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IMPACT OF FIXED ASSETS IN FIRM PROFITABILITY

Lt. Dr. Varun V Varghese
Assistant Professor, Postgraduate Department of Commerce, St.Paul's College Kalamassery

Address of Correspondence: St. Pauls College Kalamassery (Government Aided College) HMT Colony P.O Ernakulam 683503 Kerala

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ABSTRACT

Capital budgeting decisions are one the most important investment decisions to be made by a company. Fixed assets contribute to the major portion of capital requirement of a firm. The study tries to find weather there is any direct relationship between fixed assets and financial performance represented by firms profitability. Three models namely OLS pooled regression model, Random Effects Model and Fixed Effects model are used in the study to evaluate the impact of fixed assets on financial performance. All three models concur that there exist significant relationship between the dependent and independent variables and that financial performance is influenced by the level of investment in fixed assets

KEY WORDS: *Fixed Assets, Firm Profitability, Operating Margin, Fixed Assets Turnover, Foreign Exchange Rates, Interest rate, INV/COGS ratio,*

INTRODUCTION

The association of Fixed Assets with Firm Profitability is evaluated in this study. Fixed Assets refers to the assets that are intended for a long term and money invested in this assets will be huge and will be locked in for a long period of time. In financial management these decisions comes under Capital budgeting which along with working capital management becomes Investing Decision. Firm Profitability refers to the return offered by the firm in the form of profit to its stake holders. Study shows the analytical procedure of how the two variables are related and analyses the impact of Fixed Assets on the Firm profitability of Public Sector Companies. Econometric models are used to analyse the secondary data.

REVIEW OF LITERATURE

Okwo Ifeoma Mary et.al (2012) assessed the impact of a company's investment in fixed assets on its operating profit margin. Though the relationship was positive, it was not statistically significant. Therefore, the result did not suggest any strong positive impact of investment in fixed assets on the operating profit.

1. Mawih (2014) examined the effects of assets structure (fixed assets and current assets) on the financial performance of some manufacturing companies. The overall result of the study was that the structure of assets did not have a strong impact on profitability in terms of ROE. Another result of the study suggested that the effect of asset structure had an impact on ROE only in petro-chemical sector.
2. Olatunji, Toyin E and Adegbite, Tajudeen (2014) examined the effect of investment in fixed assets on profitability. It also analyzed the significant components of fixed assets investment. It was found that there was a significant relationship between dependent variable (Net Profit) and the independent variables (Building, information communication and technology, machinery, leasehold, land and fixture and fitting) with the adjusted R2 @ 96%. Therefore, investments in fixed assets have strong and positive statistical impact on the profitability of companies.
3. Eniola Victoria Oluwaremi and Dr. Florence Memba (2016) reported that asset management deals with providing efficient methods of assets utilization so as to meet organizational goals such as wealth maximization, meeting customers' needs etc. This study strived to find out the relationship between asset management and the financial performance of listed manufacturing firms. Return on Asset served as an indicator for the dependent variable of the study which is the financial performance while the indicators for the dependent variable (asset management) are fixed asset management, cash management, inventory management and accounts receivable management. The findings of the study showed that there was

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significant and positive relationship between asset management and the financial performance of listed manufacturing companies as substantiated with the p-value of less than 0.05 recorded by each construct of the Independent variable.

4. Gladys Mwaniki and Job Omagwa (2017) determined the relationship between the asset structure and the financial performance of the firms quoted under the commercial and service sector at the NSE. The asset structure is analyzed in term of: Property, Plants and Equipment, current assets, intangible assets, and long term investments and funds, which formed the independent variables. The dependent variable was the financial performance of the firms, and was measured in terms of: earning per share, return on assets, return on equity, profit margin (return on sales), and current ratio, by aid of a composite index. The results of the study indicated that asset structure had a significant statistical effect on the financial performance. In particular, the study found that: Property, Plants, Equipment, long-term investments and funds have a statistically significant effect on financial performance, while current assets and intangible assets do not have statistical significance on financial performance.
5. Ali Mohamed Ali Farah (2018) studied the relationship between capital budgeting decisions and profitability in manufacturing firms. Capital budgeting particularly addressed five areas of the study that included capital budgeting decisions (acquisition of long-term assets, replacement of long-term assets, investment appraisal techniques, outsourcing expenditure and working capital decisions) had a biggest and significant effect on profitability of the organizations. The findings showed evidence that there was significant and positive correlation between five dimensions of capital budgeting decisions and profitability of the organizations.

