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The Nexus between Inflation Rate and Financial Performance: Evidence from Kenya's Building and Construction Industry

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Abstract:- Building and construction firms contributes immensely to a country's economic development through job creation, promoting investment and enabling affordable housing. Thus, stakeholders are often preoccupied with the industry's performance and developmental stages and pace. In Kenya, the building construction industry is currently characterized by decline in capital investment, implying an unhealthy industry. The industry has reported a steady reduction in growth in the last decade, as evidenced by the drop in value from Kshs.42.5 billion in 2011 to Kshs. 39.6 billion in 2020.As an illustration, the industry had a decline in return on investment (ROI), from 13.68% in 2011 to 4.79% in 2020. The decline in growth and ROI warrants a scholarly investigation. The study aims at establishing the effect of inflation rates on financial performance of building construction industry, Kenya. The researcher used correlational research design to investigate the relationship, direction and strength of variables. The study used quarterly data which were secondary sourced from industry records and publications for2011-2020, resulting in 40 data points. The findings were that a correlation existed among inflation rate and financial performance of and construction industry in Kenya. A unit increase in inflation rate resulted in a 0.424% increase in the financial performance of the construction industry. The positive t value of 4.005 and $p \leq 0.00$ led to the conclusion on the positive directionality of the relationship. Research findings may be useful to industry's private stakeholders and government agencies by enabling them to take the right policies, strategy and actionable steps or measures to enhance the relationships that would enhance financial performance. For instance, the government may work to increase the value of its currency and manage cost of goods (inflation).

Keywords:- *Inflation Rate, Financial Performance, T – Statistics, F- Statistics.*

I. INTRODUCTION

According to Alessi & Detken, (2011), Building-construction industry is key to the economic development of the economy of a given nation. It has been recognized as a crucial industry in improving the social welfare of the population. It concerns buildings or a fixed mass of land (Pagourtzi et al., 2003). In building construction business, building construction projects can be categorized as either residential or non-residential. It involves purchase, management, and construction of housing units for profit (Abraham, 2009). Over the last one-decade, building construction industry has created jobs opportunities for 12% job seekers (Watson, 2013). Financial performance is a key concept in the construction industry. It measures how well construction firms utilize resources or assets to generate revenue and become sustainable. Construction firms use several indicators to measure financial performance, namely liquidity, profitability, valuation, efficiency and solvency (Barkham, 2012).

Bayo (2011) gives explanation on inflation as abrupt increased prices of goods and services over a given time period while (Stock & Watson, 2005) states that it's the change in averaged price level with price index as the base. Inflation is measured by consumer price index. Increase in prices decrease consumer spending which in turn reduces financial performance of building construction companies. Investors view effect of inflation on ROI before making decisions. People who are borrowing have to recompense those lending for the effects of inflation that corrode the quality and worth of their invested funds during the period a loan is outstanding. Lenders thus make sure inflation is captured when calculating interest rate payable, yielding higher interest committed. San (2013) assert that during inflation, prices at economic level increases during inflation resulting into an increased in cost of raw materials required when building, shooting the cost of building-construction property upwards.

Barkham (2012) veins that an increased level of money supply leads to a declining velocity of circulation causing rising real income thus positively affects building construction market. A conclusion is made that changes in velocity occurs as a result of the changing level of money supply. The increased money supply level circulating in the economy causes rise in inflation and prices of houses. Such occurrences causes uncertainty of the inflation level in the building-construction market severely affect it. This affects building construction markets negatively. Baffoe-Bonnie (2006) posits that an increment in money supplied into the economy beyond a certain limit may cause increase in inflation rate thus has a negative effect on the level of investment. However, a spontaneous rise in the money supplied causes interest rates to reduce while holding all factors constant, thus reducing the costs of housing services. The quantity demanded for housing will also be increased same as the prices of the housing units.

Existence of a positive relationship between the performances of the housing sector and rate of inflation is sometimes positive where an asset is an inflation hedge. Geoffrey (2011) veins that building construction buffer investors with a hedge from inflation rate since income from building construction industry usually increase when an economy experience inflation and investors can maintain the same returns. According Omare (2014), inflation rate affects interest rates levels. Higher inflation rates results in higher interest rates because the lenders demand higher returns to cushion their investments from corrosion. The increased interest rates results into a decrease in purchasing power of the money.

