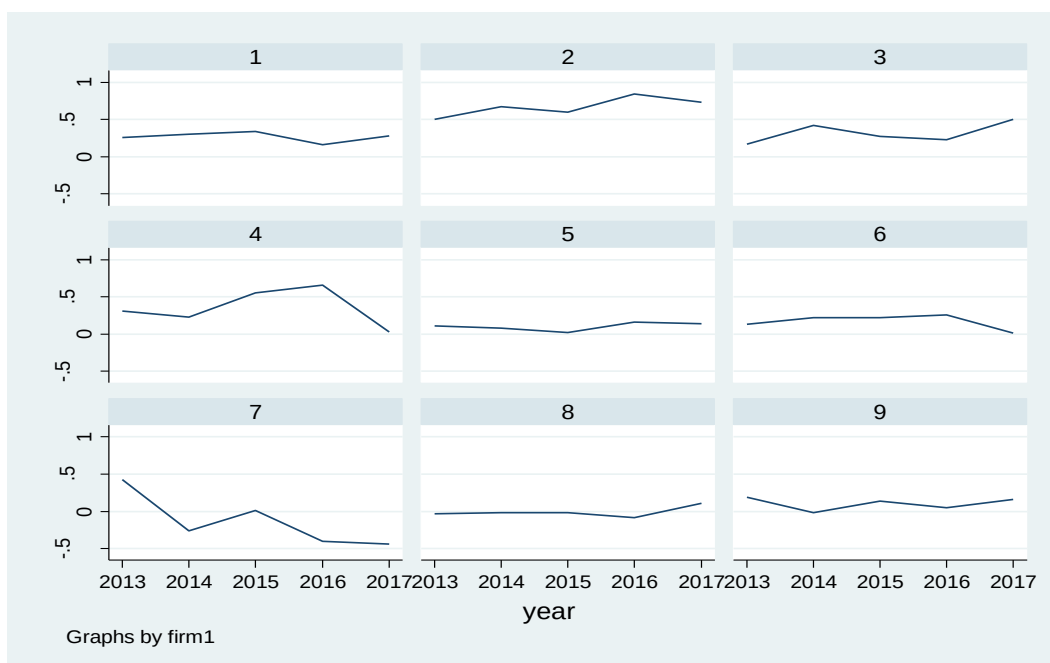


Figure 4.1 Growth plots-Trend plots for the dependent Variable.

Source: Researcher (2019)

4.4 Diagnostic Testing

This section reports on results of diagnostic analysis of panel data. The reports specifically includes the existence of time related fixed effects and the suitability of fitting pooled regression model as compared to panel data models. The presence of serial correlation and heteroscedasticity was also examined in the study. An analysis of the data was also done to determine if to use random effects or fixed effects models.

4.4.1 Test for Random Effects.

The researcher started by examining the practicability of fitting a pooled regression model or a panel data model. Breuch-pagan LM test was used to determine if a simple linear regression model was more preferable than random effect model. The Breuch-Pagan LM test was also used to check for random effects and thus helped in choosing between POLS model and Random effect model.

Table 4. Random effect model results.

```
. xtreg cashflow investments inventorycontrol profitability, re
```

Random-effects GLS regression	Number of obs	=	45
Group variable: firm1	Number of groups	=	9
R-sq: within = 0.3319	Obs per group: min =		5
between = 0.7519	avg =		5.0
overall = 0.4574	max =		5
	Wald chi2(3)	=	24.62
corr(u_i, X) = 0 (assumed)	Prob > chi2	=	0.0000

cashflow	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
investments	.3394311	.0949355	3.58	0.000	.153361	.5255012
inventorycontrol	-.0409692	.012347	-3.32	0.001	-.0651688	-.0167695
profitability	.2289808	.0990794	2.31	0.021	.0347888	.4231728
_cons	.4036945	.0766842	5.26	0.000	.2533962	.5539928
sigma_u	.1002301					
sigma_e	.14316531					
rho	.32892242	(fraction of variance due to u_i)				

Source: (Researcher 2019)

Table 5 chi-square values for the Breusch-Pagan LM test.

