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Determinants and Trend Analysis of Profitability of
EFFORT Companies; Economic Performance
Analysis in case of Tigray:

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DECLARATION

This is to certify that this thesis entitled “Determinants and Trend Analysis of Profitability of EFFORT Companies: Economic Performance Analysis in the Case of Tigrai,” submitted in partial fulfillment of the requirement for the award of the degree of MSc in Economics with a special focus on Policy Development Analysis to the College of Business and Economics, Mekelle University, through the Department of Economics, done by Mr. Gebrehiwet Romha, ID No. CBE/EPE10/12, is an authentic work carried out by him under my guidance. The matter embodied in this project work has not been submitted earlier for the award of any degree or diploma to the best of my knowledge and belief.

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ACKRONYMS:

CD-Test	Cross-sectional Dependence Test
CoV	Coefficient of Variance
DCs	Developed Countries
DGMM	Difference Generalized Method of Moments
DID	Difference-in-Difference
DV	Dependent Variable
EFFORT	Endowment Fund for the Rehabilitations of Tigray
FE	Fixed Effects
GMM	Generalized Method of Moments
GPM	Gross Profit Margin
IPS-Test	Im, Pearson and Shin Test
LDCs	Less Developed Countries
LDPD	Linear Dynamic Panel Data model
LDV	Lagged Dependent Variable
MAR	Missing At Random
MCAR	Missing Completely At Random
MNAR	Missing Not At Random
OLS	Ordinary Least Square
POLS	Pooled Ordinary Least Square
Proper	Profitability Performance (=Profitability)
RE	Random Effect
ROA	Return on Asset
ROCE	Return on Capital Employed
SGMM	System Generalized Method of Moments
VCE	Variance Covariance Estimator

ABSTRACT

The purpose of the study was to examine what determines profitability, its trend healthiness and to extent that war caused profitability to shift down in EFFORT companies in the Tigrai Region, Ethiopia. Using an unbalanced dataset of 16 companies selected from 17 total companies based on data availability criteria, a census sample design of company-level secondary data were collected between 2010 and 2024 and analyzed using the generalized method of moments (GMM) technique, specifically the system GMM estimator. Unlike existing studies that adopted inappropriate models and misuse of LDPD models, this study properly used the standard step-by-step analysis of the LDPD models for the identification of determinants; and the panel data trends as well as DID models for the trend analysis and war effect estimation of EFFORT companies' profitability, respectively.

Having passed all the basic tests, the persistent LDPD model becomes jointly and strongly significant. The empirical results show that lagged profitability, cost efficiency, managerial efficiency, working capital and market competition are the significant EFFORT-level major determinants of profitability in Tigrai. However, the roles of liquidity, company growth, and capital intensity variables were not validated by this study. In addition, these companies have been experiencing inconsistent and fluctuating profitability trends over the same time range. Similarly, the Tigrai war experienced a very huge negative shift and downtrending effect on profitability during the war period. Thus, these findings implied that EFFORT companies have had serious and significant efficiency gap in resource utilizations and cost management, which in turn affects the economic performance of Tigrai Region. This study has also summary policy implications that EFFORT corporate should focus on maximizing innovation efficiency and productivity by relocating resources to more productive performers. Besides, as current profitability largely depends on contemporaneous capacities and efforts, EFFORT leadership needs to give attention to continuous reforms like freeing these companies from political intervention, letting them focus on business agendas only, and thereby improving the unhealthy profitability trends.

Keywords: Profitability, EFFORT, Tigrai, Persistence theory, System GMM and static panel Methods.

This page is dedicated to My Beloved Life Partner Helen Gebrehiwet!!!

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

The economic environment of this new century has undertaken several changes, creating more and more complexity and uncertainty as well as opportunities for its actors. In this changing environment, which characterizes the global economy today, companies face severe competitive pressures to do things better, faster, and at a low price. They need to cope with the growing number of challenges arising from their environment and also increase their ability to adapt to such challenges. Nowadays, achieving continuous performance is the objective of any company (Taouab and Issor, 2019).

Profit is an engine that drives the business enterprise, and it is crucial in the fields of economics, strategic management, accounting, and finance to identify the factors that contribute to variations in profitability at the firm level (Goddard et al., 2005). A business needs profits not only for its existence but also for expansion, modernization, diversification, etc. Different profit indicators can be used to assess the efficiency and effectiveness of businesses in different stages (Harris & Raviv, 1991; Velmathi, 2016; Khan et al., 2020; Mokhtar et al., 2019; Jenkins, 2017). As profitability is one of the most important goals of business institutions, measuring the current and past profitability and then projecting the future one is vital.

Due to the importance of this subject, several studies have examined the key determinants of financial performance in various industries, including banks, insurance companies, the beverage industry, and manufacturing industries, more at the international level. And some analyze the trend performance. These studies considered both firm-specific and macroeconomic factors. Examples of these studies include Hurdle (1974), McDonald (1999), Stierwald (2010), Bolarinwa et al. (2018),

Martin Amaniampong1 et al. (2019), Pratheepan (2014), Isik and Tasgin (2017), Al-Jafar and Al Samman (2015), Susilo (2020), Bolarinwa (2021), Yodit (2017), Aster & Mesert (2019), and Velmath (2016), as well as Woldemariam (2017) and Shibru (2020). The focus of this research was collectively on the effect of past profitability, firm size, working capital, company growth, liquidity ratio, debt ratio, leverage, financial risk, sales growth, managerial efficiency, and capital intensity, and rarely on competition, economic growth, and inflation.

However, it is worth mentioning to consider two things as follows: First, the extant studies were mainly conducted with more focus on the DCs, such as North and South America and Europe. However, they gave less focus to LDCs of Asia and Africa. Especially, there has been less emphasis in Ethiopia and in the Tigray state environment. Second, there is still an incomplete literature and an ongoing debate on the companies' profitability, together with the confounding mixed results of factors affecting it. Similarly, adapting the main features of the existing literature on factors affecting company profitability in the context of African countries is limited, and only a few companies have adopted this researches (Bolarinwa et al., 2021; Odusanya et al., 2018). As a result, there is no generally accepted outcome to the factors affecting profitability, as countries are different in nature from each other by their operating environments, economic systems, financial systems, and political systems (Meyer et al., 2015).