Blanchard (2000) veins that higher rates of inflation increases house unit prices. Barro (2006) while studying inflation and growth posits that household and firms perform dismally during high and unpredicted inflation cycle. The prices of housing also increases causing owning a house less affordable. Hassan (2016) posits that serious attention should be given to inflation or deflation when it is expected to occur and considered during housing decisions making plenaries. This done so as to factor in cost of procuring funds needed in building construction.

Empirical findings of previous literatures on inflation rate and financial performance of the various sectors have also given mixed results. Wamucii (2010) studied the association between inflation and financial performance of banking sector, Kenya for 10-year period (2000-2009). The results showed a negative significant relationship between inflation and financial performance of banking sector. However, a recent study by Moyo and Tursoy (2020) on the effect of inflation, economic growth rate and financial performance of the banking sector, South Africa revealed that inversely significant relationship between inflation and ROE. There was a weak association between economic growth rate and ROE. However, Njuguna (2013) carried out an investigation on macroeconomic factors and financial performance of deposit taking micro-finance institutions, Kenya and reported significant positive effect of GDP on financial performance. This finding points to the fact that the relationship between inflation and financial performance of industries is still not clear.

The reason rate of inflation is employed as independent variables is its inconsistent, conflicting and inconclusive relationships with financial performance. Inflation rate give insights into the future of an economy, especially short-term predictions. Similarly, these indicators help in the drawing and prediction of patterns. Importantly, inflation rate avails information and data for status and changes of a country's economy.

II. THEORETICAL REVIEW

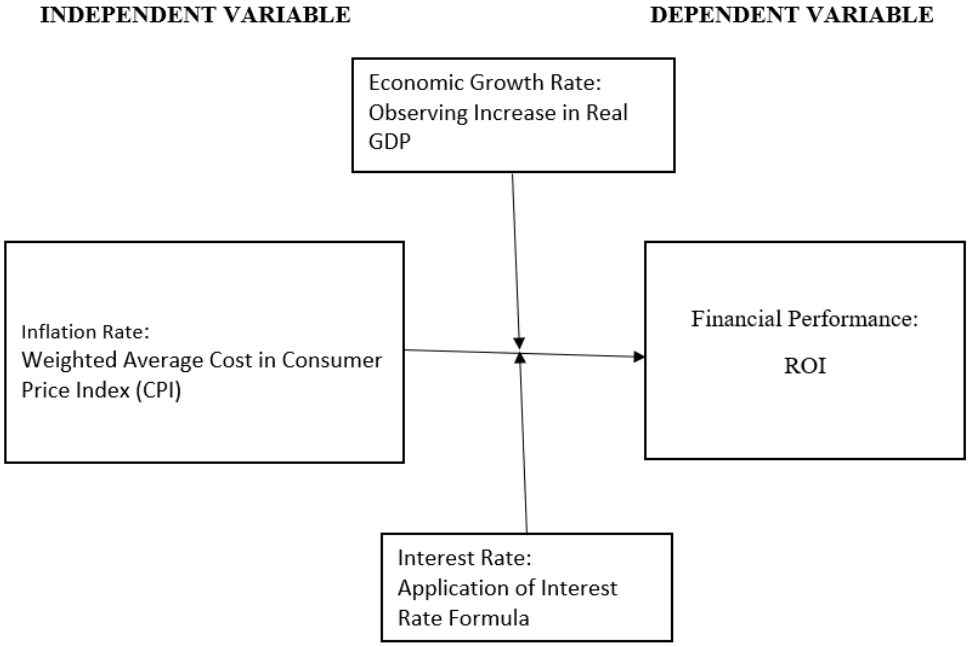
Purchasing power parity theory is anchored on postulate that the rates of exchange among countries are at equilibrium when their purchasing power is the same. Essentially, a country's purchasing power is its currency's value, in terms of the quantity of products a unit of the currency can purchase. The reason this theory anchors the study is that, as the theory postulates, an increase in inflation decreases the value of a currency and the number of products it can purchase. Thus, as purchasing power of individuals and economies change, so does inflation rate. This theory is particularly applicable for the study because it proposes the use of purchasing power or currency exchange rates to make reasonable and accurate economic decisions.