OBJECTIVE OF THE STUDY

The objective of the study is to ascertain the impact of fixed assets on the profitability of the public sector companies

METHODOLOGY OF THE STUDY

The study makes use of ex-post facto research design. The study is also descriptive and explanatory in nature. Eight public sector companies listed in Bombay stock Exchange are taken for study. Study employs panel data regression and based fully on secondary data. Annual reports of public sector companies in India formed the primary source of such data Databases like Money control, CRISIL, POWRESS and Capital Line were also sources for data. Data for a period of 10 years from 2008 to 2017 was collected. In order to explain the effect of explanatory variables on firm profitability three estimation models namely Pooled ordinary least squares (OLS) model, Random effects model and Fixed effects model were used.

Study Hypothesis

The hypotheses are set for the Public Sector Companies. The general hypothesis is given as under:
Null Hypothesis: Fixed Assets do not influence the Financial Performance of Public Sector Companies.
Alt Hypothesis: Fixed Assets influence the Financial Performance of Public Sector Companies

Model Specification

$$OP = \square + \beta 1TFA + \beta 2IR + \beta 3FER + \beta 4COS + \varepsilon \quad \text{----------(1)}$$

Where:

Operating margin = Profitability Measure proxies as Operating Profit / Sales
□= a constant i.e. the value of profit after tax when all the independent variables are zero.
β 1, β 2, β 3 & β 4 = Regression slopes for the independent variables
TFA = Sales/ Net Fixed Assets
IR = Interest Rates
FER = Foreign Exchange Rate
Inv/COS = Inventory/Cost of Sale
ε= an error term normally distributed about a mean of 0.

RESULTS AND DISCUSSIONS

Descriptive Statistics

Normality of data series of public and private sector firms in individual and common samples are checked using Jarque – Bera statistics and is described in Table 1.1 and Table 1.2.

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Table 1.1 Descriptive Statistics – Individual Samples- *Public Sector*

Public Sector	OP_PROFIT	FATO	INT	FER	INV_CGS
Mean	660.8114	8.727653	280.2126	55.2969	1.027709
Median	583.2068	3.122709	6.03	56.0175	0.847911
Maximum	5238.551	121.3333	3597.2	67.1953	4.174193
Minimum	-332.0594	0	0	43.5052	0
Std. Dev.	812.0081	20.00886	736.5043	8.41891	0.844917
Skewness	2.58171	4.241758	3.057411	-0.0292	0.929016
Kurtosis	15.02377	21.88812	11.71332	1.41554	4.050856
Jarque-Bera	535.0999	1250.466	377.7102	8.37979	15.18862
Probability	0.0000	0.0000	0.0000	0.0151	0.0005
Sum Sq. Dev.	48792430	27624.45	42852653	5599.37	56.39684
Observations	75	70	80	80	80

Since probabilities of Jarque – Bera statistics are less than 0.005, the null hypothesis that the distribution is normal gets rejected in all the cases of Public Sector Companies.

Table 1.2 Descriptive Statistics – Common Samples- *Public Sector*

Public Sector	OP_PROFIT	FATO	INT	FER	INV_CGS
Mean	615.0364	9.399011	319.8829	55.8929	0.976671
Median	542.7072	3.192195	5.38	58.5978	0.844346
Maximum	5238.551	121.3333	3597.2	67.1953	2.68524
Minimum	-332.0594	0.084951	0	43.5052	0
Std. Dev.	810.7134	20.62095	811.694	8.40419	0.753289
Skewness	2.864907	4.087716	2.679821	-0.1539	0.465015
Kurtosis	17.39468	20.39645	9.285579	1.44445	2.240099
Jarque-Bera	650.1017	1000.659	184.8011	6.81008	3.906518
Probability	0.0000	0.0000	0.0000	0.0332	0.1418
Sum Sq. Dev.	42064400	27214.3	42166220	4520.34	36.3164
Observations	65	65	65	65	65