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

cashflow[firm1,t] = Xb + u[firm1] + e[firm1,t]

Estimated results:
+-----+-----+
|                | Var      | sd = sqrt(Var) |
+-----+-----+
| cashflow       | .072971  | .2701315        |
| e              | .0204963 | .1431653        |
| u              | .0100461 | .1002301        |
+-----+-----+

Test:  Var(u) = 0
      chibar2(01) =    10.18
      Prob > chibar2 =    0.0007
```

Source (Researcher 2019)

The p value is less than 0.05 thus we reject the null hypothesis that the variance across group is zero .We therefore use random effect model and not POLS model as the p value is 0.0007.

Table 6 .Test for time fixed effects.

```
Fixed-effects (within) regression
Group variable: firm1

R-sq:  within = 0.3758
      between = 0.5112
      overall  = 0.3839

Number of obs   =    45
Number of groups =     9

Obs per group: min =     5
              avg  =    5.0
              max  =     5

F(7,29)        =    2.49
Prob > F       =    0.0390

corr(u_i, Xb) = 0.2936

+-----+-----+-----+-----+-----+-----+
| cashflow | Coef. | Std. Err. | t    | P>|t| | [95% Conf. Interval] |
+-----+-----+-----+-----+-----+-----+
| investments | .2714679 | .0974823 | 2.78 | 0.009 | .0720941 .4708416 |
| inventorycontrol | -.039993 | .0129371 | -3.09 | 0.004 | -.0664524 -.0135337 |
| profitability | .0863215 | .1255835 | 0.69 | 0.497 | -.1705256 .3431686 |
| year      |
| 2014      | -.0471698 | .0709581 | -0.66 | 0.511 | -.1922954 .0979558 |
| 2015      | -.0443473 | .0741414 | -0.60 | 0.554 | -.1959834 .1072888 |
| 2016      | .002661 | .0754561 | 0.04 | 0.972 | -.151664 .1569861 |
| 2017      | -.0618999 | .0704711 | -0.88 | 0.387 | -.2060294 .0822296 |
| _cons     | .4348239 | .0823918 | 5.28 | 0.000 | .2663138 .6033339 |
+-----+-----+-----+-----+-----+-----+
| sigma_u   | .1908828 | |
| sigma_e   | .14929656 |
| rho       | .62044796 | (fraction of variance due to u_i) |
+-----+-----+-----+-----+-----+-----+

F test that all u_i=0:   F(8, 29) =    5.61      Prob > F = 0.0002

. testparm i.year

( 1)  2014.year = 0
( 2)  2015.year = 0
( 3)  2016.year = 0
( 4)  2017.year = 0

F( 4, 29) =    0.34
Prob > F =    0.8512

.
```

Source :(Researcher 2017)

The p value was greater than 0.05 which meant that there were no significant time fixed effects ($P > 0.05$) thus fitting a two way component model or inclusion of dummies was not appropriate. All the dummies for the years were zero. The P value was 0.8512.

4.4.3 Testing for multicollinearity

Multicollinearity refers to the relationship between the independent variables. The researcher analyzed the relationship between investments, inventory control and profitability to see if they are highly correlated. Variance inflation factor analysis was used to test the presence of multicollinearity. The mean VIF was 1.05 thus it was concluded that there was absence of strong correlation between two or more independent variables. The variables are within the threshold for multiple regression analysis.

Table 7. Collinearity test.

```
. regress cashflow investments inventorycontrol profitability
```

Source	SS	df	MS	Number of obs =	45
Model	1.50533034	3	.501776781	F(3, 41) =	12.06
Residual	1.70539415	41	.041594979	Prob > F =	0.0000
				R-squared =	0.4688
				Adj R-squared =	0.4300
Total	3.21072449	44	.072971011	Root MSE =	.20395

cashflow	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
investments	.4857163	.1071956	4.53	0.000	.2692304 .7022022
inventorycontrol	-.0466324	.0133101	-3.50	0.001	-.0735126 -.0197521
profitability	.3653795	.0961286	3.80	0.000	.1712438 .5595152
_cons	.4268007	.0740092	5.77	0.000	.2773361 .5762652

```
. vif
```

Variable	VIF	1/VIF
investments	1.07	0.934413
profitability	1.06	0.945926
inventoryc~l	1.02	0.977488
Mean VIF	1.05	

Source :(Researcher 2019)

The mean VIF is below 5 which show the absence of multicollinearity.

Table 8 Correlation Matrix.