Consistently, Tobin (2001) developed the Q theory, which holds that investment is shown as a functions of ratios with the help of the quotient of current market prices of market replacing cost. The industry should keep the ratio below one and this will favor them to continue investing but should stop their investments when the ratio is equivalent to one. In addition, the investors should refrain from making investments because an asset is cheaper to make than they should investment (Jud & Winkler2003). The model proposes that the rate of investment should have Q as the base, Q is the amount which can be used to replace an asset. The ratio of Q influences decisions made by investors on the choice of an investment to make (Kaijser 2014). The theory serves as a pointer to market equilibrium. When the ratio is less than one, it signals that there is deficiency on demand whereas when the ratio equal to one it signifies that there is equilibrium of the market (Berg & Berger 2005). An industry can maximize profit in a market through sound decisions made on investments as proposed by Q theory (Kaijser 2014).

From the building construction industry, Q is the ratio of existing house's value divided by cost constructing new houses. The theory proposes that decisions on investment made by investors are based on the value of Q, where a ratio greater than one signals the need for new more units; therefore, investor

should lay investments which meets the increased demand for houses, returns from the residential units will be higher due to increased assets prices (Berg & Berger, 2005). This theory is significant to the present study because inflation rate may affect the value of the building construction industry and reducing the levels of investment in building and construction.

Fig 1.1: The conceptual framework



***(Source:** Adapted from Egbunike & Okerekeoti, 2018)*

III. EMPIRICAL LITERATURES

Wamucii, (2010) studied inflation and financial performance of commercial banks, Kenya. The study use annual secondary data from 44 commercial banks for 10-year period, 2000-2009.The findings revealed a negative significant association between inflation and financial performance of commercial banks. This is interpreted; as a decreases in inflation causes an increase in profit. However, the relationship between inflation and total assets was weak.

Boyd, Levine and Smith (2001) carried out another study; effects of inflation on financial sector performance. This study examined increases in rate of inflation and ability of the financial sector to allocate resources effectively. The findings showed that there is a significant negative relationship between inflation and banking sector development. Further, the relationship was found to be non-linear. The researcher pointed that as inflation rises, the marginal effect of inflation on banking lending activity and stock market development decreases.

Illo (2012) invested macroeconomic factors and financial performance of commercial banks, Kenya. Return on Asset was the proxy for performance. ROA was regressed against the macroeconomic factors including GDP growth rate, rate of economic growth, supply of money (M3), rate of inflation (CPI), and rate of lending of the sampled commercial banks. The period of the study was ten years from 2002-2012. The researcher adopted quarterly secondary data from Kenya's Central Bank, the Kenya National Bureau of Statistics (KNBS) and quarterly financial statements from commercial banks used as sample. Data analysis was done using Pooled Least Square method that assumed linearity between the outcome and predicator variables. The financial performance of commercial banks had positive correlation with GDP growth rate, supply of money (M3), rate of interest for lending of individual commercial banks and inflation.

Ongeri, (2014) studied macroeconomic factors and financial performance of non-bank financial institutions, Kenya. Return on Asset was used to measure financial performance. Predicator variables included rate of inflation, rate of currency exchange, and average quarterly rate of interest and quarterly GDP growth rate. The researcher adopted secondary data for a period 2004 to 2013. The results showed that return on NBFI's assets had a strong positive association with a currency's exchange growth rate and a weak positive association with quarterly GDP, inflation rate and average quarterly interest rate.

Egbunike & Okerekeoti (2018) examined macroeconomic factors, firm characteristics and financial performance, Nigeria. The variables of the study were rate of interest, rate of inflation, rate of economic growth and gross domestic product and firm characteristics. The dependent variable was performance whose proxy was return on assets. The researcher adopted *ex post facto*

research methodology. The findings revealed that rate of interest had no significant effect on rate of economic growth, but was significant on rate of inflation. Similarly, the firm characteristics showed that firm size, advantage and liquidity were significant.

Njuguna (2013) carried out an investigation; effects of macroeconomic factors on financial performance of deposit taking micro-finance institutions, Kenya. The main focus of the research was three macroeconomic factors namely: economic growth, rates of interest and rate of inflation. The findings revealed positive and significant effect of GDP on financial performance while rates of interest and rate of inflation had no significant effect on performance of deposit taking MFIs in Kenya.

Moyo & Tursoy (2020) studied inflation rate, economic growth rate and financial performance of commercial banks, South Africa. The researcher targeted four largest commercial banks; Standard bank, Nedbank, Capitec bank and FirstRand bank from 2003-2019. Financial performance was measured by return on equity. The findings showed existence of a significant inverse association between inflation and the return on equity. A weak relationship existed between economic growth rate and return on equity.