For Public Sector Companies, since probabilities of Jarque – Bera statistics are less than 0.005, the null hypothesis that the distribution is normal gets rejected in all the cases except INV_CGS

Unit Root Test

Unit root test to check the stationary nature of data series of Public sector firms is described in Table 1.3.
Public Sector

Table 1.3 Panel Unit Root Test (At Level) Summary – *Public Sector*

Panel unit root test: Summary					
Exogenous variables: Individual effects, individual linear trends				Sample: 2008 2017	
Automatic selection of maximum lags	Automatic lag length selection based on SIC: 0 to 1				
Newey-West automatic bandwidth selection and Bartlett kernel					
Null: Unit root (assumes common unit root process)					
Levin, Lin & Chu t*	**Statistic**	**Prob.****	**Cross-sections**	**Obs**	**Null**
Series: OP_PROFIT	2.92998	0.9983	8	65	Cant be Rejected
Series: FATO	-2.63359	0.0042	7	61	Rejected
Series: INT	-4.95346	0.0000	8	71	Rejected
Series: FER	-6.17637	0.0000	8	64	Rejected
Series: INV_CGS	-3.56977	0.0002	8	70	Rejected
Null: Unit root (assumes individual unit root process)					
ADF - Fisher Chi-square	**Statistic**	**Prob.****	**Cross-sections**	**Obs**	**Null**
Series: OP_PROFIT	14.1549	0.5872	8	65	Cant be Rejected
Series: FATO	14.9296	0.3830	7	61	Cant be Rejected
Series: INT	13.751	0.6173	8	71	Cant be Rejected
Series: FER	22.2287	0.1360	8	64	Cant be Rejected
Series: INV_CGS	15.2429	0.5069	8	70	Cant be Rejected
** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution,while LLC tests assume asymptotic normality.					

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The data series of FATO, INT, FER and INV_CGS except (OP_PROFIT) reject the presence of common root at 5 percent significance level. However, the presence of individual root fails to get rejected in all the cases. This necessitates first differencing to eliminate the unit root which is described in Table 1.4.

Table 1.4 Panel Unit Root Test (After 1st Differencing) Summary – *Public Sector*

Panel unit root test: Summary					
Exogenous variables: Individual effects, individual linear trends				Sample: 2008 2017	
Automatic selection of maximum lags	Automatic lag length selection based on SIC: 0 to 1				
Newey-West automatic bandwidth selection and Bartlett kernel					
Null: Unit root (assumes common unit root process)					
Levin, Lin & Chu t*	**Statistic**	**Prob.****	**Cross-sections**	**Obs**	**Null**
Series: FD(OP_PROFIT)	-14.9856	0.0000	7	52	Rejected
Null: Unit root (assumes individual unit root process)					
ADF - Fisher Chi-square	**Statistic**	**Prob.****	**Cross-sections**	**Obs**	**Null**
Series: FD(OP_PROFIT)	58.9591	0.0000	7	52	Rejected
Series: FD(FATO)	31.7527	0.0043	7	53	Rejected
Series: FD(INT)	24.3949	0.0812	8	61	Cant be Rejected
Series: FD(FER)	6.7375	0.9780	8	56	Cant be Rejected
Series: FD(INV_CGS)	51.7708	0.0000	8	61	Rejected
** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution,while LLC tests assume asymptotic normality.					

The data series of FD(OP_PROFIT) rejects the presence of common root at 5 percent significance level. However, data series of FD(INT) and FD(FER) fail to reject the presence of individual root. This necessitates second differencing to eliminate the unit root which is described in Table 1.5.