This research topic is designed to examine the prevalence of performance inefficiencies in the profitability of EFFORT companies following the gaps indicated by Bolarinwa et al. (2021) and building on other extant studies. The profitability measures of the profit margin ratios and the return ratios focused on the trend analysis part of this study. Besides, the relative use of bulky factor analysis that affects the outcome variable is considered. In addition, it explored the use of cost-efficiency measures, building upon the work of Ifeduni (2018), Tayyaba (2013), and concepts by Adam Hayes (2023). Unlike previous studies (Isik & Tasgin, 2017; Susilo et al., 2020; Bolarinwa et al., 2021; Odusanya et al., 2018, etc.) that used

inappropriate models and mixed and inconsistent results interpretations, the current research is going to address these issues through the tools specified in chapter three thereby identify the reasons for average low profitability in the study area. Therefore, this study contributed to the existing literature by providing an integrated analysis of the identification of major determinants, the trends in profitability healthiness, and the newly added examination of the Tigray war effect on the same DV.

The root reason for the necessity of this research topic is that 'Why many of the EFFORT companies have been performing below attainable capacity and planned capacity?' And even, 'Why did some companies experience net loss value?' (EFFORT 20 years' financial trend analysis data from 1996–2016, 2022/23).

It is also worth mentioning that this research paper is structured into the following sections. Section 1 briefly designates the abstract; section 2 briefly describes the introduction and its subsidiaries, and section 3 concisely presents the relevant theories and previous literature. Similarly, section 4 describes the research methodologies; section 5 presents the research results and discussions; and sections 6 and 7 report the conclusions/recommendations and references, respectively.

1.2. Statement of the Problem

Measuring business profitability performance in today's economic environment is a critical issue for academic scholars, policymakers, and practicing managers. Researchers have extended efforts to determine measures for the concept of profitability performance. Fitzpatrick (2021) encourages organizations to adopt agile performance frameworks, enabling them to adapt quickly to changing conditions while accurately measuring profitability. For leaders and policymakers, staying informed about these evolving methodologies is essential to make effective decisions that drive growth and sustainability.

However, there is incomplete literature and an ongoing debate on the agenda of companies' profitability performance and the confounding results of factors affecting it, e.g., the geographic area-specific coverage and data analysis methods.

Specifically, the main features of the existing literature on profitability in the context of African countries are still limited. Only a few companies adopted such research (Bolarinwa et al., 2021; Odusanya et al., 2018). Therefore, there is no generally accepted outcome to the factors affecting the profitability of companies. This is because countries are different in nature from each other by their operating environment, financial systems, political systems, and economic systems (Meyer et al., 2015).

Several studies have examined the key determinants of financial performance in various industries, and some analyze the trend performance, including banks, insurance companies, the beverage industry, manufacturing industries, and others. These studies considered more of firm-specific and less of industry-level and macroeconomic factors. Some examples of these studies include Pratheepan (2014), Isik and Tasgin (2017), Al-Jafar and Al Samman (2015), Susilo (2020), Bolarinwa (2021), Yodit (2017), Aster & Mesert (2019), and Velmath (2016), as well as Woldemariam (2017) and Shibru (2020). These studies were mainly conducted more in the DCs, such as Sri Lanka, Turkey, more of Europe, and North and South America, though they gave less focus to LDCs of Asia and Africa and especially rarely in East Africa, which is an unstable region in many cases, and in Ethiopia as well as the Tigray Region's business environment. As a result, there is a geographical research gap in a similar research topic in this area of study, which we are going to cover partly now. In many cases, findings from one region may not be generalizable to other areas, making it necessary to extend area-specific research into new locations or multicultural and company contexts (Meyer et al., 2015; Fischer et al., 2020). That is, the current study is going to add the company- and area-specific literature to the existing profitability literature.

The focus of previous studies was mainly to analyze the internal factors that affect the profitability of different businesses using relatively narrow profitability measurements. That is, return on assets (ROA) and return on equity (ROE) were mostly used as tools to measure profitability. Nonetheless, the cost-efficiency

measures of profit margins, such as gross profit margin, were very rarely used as indicator of identifying profitability trends. Thus, this research considered a combination of margin ratios and return ratios as measures of cost efficiency. Moreover, the inclusion of ROCE as a measure of return ratio is also rarely discussed in the extant studies (<https://www.fathom.com>, 2024 Report).

This research topic is designed to examine the prevalence of performance inefficiencies in the profitability of EFFORT companies. The root reason for the necessity of this research topic is, 'Why have many of the EFFORT companies been performing below attainable capacity and planned capacity?' Even, 'Why did some companies experience net loss value?' How EFFORT companies had been performing in profitability? What was the effect of Tigray war on the same dependent variable? Therefore, there is a need to examine this problem using appropriate models following the existing literature.

Most of the existing studies have more or less research gaps in data analysis methods, which call for unreliable, thereby misleading, conclusions. This is because they utilized more of the ordinary least square (OLS) and static panel data models and less of the dynamic linear panel data model, though the data characteristics they employed demanded a dynamic model (Ifeduni and Charles, 2018; Susilo et al., 2020; and Hossain, 2020). Similarly, those papers that used the dynamic linear panel models also lack clear model specifications, such as serial correlation testing, use of mixed interpretation results from different models, missing the different rules-of-thumb for decision-making between difference and system GMM estimators, and wrong instrumental variable defining (Hossain, 2020; Bolarinwa et al., 2021; Odusanya et al., 2018; and Isik and Tasgin, 2017). Thus, this research addressed these research gaps through the use of clear model and instrument specifications together with testing procedures in order to identify the reasons for below capacity economic performance in EFFORT companies.

Likewise, none of the extant literature has tried the theoretical formulation of profit maximization together with very little focus on the use of economic theories and

concepts. However, this research largely gives attention to economic theories of profit and profitability and conceptual arguments together with the theories of business dynamism, both for understanding as well as for hypothesis testing purposes. Similarly, this research topic also focused on trend analysis. The use of absolute measures considered by Velmathi (2016) and Chellasamy and Ponsabariraj (2013) was replaced by the use of relative measures of profitability, following the literature by Nella and Sari (2020), Uddin (2022), Kokila and Ramprathap (2021) and (Hongyu M. et al. 2023).