```
. pwcorr cashflow investments inventorycontrol profitability, sig star(0.05)
```

	cashflow	invest-s	invent-1	profit-y
cashflow	1.0000			
investments	0.3871*	1.0000		
	0.0086			

The correlation matrix above shows the absence of multicollinearity. According to (Fied, 2009) a correlation matrix is a conventional check for multicollinearity. The Matrix measures the nature and strength of the relationship between the independent variables under the study. The correlation between investment and cash flow is 0.3871 .This shows that the two variables have low correlation. A correlation factor of one show that the study variables are highly correlated and thus not suitable for the study. As the correlation factor approaches to Zero, collinearity reduces.

4.4.4 Testing for Serial Correlation

Auto correlation or serial correlation is a situation which occurs if the error terms of the regression variables for successive periods are correlated. Serial correlation distorts the efficiency of regression estimators if present in a data set. The presence of auto correlation was tested by the researcher by use of the Wooldridge test. The STATA command was xtserial. The null hypothesis for this test was that there was no first order auto correlation in the panels. This hypothesis is rejected if the p value of the test is less than 5%.

Table 9. Wooldridge test for serial correlation.

```
. xtserial cashflow investments inventorycontrol profitability
```

Wooldridge test for autocorrelation in panel data

H0: no first order autocorrelation

F(1, 8) = 5.693

Prob > F = 0.0441

The p value from the study was less than 0.05 indicating the presence of serial correlation. This implied that a robust model needed to be fitted to correct the problem of serial correlation otherwise the efficiency of the regression estimators could be distorted. The p value was 0.0441.

4.4.5 Test for heteroscedasticity.

The researcher used the modified Wald test for group wise heteroscedasticity to test if heteroscedasticity was present in the data. The results of the test are portrayed. Presence of heteroscedasticity tends to inflate the standard errors, which increases the probability of committing type two errors i.e. Failing to reject a false hypothesis about a coefficient. Modified Wald test null hypothesis is that data is homoscedastic across entities i.e. Error terms have a constant variance

Table 10. Modified Wald test for GroupWise Heteroscedasticity.

```
. xtreg cashflow investments inventorycontrol profitability,fe
```

Fixed-effects (within) regression	Number of obs	=	45
Group variable: firm1	Number of groups	=	9
R-sq: within = 0.3468	Obs per group: min	=	5
between = 0.5540	avg	=	5.0
overall = 0.4627	max	=	5
	F(3,33)	=	5.84
corr(u_i, Xb) = 0.2948	Prob > F	=	0.0026

cashflow	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
investments	.311671	.0933666	3.34	0.002	.1217153	.5016267
inventorycontrol	-.051065	.0162168	-3.15	0.003	-.0840582	-.0180717
profitability	.1193912	.1077563	1.11	0.276	-.0998407	.3386231
_cons	.4596201	.085008	5.41	0.000	.2866699	.6325702
sigma_u	.16945588					
sigma_e	.14317678					
rho	.58346766	(fraction of variance due to u_i)				

F test that all u_i=0: F(8, 33) = 4.99 Prob > F = 0.0004