Table 1.5 Panel Unit Root Test (After 2nd Differencing) Summary – *Public Sector*

Panel unit root test: Summary					
Exogenous variables: Individual effects, individual linear trends				Sample: 2008 2017	
Automatic selection of maximum lags	Automatic lag length selection based on SIC: 0 to 1				
Newey-West automatic bandwidth selection and Bartlett kernel					
Null: Unit root (assumes individual unit root process)					
ADF - Fisher Chi-square	**Statistic**	**Prob.****	**Cross-sections**	**Obs**	**Null**
Series: SD(INT)	35.177	0.0038	8	56	Rejected
Series: SD(FER)	31.2219	0.0126	8	56	Rejected
** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution.					

Data series of SD(INT) and SD(FER) reject the presence of individual root after second differencing.

Correlation

The linear relationship between the explained variable and explanatory variables are checked by correlation between them. Table 1.6 shows the linear relationship between predictors and predictant as well as between predictors, both in case of public and private sector

Table 1.6 Correlation between Variables – *Public Vs Private Sector*

Public Sector	FDOP_PRO	FDFATO	SDINT	SDFER	FDINV_CGS
FDOP_PRO	1.0000				
FDFATO	0.0114	1.0000			
SDINT	0.0399	0.0031	1.0000		
SDFER	0.3071	0.0987	-0.0333	1.0000	
FDINV_CGS	0.4194	0.0390	0.0018	0.3521	1.0000

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Though a higher correlation between predictant FDOP_PRO and predictors is desirable, a low correlation is found to exist between FDOP_PRO and FD(FATO) and SD(INT) in public sector firms.

The linear relationship between predictors in case of public sector is significantly low as expected, except in the case of FD(INV_CGS) and FD(OP_PROFIT).

Pooled OLS

After having checked the normality, stationary nature and linear relationship of data series relating to predictors and predictant, the data are subjected to pooled OLS regression the results of which are summarised in Table 1.7.

Table 1.7 Pooled OLS Results – Summary – *Public Vs Private Sector*

Public Sector				
Method: Panel Least Squares		Sample (adjusted): 2010 2017		
Periods included: 8		Cross-sections included: 7		
Total panel (unbalanced) observations: 52				
Dependent Variable: FDOP_PRO				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
FDFATO	-0.674504	4.204524	-0.16042	0.8732
SDINT	0.363578	1.037542	0.350422	0.7276
SDFER	29.30081	21.98772	1.332599	0.1891
FDINV_CGS	674.5039	263.8758	2.556142	**0.0139**
C	-69.38949	91.88831	-0.75515	0.4539
R-squared	0.207397	Durbin-Watson stat		0.975937
Adjusted R-squared	0.139942	F-statistic		3.074578
S.E. of regression	611.1127	Prob(F-statistic)		**0.02493**

In public sector the coefficients of FDINV_CGS is found as significant variable since the null hypothesis that coefficient is zero gets rejected at 5 percent significance level. In all other cases the p values of t statistics is greater than 0.05, which fails to reject the null hypothesis that coefficient is zero.

The R- squared and adjusted R- squared are reasonably high in public sector indicating a reasonably good fit in both the models. This is further substantiated by less than 0.05 probability of F- statistic in both the cases, which reject the null hypothesis that the fit of intercept only model is as good as the specified model. This implies that the explanatory variables have predictability power and can explain more than what the intercept only model could.

The Durbin-Watson statistic values from 0 to less than 2 indicate positive autocorrelation for which no concern is required.

Regression can be represented as follows:

Public Sector

FDOP_PRO =- 69.389 – 0.675*FDFATO + 0.364*SDINT + 29.301*SDFER +674.504*FDINV_CGS

The significant coefficient namely FDINV_CGS and other coefficients namely, SDFER, SDINT has a positive impact and variable FDFATO has negative impact on FDOP_PRO in case of public sector firms.

Multicollinearity

Multicollinearity between the predictors are tested using Variance Inflation Factors for checking the validity of the OLS regression in Table 1.8

Table 1.8 Variance Inflation Factors – *Public Vs Private Sector*

Public Sector			
Sample: 2008 2017		Included observations: 52	
	Coefficient	**Uncentered**	**Centered**
Variable	**Variance**	**VIF**	**VIF**
FDFATO	17.6780	1.010513	1.0099
SDINT	1.076493	1.020101	1.0014
SDFER	483.4597	1.228407	1.1526
FDINV_CGS	69630.43	1.184777	1.1418
C	8443.462	1.175659	NA

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CIF in all the cases are significantly low. Centred VIF of less than 5 is considered to be the best indicator of no multicollinearity. Both the models of public and private sector are validated

Period Random Effects - Public Sector

As the panel has unbalanced observations, two-way analysis is not possible. So period random effect analysis is done as follows:

The period random effects of explanatory variables on explained variable in the case of public sector is shown in Table 1.9.