In summary, this research topic emphasized on factors that affect profitability, its trend healthiness, and the war exposure effect in EFFORT companies. This study employed the step-by-step linear dynamic panel data model to examine the determinants of profitability. The static panel data trend using a line chart and the DID estimation methods, respectively, were used to examine the main questions raised in section 1.3.

1.3. Research Questions

- 1.3.1 What are the main factors affecting EFFORT companies' ability to earn?
- 1.3.2 How had the EFFORT companies' profitability trend looked in the last fifteen years? And how many of these companies have had healthy performance?
- 1.3.3 What was the effect of the Tigray war on such companies' profitability performance, and to what extent?

1.4. Objectives of the study

1.4.1. General Objective

The main objective of this thesis to analyze the factors influencing, the trends path healthiness and the effect of war on profitability of EFFORT companies.

1.4.2. Specific Objectives

Based on the general objective, the study addressed the following specific objectives.

- 1) To analyze the major factors influencing profitability.
- 2) To show the trend analysis of profitability.
- 3) To estimate the effect of Tigrai war on profitability.

1.5. Scope of the Study

Conducting research on profitability is a broad and multi-dimensional topic. However, this study specifically focused on EFFORT companies that meet the selection criteria outlined in the "sampling design & census or participant" section. This research primarily examined the major determinants that affect the outcome variable, analyzed its trends, and estimated the effect of the Tigrai's war on profitability performance.

The data were collected exclusively from 17 EFFORT companies, covering a period of 15 years from June 2010 to June 2024, in which the source is mainly the secondary data type. The main focus of this research topic is why many of these companies have been performing below attainable capacity and even experienced net loss in the specified time range. The methodologies employed were the static and dynamic panel data methods. To analyze the trends of profitability, this research used both the margin ratios and return ratios as key indicators of profitability performance. Specifically, the outcome variable itself, the gross profit margin (GPM) from the first set of ratios, and the return on assets (ROA) and on capital employed (ROCE) from the second set of performance ratios.

1.6. Significance of the Study

First, this research includes the new factor of cost efficiency and profitability margins as measures of companies' profitability performance following the gap indicated by Bolarinwa et al. (2021). Similarly, it took in to account the return on capital employed to the existing literature. Second, the results could be used as input to interested researchers for further study of similar or highly related research

problems in the region. Because the findings on the effect of war and identification of the main determinants of profitability in the specific area and corporate context are worthwhile contributions.

Third, this study was conducted to create awareness and improve knowledge of decision makers in EFFORT companies. Thus, it forwarded some necessary corporate and regional-level policy implications that will help for future improvements in profitability performance and market competitions of companies, as stated in the recommendation section. Fourth, it will be informative for financing organizations (creditors), investors, and shareholders who want to invest in the areas of business profitability performance

CHAPTER-TWO

LITERATURE REVIEW

2.1. Theoretical Review

2.1.1. Definition and Concepts of Profitability;

According to Edward Evan (2014), these terms “profit” and “profitability” are used quite frequently in everyday talk to mean the same thing. However, the two words are not necessarily equivalent and are quite different. Profit is the excess of income above the costs incurred in the process of producing that income. Profit is an absolute measure of the gain from an investment or business operation. Profitability, on the other hand, is the size of the profit relative to the size of the business. Profitability measures how efficient the business is in using its resources to produce profit (rate of return on investment). Unlike profit, profitability is a relative measure of the success or failure of a business. It has more to do with the rate of return expected on an investment (capital), or the size of the return, compared to what would have been obtained from an alternative investment—such as putting your money in a risk-free certified deposit or buying government treasury bonds (Ibid).

Based on Peristiani's (1997) theory of profit, companies that generate high profits are typically more efficient. Within the realm of efficiency, there are two distinct approaches: x-efficiency and scale efficiency. The x-efficiency approach posits that more efficient companies are more profitable due to their lower costs. These companies often capture a significant market share, resulting in higher levels of market concentration. On the other hand, the scale approach emphasizes the importance of economies of scale rather than differences in management or production technology. Larger companies can achieve lower unit costs and higher profits through economies of scale. As a result, these large companies are able to

gain and increase market share, leading to higher levels of concentration and ultimately increased profitability.

A basic assumption in much of the literature is that companies are profit maximizers. At this point of discussion on profitability, it is therefore instructive to remind ourselves of exactly why such business entities maximize profits. To be sure, standard theory tells us that a company's shareholders are claimants for their profits and thereby interested in maximizing these profits. They also maximize their return on investment by maximizing revenue and by minimizing costs. Depending on the market power of the company in input and output markets, respectively, it can be possible to increase output prices or decrease input prices (Brueckner.M, 2013).

In addition, different economists have presented different views on profit, in which the most popular theories are reviewed here under for understanding and hypothesis testing:

An American economist, Prof. F. A. Walker (1876), propounded the theory of profit as the 'rent theory of profit.' According to him, "As rent is the difference between the least and most fertile land, similarly profit is the difference between the earnings of the least and most efficient entrepreneurs." He concluded that an entrepreneur with the least efficiency generally strives to cover only the cost of production. On the other hand, an efficient entrepreneur is rewarded with profit for his differential ability, and this reward, according to him, is entitled the normal profit or economic profit. Walker assumed 'the condition of perfect competition in which all organizations are supposed to have equal managerial ability,' so his assumption needs critical evaluation with regard to the real nature of profit-making companies. However, this theory is highly criticized for its assumption of equal managerial ability, equalization of profit to rent of land and ability, and ignorance of the roles of risk-taking or uncertainty and innovation.

In contrast to Walker's theory of profit, another American economist, J. B. Clark (1900), in his 'dynamic theory of profit,' "propounded the idea that profit does not ascend in a static economy but is rather earned in a dynamic economy." According to

him, a static economy is described as one where the size of the population, the amount of capital, the nature of human wants, and the methods of production remain the same and there is no risk or uncertainty and only normal profit is earned, partly assuring Walker's argument. Similarly, Clark also argues that an economy is always dynamic in nature, changing over time and characterized by an increase in population and in capital, multiplication of consumer wants, advancement in production techniques, and changes in the form of business organizations that offer opportunities to entrepreneurs to make pure profits. Conversely, Prof. Knight (1921) criticized the dynamic theory of profit, saying that only the changes that cannot be foreseen yield profits; otherwise, they have no role in profit earnings.