```
. xttest3
```

Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: $\sigma(i)^2 = \sigma^2$ for all i

chi2 (9)	=	117.36
Prob>chi2	=	0.0000

The p value was less than 0.005($p < 0.005$) thus indicating the presence of heteroscedasticity in the data set. To correct this robust model must be fitted to take into account the effects of heteroscedasticity .The p value for the data was 0.0000. This implied that the data is heteroskedastic which means that the error terms across the entities are not constant.

4.5 Model Fitting: PraisWinsten Panel Regression Model with Corrected Standard Errors.

The data set had serial correlation and heteroscedasticity thus a robust model had to be fitted to correct the same. The linear regression assumptions were violated by the presence of this two. The researcher fitted a PraisWinsten Panel Regression Model with corrected standard errors .This was done to produce robust results in the presence of serial correlation and heteroskedasticity. Figure 4.8 below shows the results after fitting the model.

Table 11 PraisWinsten Panel Regression Model with Corrected Standard Errors.

. xtprcse cashflow investments inventorycontrol profitability, correlation(ar1) hetonly						
Prais-Winsten regression, heteroskedastic panels corrected standard errors						
Group variable:	firm1	Number of obs	=	45		
Time variable:	year	Number of groups	=	9		
Panels:	heteroskedastic (balanced)	Obs per group: min	=	5		
Autocorrelation:	common AR(1)	avg	=	5		
		max	=	5		
Estimated covariances	=	9	R-squared	=	0.4298	
Estimated autocorrelations	=	1	Wald chi2(3)	=	22.18	
Estimated coefficients	=	4	Prob > chi2	=	0.0001	

cashflow	Het-corrected					
	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
investments	.428092	.1156557	3.70	0.000	.2014109	.6547731
inventorycontrol	-.0439795	.0158903	-2.77	0.006	-.075124	-.012835
profitability	.3185589	.0855904	3.72	0.000	.1508047	.4863131
_cons	.4165713	.0910387	4.58	0.000	.2381387	.5950039
rho	.1548155					

Source: Researcher (2019)

The results presented in figure 4.8 above showed that the constant was 0.4165713 and this value was statistically significant at 5% significance level as the P value was 0.0000. The implication from these results is that without the influence of the independent variable, the dependent variable will have a value of 0.4165713. This means that firms will be able to cover 41% of their current liabilities.

The results indicated that investments had a regression coefficient of 0.428092 with a p value of 0.000. This implied that there was a statistically significant positive relationship between cash flow and investments in manufacturing and allied firms listed in the Nairobi stock

exchange. Essentially, 1% increase in investments would result in 42.8092% increase in cash flow.

The co efficient for inventory control was -0.439795 with a p value of 0.006 this implied that 1%decrease in inventory control resulted into 43.9795% decrease in cash flow. This showed that there was a statistically significant negative relationship between cash flows and inventory control at 5% confidence interval.Profitabilty had a co efficient of 0.3185589 and a p value of 0.000.This implied that there was a statistically significant positive relationship between profitability and cash flows at 5% confidence level. This is because the P value was less than 0.05.A 1% increase in profitability would result to 31.85589increase in cash flows.

Therefore the model equation for the study was,

$$Y = 0.4165713 + 0.428092X_1$$

Where:

Y= Dependent Variable (Cash Flow)

0.4165713 = Constant (cash flow level when all the independent variables are at Zero)

0.428092 = Co efficient of X1(change in the dependent variable due to a unit change in X1.

X₁ = investments

4.6. Discussion of results

4.6.1 Investments and Cash Flows

The results indicated that investments had a regression coefficient of 0.428092 with a p value of 0.000.This implied that there was a statistically significant positive relationship between cash flow and investments in manufacturing and allied firms listed in the Nairobi stock exchange. From these findings the implication is that investments tend to influence cash flows positively. AS such, manufacturing firms should increase investments which in turn will increase cash significantly. Firms should invest more in manufacturing firms as this improves their efficiency which inturn influences cash flows significantly. This study is in agreement with Kinyanjui (2013) who concluded that there is a significant positive relationship between investments and cash flows. Imtiaz (2017) concluded in his study that there is a positive relationship between cash flow and investment but the relationship is insignificant in low investment firms. Letenah (2014) and Atil(2003) concluded that there is a positive cash flow –investment sensitivity in manufacturing firms.Degryse and De-Jong (2005) carried out a study to establish the relationship between cash flow and investment and established a positive relationship between cash flow and investment for both types of manufacturing organizations having low and high investment opportunities.

5. Conclusion

Cash flows had a similar trend in almost all the firms except in one firm for the period covered by the study as showed in the growth plot. The researcher established that a relationship exists between investments and cash flows. There was a statistically significant positive relationship between investments and cash flows. From these findings the implication is that investments tend to influence cash flows positively. As such, manufacturing firms should increase investments which in turn will increase cash flows. By

acquiring enough machines and equipment for production can increase the output of the firm which in turn increases cash flow from operations.

The general objective of the study was to establish the factors that affect cash flow in manufacturing firms listed in the Nairobi stock exchange. The specific objective of the study was to establish if investments had any effect on cash flows. The results showed that investments had a relationship with cash flows which was significant in the period the study covered. Investments have a significant positive relationship with cash flows which meant that by increasing investments, the firms would end up increasing their cash flows.

From the study findings, the following will be recommended. Manufacturing firms should consider increasing investments in terms of capital expenditure to acquire more machines and equipment as firms with high investments have a high cash flow investment sensitivity. This is because the production efficiency of manufacturing firms increases when a firm has enough machines and equipment which in turn increases cash flows.

The research gaps arising from this study form the basis for further research by different researchers. There is a need to consider carrying out a similar study that will consider other factors which affect cash flows like trade payables, trade receivables and budgets as very little literature exists on this. Further there is little literature that exists on the factors affecting cash flows in manufacturing firms. A lot of emphasizes has been put on the importance of cash flows but the factors which affect cash flow have not been discussed conclusively thus need to conduct more research in this area.

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