Khan (2015) studied inflation and financial development. The study examined the effect of inflation on financial development, Pakistan for a period of 2002-2011. Experimental findings showed that high rate of inflation decrease level of performance of financial markets. GDP per capita was found to promote development of financial sector. Finally, there was a negative association existing between inflation and financial development.

Hami (2017) studied Inflation and Financial Development Indicators, Iran. The study used seasonal annual data for the period (2000–2015). Time series data were collected from World Bank and seasonal inflation rate. Five financial development indicators formed the variable of the study. Then Johansen Co- Integration Test and Vector Error Correction Model were used to estimate the proposed model. The findings revealed a negative significant effect between rate of inflation and financial depth, positive significant effect on the ratio of total deposits in banking system to nominal GDP.

A majority of these studies was done in Kenya but still they yielded contradicting results. The impact of inflation on financial performance of industries, Kenya still remains unclear. This un-clarity of the previous studies may be addressed by the current study through extending of the duration of study period, which will make the researcher, go for more recent secondary data.

IV. METHODOLOGY

The study employed a correlational survey methodology to building and construction firms in Kenya between 2011 and 2020. According to Rahi (2017), a survey methodology is most suits a research that aims at establishing a problem and in obtaining information relating to the status of a phenomenon. In this context, it helps the researcher describe the variables while considering all the building and construction firms. The target population was the entire building construction industry in Kenya made up of 455 individual firms. The study used secondary quantitative data of the industry sourced from Kenya National Bureau of Statistics and Central Bank of Kenya. Research data sourced from secondary platforms was analyzed with multiple linear regression and correlation. This approach provided the researcher with opportunity to adopt the latest statistical packages for social sciences. The analysis used t – statistics and F- statistics to check the empirical relevance of regression coefficients and the regression equation respectively. The coefficient of determination (R-square) was employed in determining the explained variation and unexplained deviation.

V. DISCUSSION

- *Descriptive Statistics*

Table 4.1 summarizes the descriptive analysis for collected data. From the results, the mean for interest rate, inflation rate and economic growth rate (GDP) are 9.6174, 7.1770 and 5.0375 respectively. The standard deviation column shows that 95% of the values are within 2 standard deviations of the mean. Thus, the data used in the study was not spread out, thus quite close to the mean.

***Table 4.1:* Descriptive Statistics for study variables**

	N	Minimum	Maximum	Mean	Std. Deviation
Interest Rate	40	5.53	18.00	9.6174	2.54668
Inflation Rate	40	3.98	16.29	7.1770	2.91196
Economic Growth Rate GDP	40	3.30	6.50	5.0375	.82887

- *Determination of the Model's Fit*

From table 4.2, the analysis analysis yielded R, R^2 and adjusted R^2, which showed the model-data fit.

Table 4.2: Model Summary

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.665[a]	.442	.396	1.70585
a. Predictors: (Constant), Economic Growth Rate GDP, Interest Rate, Inflation Rate				

In table 4.2, 'R', the multiple correlation coefficient, measures the predictability of the outcome variable by showing the quality of the prediction of the financial performance of Kenya's building and construction industry between 2011 and 2020. The 'R' value of 0.665 shows a 'good' level when predicting the dependent variable. On the other hand, the '$R^{2'}$ of 0.442, coefficient of determination, is variance in proportion in financial performance of building and construction industry' that the independent variables explain.

Statistically, the 'R^2' value of 0.442 indicates that the predicator variables of interest rates, inflation rate and economic growth explain 44.2% of the variance of financial performance of building and construction industry'.

➢ *Statistical Significance Reporting*

The significance of the model is established from the ANOVA table's 'Sig' column. As shown in table 4.3, the 'Sig' obtained in the study was 0.000, implying regression model significantly fitted the data at $p < 0.05$. The ANOVA table (Table 4.3) shows the F-ratio, the test of the regression model's fit for the data. The analysis yielded $F(3, 95) = 27.707$, $p < 0.05$. According to the table, the predicator variables of inflation rate, interest rate and economic growth are statistically significant in their prediction of the dependent variable, financial performance of building-construction industry, Kenya. Thus, regression is a good fit for data used in the research.

Table 4.3 Statistical significance

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	83.121	3	27.707	9.522	.000[b]
	Residual	104.757	36	2.910		
	Total	187.878	39			
a. Dependent Variable: Financial Performance of Construction Industry						
b. Predictors: (Constant), Economic Growth Rate GDP, Interest Rate, Inflation Rate						

➢ *Estimated Model Coefficients*

In interpreting the coefficients table 'Sig', it is important that two values, the 'Constant' and the second 'Sig' are identified and understood.