Table 1.9 Panel EGLS – Period Random Effects – *Public Sector*

Method: Panel EGLS (Period random effects)				
Dependent Variable: FDOP_PRO		Sample (adjusted): 2010 2017		
Periods included: 8		Cross-sections included: 7		
Total panel (unbalanced) observations: 52				
Swamy and Arora estimator of component variances				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
FDFATO	-0.6745	4.201611	-0.160535	0.8731
SDINT	0.363578	1.036823	0.350665	0.7274
SDFER	29.30081	21.97249	1.333523	0.1888
FDINV_CGS	674.5039	263.693	2.557913	**0.0138**
C	-69.3895	91.82467	-0.755674	0.4536
Effects Specification				
			S.D.	Rho
Period random			0	0
Idiosyncratic random			610.6894	1
Weighted Statistics				
R-squared	0.207397	Mean dependent var		-51.856
Adjusted R-squared	0.139942	F-statistic		3.074578
S.E. of regression	611.1127	Prob(F-statistic)		**0.0249**
Sum squared resid	17552559	Durbin-Watson stat		0.975937
Unweighted Statistics				
R-squared	0.207397	Mean dependent var		-51.856
Sum squared resid	17552559	Durbin-Watson stat		0.975937
Figures in bold indicates significant at 5% level				

The coefficient of FD(INV_CGS) is the only significant predictor in the model. The R – square and adjusted R square are high which indicate that the model has reasonably good fit. The P value of the F statistic being less than 0.05 rejects the null hypothesis that the fit of the intercept only model is as good as the specified. This implies that the explanatory variables have predictability power and can explain more than what the intercept only model could.

The Durbin-Watson statistic values from 0 to less than 2 indicate positive autocorrelation for which no concern is required.

Public Sector

FDOP_PRO = - 69.389 – 0.675*FDFATO + 0.364*SDINT + 29.301*SDFER+674.504*FDINV_CGS

Multicollinearity

Model is checked for multicollinearity between Predictors using VIF results of which are shown in Table 1.10

Table 1.10 VIFs – Period Random Effects EGLS – *Public Sector*

Sample: 2008 2017	Included observations: 52		
Variable	**Coefficient Variance**	**Uncentered VIF**	**Centered VIF**
FDFATO	17.65354	1.010513	1.0099
SDINT	1.075003	1.020101	1.0014
SDFER	482.7902	1.228407	1.1526
FDINV_CGS	69534	1.184777	1.1418
C	8431.769	1.175659	NA

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The centred VIF is very low in all the cases. This indicates that issue of multicollinearity does not arise.

Correlated Period Random Effects – Hausman Test

The null hypothesis that preferred model is random effects is tested using Hausman test the results of which are shown in Table 1.11

Table 1.11 Hausman Test – Period Random – *Public Sector*

Correlated Random Effects - Hausman Test			
Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Period random	4.489224	3	0.2133

The null hypothesis fails to get rejected since p value of the Chi-Square statistic of Hausman Test falls above 0.05. Hence preferred model is random effects for period.

Cross Section Random Effects – Public Sector

As the panel has unbalanced observations, two-way analysis is not possible. So cross section random effect analysis is done.

Cross section random effects in the case of public sector is tested and results of EGLS (Estimated General Least Square) is shown in table 1.12.