To sum up, the current study considers all these theories on the basis of the idea that each of them has its own contribution to the conceptual development of profit and profitability. The definition given here offers special attention to the integrated idea of all theories where applicable. However, to have a clear-cut value, the study focused on verifying the ideas of normal profit together with the equal managerial ability assumption versus pure profit in the dynamic theory.

2.1.2. The Mathematical Modeling of Profit Maximization

The equilibrium conditions assumed here are perfect competition and behavior of myopic oligopoly; in the long run all costs are assumed to be variable. Consider that companies are also assumed to have myopic behavior. Therefore, for an individual company i , let's express profit (profitability) as Y_i , the revenue output vector as J_i , the input vector as X_i , the output price vector as P_i , and the input price vector as W_i . Each company maximizes profit using the transformation function (T_f) and pricing opportunity set S , which captures the company's valuation of its competitive position and the level of net worth, and Z is part of the pricing opportunity.

For each output in the output vector j_i , the company i sets the price p_i based on the inverse demand function $f(X)$ law of demand. Then, in order to maximize the ultimate goal, which is profit, a company maximizes p_i using the revenue minus cost functions as follows:

$$Y_i = p_i J_i - W_i X_i \dots\dots\dots (1)$$

subject to $Tf (X_i, J_i) = 0$, $S (p_i, w_i, X_i, J_i) = 0$ and

$P_i = f (\sum_{i=1}^N J_i) = f(J)$ where $i=1.., f(j)$ is the inverse market demand function and N is the number of companies considered.

The corresponding Lagrangian equation can be presented as:

$$LY_i = p_i J_i - w_i X_i - \epsilon Tf (*) - \Theta S (*) \dots\dots\dots (2).$$

Then, solving for p_i and X_i simultaneously gives us the optimal output prices and input quantities: $p_i^* = p_i^*(J_i, w_i, Z_i)$ and $X_i^* = X_i^*(J_i, w_i, Z_i)$.

Profits (profit abilities) are maximized when:

$$dY_i/dJ_i = P_i' + J_i f'(J) \frac{dJ}{dJ_i} - w_i'(J_i) X_i^* = 0 \dots\dots\dots (3)$$

Multiplying both sides by J_i yields:

$$p_i' J_i - w_i'(J_i) X_i^* J_i = - (J_i)^2 f'(J) \left(\frac{dJ}{dJ_i}\right) = 0 \dots\dots\dots (4)$$

Where $p_i' J_i$ denotes marginal revenue, $w_i'(J_i)$ stands for marginal cost which depend on the price of inputs that in turn influenced by output demand. The assumption here is that companies operate in perfect competitive input markets but output price differentiation is potentially possible.

$$\text{Let's define } \frac{dJ}{dJ_i} = 1 + \frac{d \sum_{i=1}^N J_i}{dJ_i} = 1 + \lambda \dots\dots\dots (5)$$

Where λ refers to the conjectural variation of company i 's output. A high value λ means a company has a high awareness of its interdependence with its competitors (other companies).

Substituting (5) in to (4) yields:

$$p_i' J_i - w_i'(J_i) X_i^* J_i = - (J_i)^2 f'(J) (1 + \lambda) = 0 \dots\dots\dots (6)$$

Dividing both sides by $p_i' J_i$ and rearranging gives:

$$\frac{p_i' J_i - w_i'(J_i) X_i^* J_i}{p_i' J_i} = - \left(\frac{J_i}{J}\right) \left(\frac{f'(J) J}{p}\right) (1 + \lambda) = 0 \dots\dots\dots (7)$$

The left hand side of equation 7 can be decomposed in to three parts:

1. (J_i/J) is company's market share (MS) in its industry, with $0 \leq MS \leq 1$.
2. $(f'(J) J)/p$ is the inverse of the market price elasticity of demand, $1/\eta$.

3. $1+\lambda$, measures company i 's expectations about the reactions of its rivals dJ/dJ_i , with $1 \leq \lambda \leq 1$. Then, we can rewrite equation 8 as:

$$\frac{p'_i J_i - w'_i(J_i) X_i^2}{p'_i J_i} = (MS) \left(-\frac{1}{\eta}\right) (1 + \lambda) \dots\dots\dots (8)$$

After multiplying by $p_i J_i$, it yields the optimal profit Y_i as:

$Y_i^* = p_i^* J_i - w'_i(J_i) X_i^* = ((MS) \left(-\frac{1}{\eta}\right) (1 + \lambda)) p_i^* J_i \dots\dots\dots (9)$

Therefore, optimal profit Y_i , which is equivalent to optimal profitability performance, rises with the increase in the market share MS, with a decrease in price elasticity of demand η , with an increase in the conjectural variation λ , with an increase in the price of outputs p_i^* , and with an increase in demand for output J_i . In essence, firms that hold greater market power (large share, inelastic demand, and strategic insight) achieve higher profitability.

In the dynamic panel data model formulation; an individual company i maximizes profit Y_i by choosing prices p_i and production J_i to maximize the difference between revenue and cost can be written as:

$$Y_i = \max_{j_i X_i} \left\{ \sum_{j_i \in J_i} P_i j_i - \sum_i W_i X_i \right\} \dots\dots\dots (10)$$

Subject to:

$$j_i = Tf(X_i, Z, S)$$

And the inverse demand function relationship for each output j_i ;

$$p_i = f^{-1}(j_i)$$

Z refers to relevant control variables reflecting pricing opportunity S and transformation technology Tf .

More specifically, the System GMM Model Specification for the dynamic profitability equation of company i at time t , based on the theoretical framework, can be written as:

$$Y_{it}^* = \alpha_0 + \alpha Y_{it-1} + B_1(p_{it} J_{it}) + B_2 MS_{it} + B_3 W_{it} X_{it} + B_4 \left(\frac{1}{1 + \lambda_i \eta} \right) + u_{it} \dots\dots (11)$$

Where,

Y_{it} = Profitability, Y_{it-1} = Lagged profitability capturing persistence, $P_i J_{it}$ = the sales revenue, MS_{it} = Market share (captured by market competition), $W_{it} X_{it}$ = the cost

function (input price multiplied and input quantity), $1/\eta$ = inverse market price elasticity,

$1+\lambda_i$ = conjectural variation capturing company expectation about rivals' reaction, u_{it} = the idiosyncratic errors.