Table 4.4: Coefficients

Coefficients[a]						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	6.242	2.337		2.671	.011
	Interest Rate	-3.305E-005	.001	-.003	-.024	.981
	Inflation Rate	.424	.106	.563	4.005	.000
	Economic Growth Rate GDP	-.477	.371	-.180	-1.287	.206
a. Dependent Variable: Financial Performance of Construction Industry						

The, 'Constant' in table 4.4 is 6.242 is significantly different to zero meaning if the variables were assigned zero, financial performance of the building-construction industry would be 6.242.

The 'Sig' column, on the other hand, shows the significance of the study's variables. For any 'Sig' or $p \leq 0.05$, the test hypothesis is rejected. For instance, for inflation rate, since 'Sig' or $(p) \leq 0$, the hypothesis that 'there is no correlation between inflation rate and the financial performance of the construction industry is rejected. Thus, inflation rate significantly affects the financial performance of the industry.

While p values for interest rate and economic growth rate (GDP) are higher than 0.05, in the present study, such a high-value for p is considered statistically significant because of the variability in the data used in the study. Thus, there is significant correlation between these predicator variables and the outcome variable. The variance for interest rate and economic growth were 12.47 (5.53-18) and 2.7 (3.8-6.5) respectively. Therefore, the large effect of economic growth rate and interest rate on financial performance of construction industry may have yielded a large p-value because of the sample size or a large variance.

The un-standardized coefficients in table 4.3 show the variations in the dependent variable with each of the predicator variables when the other predicator variables are constant. For instance, a unit or percentage increment in the inflation rate results in 0.424% increases in the financial performance of the building and construction industry in Kenya. On the contrary, a unit percentage drop in Kenya's GDP growth rate translated into a 0.477 drop in the financial performance of construction industry. Similarly, unit drop in interest rate caused a 3.305% drop in financial performance of the construction industry.

➢ *Statistical Significance of the Independent Variables*

The researcher established whether the standardized and unstandardized coefficients are equal to zero in the population. If $p < 0.05$, the coefficients are statistically significantly different to zero. From table 4.4, the p value for inflation rate (0.000) is less than the study's significance level of 0.05, the null hypothesis is rejected. Thus, there is correlation between inflation rate and the financial performance of the building-construction industry in Kenya. High magnitude of the t values

for inflation rate (4.005) leads further to rejection of null hypothesis.

The positive t value for inflation rate shows a positive directionality in the relationship. That is, increase in quarterly inflation corresponded with an increase in quarterly financial performance of the building construction industry contradicting study by Boyd, Levine & Smith (2001). A unit drop in quarterly interest rate, on the other hand, translated into a 3.305% growth in the quarterly financial performance of building-construction industry in Kenya.

However, a unit growth in quarterly GDP corresponded to a 0.477% drop in the quarterly financial performance of the construction industry with t value of -1.950. Similarly, interest rate yielded a negative t value (-0.24), implying a negative directionality. That is, as interest rate grew, the building construction industry's financial performance decreased. However, a $p \geq 0.05$ indicated an absence of statistical significance for this variable. Kamweru and Ngui (2017) had similar findings and levels of insignificance in a study on the influence of interest rates on performance of the real estate industry at Nairobi.

Table 4.5: tests of statistical significance

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.242	2.337		2.671	.011
	Interest Rate	-3.305E-005	.001	-.003	-.024	.981
	Inflation Rate	.424	.106	.563	4.005	.000
	Economic Growth Rate GDP	-.477	.371	-.180	-1.287	.206

a. Dependent Variable: Financial Performance of Construction Industry

Summarily, the researcher ran multiple regression to predict financial performance of building and construction industry in Kenya from interest rate, inflation rate and economic growth. The study's variables statistically significantly predicted financial performance of construction industry $F(3, 95) = 27.707$, $p < .0.05$, $R = 0.66.5$. All variables statistically affected or added to the prediction.