Table 1.12 Panel EGLS- Cross Section Random Effects – *Public Sector*

Method: Panel EGLS (Cross-section random effects)				
Dependent Variable: FDOP_PRO		Sample (adjusted): 2010 2017		
Periods included: 8		Cross-sections included: 7		
Total panel (unbalanced) observations: 52				
Swamy and Arora estimator of component variances				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
FDFATO	-0.674504	4.132817	-0.163207	0.8711
SDINT	0.363578	1.019847	0.356502	0.7231
SDFER	29.30081	21.61273	1.35572	0.1817
FDINV_CGS	674.5039	259.3755	2.600492	**0.0124**
C	-69.38949	90.3212	-0.768252	0.4462
Effects Specification				
			S.D.	Rho
Cross-section random			0	0
Idiosyncratic random			600.6904	1
Weighted Statistics				
R-squared	0.207397	Durbin-Watson stat		0.975937
Adjusted R-squared	0.139942	F-statistic		3.074578
S.E. of regression	611.1127	Prob(F-statistic)		**0.02493**
Unweighted Statistics				
R-squared	0.207397	Mean dependent var		-51.856
Sum squared resid	17552559	Durbin-Watson stat		0.975937
Figures in bold indicates significant at 5% level				

In the case of cross section random effects analysis coefficient of FD(INV_CGS) is the only significant predictor in the model as in the case of cross section random effects. The R – square and adjusted R square are reasonably high which indicate that the model has reasonably good fit. The p value of the F statistic being less than 0.05 rejects the null hypothesis that the fit of the intercept only model is as good as the specified. This implies that the explanatory variables have predictability power and can explain more than what the intercept only model could. The Durbin-Watson statistic values from 0 to less than 2 indicate positive autocorrelation for which no concern is required.

Public Sector

FDOP_PRO = - 69.389 – 0.675*FDFATO + 0.364*SDINT + 29.301*SDFER+674.504*FDINV_CGS

Multicollinearity

Model is checked for multicollinearity between Predictors using VIF results of which are shown in Table 1.13.

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Table 1.13 VIFs- Cross Section Random Effects – *Public Sector*

Sample: 2008 2017		Included observations: 52	
Variable	**Coefficient Variance**	**Uncentered VIF**	**Centered VIF**
FDFATO	17.08018	1.010513	1.0099
SDINT	1.040088	1.020101	1.0014
SDFER	467.11	1.228407	1.1526
FDINV_CGS	67275.65	1.184777	1.1418
C	8157.919	1.175659	NA

None of the centred VIF is not higher than 1.15 in all the cases. This indicates that issue of multicollinearity does not arise.

Correlated Cross Section Random Effects – Hausman Test

The null hypothesis that preferred model is random effects is tested using Hausman test the results of which are shown in Table 1.14

Table 1.14 Hausman Test – Cross Section Random – *Public Sector*

Correlated Random Effects - Hausman Test			
Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random	7.644721	4	0.1055

The null hypothesis fails to get rejected since p value of the Chi-Square statistic of Hausman Test falls above 0.05. Hence preferred model is random effects.

Testing of Hypothesis

The null hypothesis that Fixed Assets do not influence the Financial Performance of Public Sector Companies stands rejected.

In the case of OLS Regression model, INV_CGS of Public Sector significantly influence the Financial Performance.

In Period Random Effects model, INV_CGS of Public Sector significantly influence the Financial Performance.

In Cross-Section Random Effects model also, INV_CGS Public Sector significantly influence the Financial Performance

RESULTS AND DISCUSSION

The dependent variable Financial Performance is represented by Profitability in terms of Operating Margin (OP_PRO). The independent variables represent Fixed Assets in terms of Fixed Asset Turnover (FATO), Foreign Exchange Rates (FER), Interest (INT) and Inventory or Cost of Goods Sold (INV_CGS). The results of all the three models used in the study show that the coefficient FDINV_CGS which is significant and other coefficients SDFER, SDINT have positive impact on FDOP_PRO and the variable FDFATO has a negative impact on FDOP_PRO.

From the results we can conclude that dependent variable Financial Performance represented by Firm Profitability indicated by (OP_PRO) is influenced by independent variable Fixed Assets represented by Fixed Assets Turnover (FATO), Foreign Exchange Rates (FER), Interest (INT) and Inventory or Cost of Goods Sold (INV_CGS). In which the coefficient of INV_CGS was significant and coefficients of FER, INT have positive impact on OP_PRO were as FATO has negative impact.

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