This formulation captures the dynamic profit maximization under myopic oligopoly where firms respond to market conditions (captured via market share, elasticity, and conjectural variations) and their competitive environment, within the framework of a structural dynamic panel data model estimated by robust methods accommodating endogeneity.

2.2. Empirical Review

According to Guangguo et al., 2001; Deloitte, 2007; Raguž, 2010; KPI Depot, 2024; and APQC, 2025, a company's performance refers to how well it is achieving its goals and objectives. These can be measured using different financial and non-financial metrics. While revenue growth, profit margins, and return ratios are examples of the first metrics, customer satisfaction, employee performance and satisfaction, and market performance are examples of the second metrics. To effectively measure company performance, it's essential to set clear and specific objectives, track progress regularly, and analyze the data to specify areas of improvement. In addition, benchmarking against industry peers and using key performance indicators can help provide a comprehensive view of a company's overall performance. Consequently, the present researcher's focus is mainly on the financial metrics as performance pointers.

Velmathi (2016) made a profitability trend analysis, using a case study of Tamil Nadu Newsprint and Papers Limited (TNPL) Company in India, with the objective to find out the consistency in efficiency and effectiveness of a company's earnings, employing secondary data collected during 2005-06 to 2014-15. The findings explored by means of descriptive trend analysis on four proxy measures of profit—gross profit (GP), operating profit (OP), pre-tax profit (PTP), and net profit (NP)—were assured a consistently positive profit trend in GP, OP, and NP, whereas a non-consistent or fluctuating profit trend was found in the PTP measure. This implies that the company's ability to operate a business with sufficient success not only to

recover from the revenues of the period but also to leave a margin of reasonable compensation to the owners for providing their capital at risk, which indicates high operational and managerial efficiency. This study focused only on the cost efficiency of absolute measures of profit by ignoring the return ratios and cost efficiency (profit margins) as measures of profitability. In addition to this research gap, the descriptive trend analysis results were not equipped with different graphical presentations but rather stated them via absolute earned data trend only.

Isik and Tasgin (2017) investigate factors affecting profitability at 120 Turkish manufacturing industry firms listed on the Bursa Istanbul Stock Exchange during the period 2005-2012. Their estimation results using the dynamic panel data GMM analysis model, taking into account the endogeneity of variables, show that past profitability, firm size, net working capital, and economic growth have a positive and significant effect on profitability measured by return on asset (ROA). In contrast, financial risk and R&D costs have a significantly negative effect on ROA. Lastly, researchers indicated that problem areas that need to be included in the next studies are the impact of the ownership structure of firms and that of past financial crises on profitability. The slight research gaps here are the paradoxical use of AR (1) statistical tests in order to test the absence of first-order autocorrelation in the equation levels while ROA_{it-1} (first lag value) leads to beginning the instruments at the second-year lags of ROA_{it-2} or ΔROA_{it-2} ; rather, the focus of testing should be on AR (2)—the second-order serial correlation (Roodman, 2009; Arellano and Bond, 1991). And the second criticism is that this paper used only one (ROA) indicator of performance in profitability from the return ratios in which the cost efficiency measures of profitability variables could have different relationships or conclusions due to the influence of the same independent variables.

An analysis on factors affecting the profitability of Indonesia's manufacturing firms that were chosen based on certain sampling criteria was done by D. Susilo et al. (2020), using the data collected on 351 sample firms listed in the Indonesia Stock Exchange for the period 2010-2017. The results, with the help of regression path

analysis, found that working capital, firm size, and firm growth have a positive and significant impact, while capital structure and non-debt tax shield didn't affect profitability performance. The researchers have concluded their findings were consistent with the picking order and financial agency theories. However, the data characteristics here demanded the static panel data modeling of Baltaghi (2005). Conversely, the researcher employed the regression path analysis (RPA) model (which was developed by Bollen (1989)) to analyze how complex the multivariate different variables' relationships are. It might be misleading to conclude based on the results obtained. It is because the RPA cannot handle the problem of unobserved heterogeneity (individual-specific effects), which the fixed or random effects models could manage (ibid). In addition to this, the paper also overlooked the main profitability measures of margin ratios and return ratios.

Hossain (2020) from Bangladesh attempted to examine factors affecting the profitability of 34 manufacturing companies listed on the Dhaka Stock Exchange (DSE) using secondary data collected from the Colombo Stock Exchange for the period of 2014-2019. The findings, using ordinary least squares regression models, indicate managerial efficiency, sales growth, and capital intensity have a statistically significant positive impact on profitability. And liquidity and leverage have a statistically significant negative effect on profitability measured by ROA and ROE. Conversely, results of firm size, working capital, and annual inflation and GDP growth have no significant influence on profitability, which needs further investigation by changing the inappropriate method of analysis. Therefore, the main critics here are the use of the traditional data analysis method of ordinary least squares regression models instead of employing the more appropriate panel data analysis models based on decision test results (Baltagi, 2005). The second gap is an ignorance of profit margins as cost-efficiency performance measures, and that of the third is that the hypothesis development part wasn't supported by theoretical concepts and empirical results that would have been tested with an appropriate data analysis method.

Bolarinwa et al. (2021) examined a large-sized firm-level data set of 896 firms selected from 27 African countries of data ranging from 2005 to 2017. They focused on firm-specific, industry-level, and macroeconomic factors influencing firms' profitability in Africa, in which they have introduced the standard measure of a firm's managerial efficiency using the generalized method of moments (GMM) technique. The empirical findings were that the lagged DV, firm size, age, managerial efficiency, leverage, tangibility, firm growth, and competition have significant effect on the DV. Nonetheless, the study didn't validate variables of macroeconomic and liquidity. Finally, the paper indicates that problem areas that further need investigation are profit itself and cost efficiency. The uncovered gaps were the exclusiveness of profit margins, which are the best indicators of financial and economic performance (Michael E. Porter, 1985, and David A. Aaker, 1991). This paper did not explain clearly what type of model the inferences they made were based on. Rather, it just compared the results and significance level among OLS, difference, and system GMM estimators, i.e., the authors gave mixed interpretations using different estimators.