- *Inflation Rate*

Researcher established positive directionality in relationship between inflation rate and the financial performance of building and construction industry in Kenya. The rising inflation rate over the period under study may have encouraged the stakeholders in Kenya's construction industry to invest or buy more (De Gregorio, 1992). The higher investment or more activities in the industry resulted in the positive directionality in relationships between inflation rate and the financial performance of construction industry, Kenya. The fact that inflation erodes debt makes people, organizations or industries with mortgages and loans benefit from inflation. Notably, since the construction, industry heavily uses mortgages and loans imply it is likely to benefit from high or increasing inflation. As inflation rises or peaks, mortgage and loan repayments takes increasingly smaller percentage of the income or financial resources of construction industry stakeholders. Thus, the fact that inflation reduces the real value of debt may explain positive correlation between inflation rate and financial performance of building construction industry in Kenya.

As Conerly (2021) rightly observes, there are many instances or situations in which high inflation may help the building and construction industry grow. In addition, there are industries that may be hurt or could face untold uncertainties amidst high or growing inflation. For instance, the commodity and real estate and associated industries are likely to benefit from high inflation than those dealing in or handling large inventories. In the face of high or increasing inflation, the stakeholders of building construction industry such as real estate companies accrue substantial financial benefits from increasing inflation rate. Whereas mortgage rates are fixed, rent normally increases with increase in inflation (Conerly, 2021). Consequently, construction companies, more so property owners, are likely to report financial growth. The other avenue by which the construction industry grows during inflation is growing costs. Whereas costs may rise during inflation, construction companies also charge significantly higher prices, culminating in marginal gross margins changes.

As established in this study, construction companies has a higher stake in Kenya's economy. In particular, the contribution of the industry to the country's GDP manifests across literature and research. Inflation is undoubtedly among the key drivers or variables of Kenya's economy and sectors such as the building and construction industry. Thus, as shown in the study, the position and role of inflation in the growth of the industry cannot be ignored. Conerly (2021) and Musarat, Alaloul and Liew (2020) concur, many construction companies or project managers ignore or neglect inflation rate during budgeting. As a result, construction projects and companies report cost overruns. These overruns are mainly attributed to growing or changing cost of hiring machinery, wages and materials. Thus, recommends Musarat, Alaloul and Liew (2020), construction companies and other stakeholders should design and apply frameworks or guidelines for fostering and exploiting the association between inflation rate and building and construction industry.

Normally, high inflation hurts construction industry as real estate buyers and developers struggle to meet financial goals (Mwanza, 2012). However, notes Mwanza (2012), high costs had driven real estate developers to cut back at the start of 2010s, ending the boom in Kenya's construction industry in the 2000s. Several factors, trends, practices or strategic actions explain the financial growth or stability of Kenya's construction industry despite the quarterly growth in inflation. These factors include large infrastructural projects such as the standard gauge railway, development of transport infrastructure and enhanced production of local materials such as cement. Other notable drivers of the financial performance of the Kenyan construction industry between 2011 and 2020 were increase uptake of construction materials by local builders, mega energy projects such as the Olkaria III and Olkaria IV geothermal projects (Mwende, 2015).

There have also been notably large private projects in the industry, including gated estates, malls and office blocks, which have played quite huge roles in the performance of the construction industry. Equally important has been commercial banks and microfinance institutions, which have lent more loans to building and construction companies in recent times. The information this study adds to literature is that appropriate monetary policies aimed at controlling inflation volatility is key to financial performance and sustainability of the construction industry amidst high inflation. The study's quarterly data may explain why the regression analysis yielded positive correlation between inflation rate and financial performance of construction industry. Thus, it hypothesized; data for longer periods such as annual rates may show a different directionality in the relationship. Thus, as agrees Kamweru and Ngui (2017), this study established that long-term regulation, stabilization of inflation rate is the key to reducing the losses construction investors, and practitioners incur because of high inflation or inflation volatility.

VI. CONCLUSION

The positive directionality in the relationship between inflation rate and the financial performance of building and construction industry in Kenya may best be explained through instances in which inflation serves an industry or an economy well. The study by Boyd, Levine & Smith (2001) on effect of inflation on financial sector performance conflicts findings of current study, establishing significant and negative relationship between inflation and banking sector development and equity market activity. While low inflation is often considered attractive and desirable, inflation rates below the target levels may be harmful to an economy or industry (Milligan, 2015). For instance, falling prices of construction materials may imply savings for the industry. As a result, buyers of such materials may spend the savings elsewhere, further boosting the economy. However, reducing inflation and constant lowering of prices may slow down an industry or an economy as buyers or users wait for further decrease in prices. A unit increase in inflation rate resulted in a 0.424% increase in the financial performance of the construction industry. A recommendation is made that further and future researchers should establish the causal relationship between the performance of building and construction industry and inflation rate.

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