Odusanya et al. (2018) attempted to examine the factors affecting firm profitability for non-financial firms using a sample of 114 business firms listed on the Nigerian Stock Exchange with data collected for the period of 1998 to 2012. With the help of the Generalized Method of Moments (GMM) technique, the results illustrated that lagged profitability exercises have a significant positive impact on firm profitability. And that of financial risk, inflation rate, interest rate, and short-term leverage have significantly negative effects on company profitability, in which no proxy measures of profitability were used. On the other hand, age, long-term leverage, growth opportunity, firm size, and asset tangibility reportedly have an insignificant impact on the outcome variable, which needs further investigation. In addition, the path to use the system GMM model should be based on the step-by-step regression analysis that begins from the pooled OLS and goes through fixed effects, difference GMM, and system GMM with the help of the decision rule of thumb (Bond, 2001).

However, this research paper ignored these steps and chose to use system GMM with conceptual reasoning only, so it lacks clear modeling. And even the development of hypothesis testing and selection of valid instrumental variables (where it begins and the type of instruments used) are not clearly stated.

Ifeduni and Charles (2018) investigated factors affecting manufacturing companies' profitability measured by ROE and ROA as proxies in Nigeria using the data collected from the Nigerian Stock Exchange Market ranging from 2011 to 2015 on 12 sample companies. The findings of the panel data analysis model, specifically the fixed and random effects models together with the Hausman test, indicated that all predictors were important determinants of profitability in the study area, though it emphasized that efficient utilization of assets is more significant than the asset size. These explanatory variables were firms' size, leverage, lagged profitability, capital base, and productivity, which significantly affect these profitability indicators (ROA and ROE). This study turned up the opportunities in the Nigerian manufacturing sector, where the average return on equity is as high as 27 percent with limited volatility. However, as the data observation characteristics demand the dynamic panel data modeling, researchers wrongly employed the inappropriate static panel data modeling, which gives biased and inconsistent results. This is mainly due to the inclusion of lag values, the number of firms ($N > T$ time period), and the possibility of endogeneity, heteroskedasticity, and serial correlation issues (Hansen, 1982; Arellano and Bond, 1991; Arellano and Bover, 1995). Further, the development of hypothesis testing together with supportive facts from conceptual and empirical sources is not stated clearly.

2.3. Research Hypothesis

Based on theoretical and empirical review, the researcher set the following relevant hypothesis. These were tested using the linear dynamic panel data and the static panel data (difference-in-difference & panel data trend) models. The researcher checked if his research findings are in favor of or against the following hypothesis.

According to Christopher Hanck et al. (2025), what are the explanations of why testing hypotheses about the model coefficients one at a time is different from testing them jointly? When we intend to reject or accept the hypothesis that the coefficients on variable1, variable2, variable3, etc. are zero, we have to resort to joint hypothesis tests. A joint hypothesis imposes restrictions on multiple regression coefficients. After estimation by the GMM estimators with Stata reports a Wald statistic or F-statistic test-based sample size for the joint significance of all regressors (Arellano-Bond, 1991; Blundell-Bond, 1998; and Roodman, 2009).

Hypothesis 1: All control variables are jointly significant and have an important effect on profitability performance.

The Dynamic Capabilities Theory, developed by Teece et al. (1997), suggests that firms must adapt, integrate, and reconfigure internal and external competencies to address rapidly changing environments. This adaptability can enhance a firm's ability to achieve persistent profitability. The evidence from empirical findings also shows that certain industries tend to have companies with more stable profitability due to market structures and barriers to entry (Caves, 1998). He found that firms in concentrated industries often exhibit higher profitability persistence. Ghosh and Ghosh (2014) attempted to analyze the profitability persistence in Indian firms, and they found that previous profitability levels significantly influence current profitability. Other recent studies confirmed that lagged profitability values exert a significant positive effect on current firms' profitability, implying persistent and sustained competitive advantages in industry perspective (Isik and Tasgin, 2017; Odusanya, 2018).

Hypothesis 2: Past profitability plays a higher and significant role in the performance of current profitability (the DV is highly persistent).

Companies that generate high profits are typically more efficient (Peristiani, 1997). Mintzberg (1975) emphasizes that managerial efficiency reflects how well leaders organize, direct, and control their resources to achieve strategic goals. However, Under the perfect competition assumption (Walker, 1876) all firms are considered to operate with maximum efficiency and have equal access to resources, perfectly

competitive markets, and no single firm can influence market outcomes. This implies uniform managerial efficiency among firms.

This hypothesis challenges the assumption by suggesting that "EFFORT companies" (which could mean companies differentiated by the degree of managerial efforts or resources they apply) have managerial efficiency that is not homogenous but rather varies and deviates from the ideal efficient behavior expected in perfect competition. In other words, it posits that managerial efficiency is heterogeneous across firms due to differences in managerial effort, and this difference is significant enough to contrast with the uniform efficiency assumed in perfect competition theory.

This hypothesis often serves to investigate if managerial practices, capabilities, or inputs cause measurable differences in company performance, contrary to perfect competition's simplification of equal efficiency.

Hypothesis 3: EFFORT companies have different managerial efficiency as opposed to the perfect competition assumption. They will also have consistent trends in profitability.

Mardini, A. (2019), attempted to analyze the costs of conflict, focusing on the impact of the Syrian civil war on business operations. His findings indicate that businesses faced enormous challenges due to infrastructure collapse and a volatile market, leading to dramatic losses in profitability. Siniver, E., & Ruppin, A. (2015), who focused on war and firm performance using evidence from the Israeli-Palestinian conflict, concluded that direct conflict and instability led to a marked decrease in profitability, with firms involved in resource-intensive operations suffering the most. And Oetzel, J. & Getz, K. (2012), who evaluated the Economic Impact of War on Business Performance, offer a comprehensive review of various case studies, concluding that firms operating in war-torn regions often experienced diminished market access, increased operational costs, and hampered profitability.

Hypothesis 4: The highly intensive war taking place in Tigray had a large negative and significant effect on EFFORT companies' profitability.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Description of EFFORT Companies

Tigrai, which is part of Ethiopia, had been the source of the majority of changes that occurred in the last three decades of this country. However, this region had remained within a severe destructive war and full blockage for the past three to four years, which was evil for Tigrai that forced it 20 to 30 years back.

The Endowment Fund for the Rehabilitation of Tigrai (EFFORT) was established in August 1995, which was later certificated in 1997 in accordance with the 1960s Civil Code of Ethiopia. The initial capital used to establish EFFORT originated from the wealth accrued during the civil war that took place for 17 years and ended up overthrowing the military Derg regime in the country. Throughout the war, TPLF had been accumulating huge amounts of money through donations from alliances and supporters of the people of Tigrai and TPLF, foreign trades, and income-generating agricultural activities that were taking place in the liberated areas of Tigrai (EFFORT Profile, 2024).

Being a dual-behaved corporate, namely the Investment Centre and the Endowment Fund for the Rehabilitation of Tigrai, EFFORT, which are under the integrated leadership of the Board and the Council. The first Investment Centre coordinates all companies in which it has shares value in each and plays the greatest role in directing those (EFFORT Bylaws, 2020). Therefore, this study focused on the profit-making institution, EFFORT Investment Centre, and its subsidiary companies engaged in different areas of business industries. A short detail with their basic description of these subsidiary companies is stated below in Table 1.

Table 1: EFFORT Companies’ Short Description.

S. No	Company Name	Year of Establishment	Initial Capital	Engagement Area	Year of operation	BusE Age
1	Trans Ethiopia	1993	100 mln brr	Transport Logistic	1993	32
2	Mesfin Metals Engineering	1993	358 USD	Metal & Engineering	1993	32
3	Messebo Cement Factory	1997	473 mln brr	Cement Production	2000	25
4	Sur Construction	1992	108 mln brr	Construction& Truism	1992	33
5	Guna Trading House	1992	18.6 mln brr	Wholesaler and in & out distribution	1992	33
6	Addis Pharmaceuticals Factory	1992	53 mln brr	Producing Medicines	1997	33
7	Almeda Textile Factory	1994	-	Producing Textiles	1996	29
8	Hiwet Agricultural Mechanization	1992	25 mln brr	Agri-business	1992	33
9	Saba Dimensional Stone Factory	1992	76 mln brr	Stone& marble Prod.	1994	31
10	Sheba Leather Factory	1993	94 mln brr	Producing Leather outputs	2004	21
11	Bruh Tesfa Irrigation & Water Tech.	2004	41 mln brr	Irrigation & water supply Installation	2004	21
12	Maichew Particle Board	2007	280 mln brr	Producing P/board	2007	18
13	DW International - in business operation	2005	21+	Information Disseminate.	2005	20
14	Ezana Mining Development	1993	28 mln brr	Mining Development	1994	31
15	Mega Printing PLC	1996	6.896 mln brr	Printing	1996	29
16	Mega Publishing and Distribution	2007	-	Mainly Distribution	2007	18
17	Tekeze Technology Park	2019	-	ICT Services	2020	5

Source: self-compiled from each company’s Archive.

- BusE. Age stands for ‘Business Engagement Age’ or business life time that starts from the date each company began business operation.

Most of these companies have been playing a leading role for the past three or more decades, starting from their inauguration in 1992 and after. This was two or three years before the establishment of EFFORT as a coordinator and shareholder in 1995 and legal certification in 1997 (EFFORT Founding Text and Bylaw, 2008). The initial capital of 8.67 million birr funded for the establishment of EFFORT has now amounted to 15.699 billion birr by June 2020. And these companies collectively had been contributing to the nation’s tax revenue, ranging from 648 million to 2.255 billion birr per year (for the years 2009–2016 only). Besides, they attributed over

1.066 billion birr for social contributions as well as 521.14 million birr for other supports of the same years (EFFORT 20 Years Financial Trend data from 1996–2016, 2022/23).

Until 2019 (before Covid-19 and the Tigray war), many of these companies were not performing up to their potential profitability, specifically less than their attainable capacity. This, in turn, had a negative impact on employment opportunities in the region and slowed down overall economic growth (EFFORT companies' damage and loss assessment report, 2022). In order to be evident through an actual performance data summary at the corporate level, a six-year (2013–2018) annual sales and profit-before-tax actual execution compared against each year's annual planned capacity of 12 companies looked like the following. From the 116.974 billion birr aggregate sales revenue plan, a total of 83.952 billion birr (72%) was achieved, losing a 28% average annual variation from planned capacity but not from attainable capacity, which is always greater than the planned one. In order to comprehend it annually, for the year 2013, a sum of sales plan of 14.998 billion birr was the actual performance, which was 8.157 billion birr in sales revenue, which is 54%, with a 46% annual performance variation against the plan. In 2014 the planned versus actual sales income performance was 66%; in 2015 it rose up to 80%; in 2016 it went down to 74%; in 2017 it was 76%, and in 2018 it went back to 74% with an overall variation range of 24% - 34% from potential planned capacity.

Furthermore, the pre-tax profit income actual presentation recorded almost similar trends at the corporate level, but there were exceptional achievements at individual company levels with three companies' recorded value of consecutive pre-tax profit losses. That is, the performance against the pre-tax profit plan of 18.151 billion was 13.544 billion birr (75%) of the total corporate revenue with 25% variation. With regard to yearly detail analysis, the planned amount of pre-tax profit income of 1.823 billion birr in 2013 ended with an actual value of 0.876 billion birr (48%). And in the 2014, 2015, 2016, 2017, and 2018 fiscal years, with respective forecasted values of 2.133 billion, 2.832 billion, 4.076 billion, 3.209 billion, and 4.077 billion birr,

respectively, the actual performances were 1.437 billion (67%), 2.289 billion (81%), 3.063 billion (75%), 3.331 billion (104% due to high inflation effect), and 2.548 billion (62%), respectively.

Therefore, all these sales income and pre-tax profit performances are indications of efficiency gaps in comparison to the planned value. Especially if the comparison perspective changes to the maximum standard potential capacity, the variation percentage amounts could have been aggravated more than the variation values explained above. Even though these companies had ample opportunities with fewer competitors in both the regional and national markets, they unfortunately missed out the chance to sell their maximum products and operate at optimal capacity utilization thereby profitability. For example, 6 out of 16 companies experienced consecutive net losses and have negatively inverted profit performance (EFFORT 20 Years Financial Trend data from 1996–2016, 2022/23).

3.2. Sample Size of the Research

The researcher planned to determine the population size of the study using the census method that considered all the companies that have been in business operation. More specifically, the researcher is going to give an equal chance for each EFFORT company to be included. This means that companies meeting the criteria of having at least ten years of consecutive audited financial performance reports or unaudited financial performance data and those companies in which EFFORT Investment Center has the upper hand in decision-making law based on capital share contribution will be selected for investigation.

Therefore, this research collected the annual financial performance data for a maximum of 17 companies, which are under the lead of the EFFORT Investment Centre, running for a period of fifteen years. These resulted in a maximum sample size of 255 observations ($N*T \Rightarrow 17*15 = 255$). As a result, the maximum sample size represents 100% of the total population, ensuring a highly representative sample.

3.3. Ethical Consideration

The researcher is responsible for the data privacy of the companies regarding the use of their names, raw data surveyed, addresses, photos, and videos. Thus, the researcher gave codes to their specific names instead of using their full names. Furthermore, password-protected secondary data management is executed. However, the specific company results of the analysis may be presented to a higher decision-making body—owners and company leadership—in order to make them aware of future improvements.

In addition, the results of the analysis would only depend on the real data collected mainly from each company's archive. Therefore, there was no use of any type of fabricated data or manipulated data in this study approach. The focus is to present stable and consistent findings. Furthermore, by maintaining the required clarity of the researcher's thoughts and proper citation of sources, there was due care for copyrights and intellectual matters throughout the research processes.

3.4. Data Collection Method

To analyze the determinants of profitability, the researcher gathered data on various firm-specific, industry-level, and macroeconomic variables. These are managerial efficiency, capital intensity, liquidity, company age, company growth, assets turnover ratio, working capital, lagged values of profitability (Y_{it-1}), competitiveness, and economic growth by GDP. These data were mainly collected through the use of secondary sources, specifically the audited financial performance reports of each company for each year within the specified time range.

In order to conduct a profitability trend analysis, the researcher gathered data on annual audited profitability performance indicators of gross profit margin and earnings before tax margin as well as measures of return on investment, such as return on assets (ROA) and return on capital employed (ROCE). To estimate the third objective, the effect of the Tigray war on profitability, data were collected on war damage and economic loss severity level. This analysis introduced a dummy

variable of war exposure to estimate its effect, considering 15 years of data but classifying it as pre- and post-war periods.

In addition to the audited source, data were collected and organized to document claims of damage and economic loss, as well as unaudited financial reports from each year, which gathered the necessary raw data for this study. Then, the data collected from all available sources were converted into financial ratio analysis to create a dataset. The types of econometric data collected and created include time-series data ranging from 2010 to 2024 and cross-section data on 17 individuals from a total population of 17 companies. The dataset created was an unbalanced panel data type due to some missing observations.

3.5. Data Analysis Methods

Based on data characteristics and behavior, an appropriate descriptive statistics and panel data method of analysis were employed.

3.5.1. The Descriptive Method

In order to show the summarized key features of profitability data in all the objectives descriptive statistics such as means, medians, and standard deviations, providing a foundational understanding before applying more complex analyses was done (Anderson, D. et al., 2016).

3.5.2. Empirical Model

In order to showcase and estimate the second and the third objectives, the static panel data methods, the panel data trend, and a simple difference-in-difference (DiD) panel data model were employed (Card and Krueger, 1994; Angrist and Pischke, 2009; and Masten et al., 2019). In a dummy variable introduced as a binary behavior of the war exposure estimation, the pre-war period has got zero values, and the post-war period has given values of one.

To address the first objective, the researcher used the linear dynamic panel data model first recorded by Hansen (1982) and later on improved by the works of Arellano and Bond (1991); Arellano and Bover 1995; Blundell and Bond (1998).

The dynamic linear model is specified as

$$Y_{it} = \alpha Y_{it-1} + \beta X_{it} + \omega_i + \epsilon_{it} \dots\dots\dots (12)$$

Where,

- Y_{it} is the dependent variable/profitability performance of ‘i’s ($i = 1 \dots\dots N$), individual companies at ‘T’ time periods ($t=1 \dots\dots T$).
- Y_{it-1} represents the persistence effect of profitability, implying history matters on current earning capacity level (Greene, 2008).
- ‘ α ’ (alpha) captures the autoregressive (persistence) parameter value.
- X_{it} represents the vector of all the potential company-specific, industry-specific, and macroeconomic-specific explanatory variables listed in table 1(b), and β is the vector of coefficients of each predictor variable for company ‘i’ and at ‘t’ time periods;
- ω_i (phi) indicates the unobservable company-specific error term or time-invariant company effects, which will be extracted by the dynamic panel data analysis model (Hansen, 1982; Arellano and Bond, 1991);
- ϵ_{it} indicates the effects of all unobservable cross-section variables changing over time or the independently and identically distributed (i.i.d) disturbance term and $\epsilon \sim N(0, \sigma^2\epsilon)$.
- ‘ β_0 ’ represents the constant value of profitability without the model.

Dynamic panel data estimation relaxes the OLS assumptions. This study includes the dynamic lags of profitability as part of the regressors to measure the persistence effect on current profitability. The inclusion of lagged profitability among other independent variables breaks down the traditional ordinary least squares (OLS) estimator, as well as the static panel data models, and then adopts the dynamic panel data models (Hansen 1982; Arellano and Bond 1991; and Arellano and Bover 1995). The OLS and static panel data, where only exogenous variables are included as regressors, look like this:

$$Y_{it} = \beta_0 + X_{it}\beta + V_{it} \dots\dots\dots (13),$$

which represents the pooled OLS model (where $V_{it} = \mu_i + \epsilon_{it}$) (Ibid; Hadush et al., 2023), and

$$Y_{it} = \beta_0 + X_{it}\beta + \omega_i + V_{it} \dots\dots\dots (14)$$

This is also the fixed-effects model (Ibid). Therefore, these models can be appropriate theoretically in estimating such equations as stated in (13) and (14).

And we used statistical testing tools like the Hausman Test and other appropriate tests to check the relative effectiveness of pooled OLS, fixed, and random effects models.

Due to the presence of the lagged regressor, we progressed to that of the more efficient GMM estimator (Blundell-Bond, 1998, and Roodman, 2009). It is because this advanced method is a general estimator, designed for situations with independent variables that are not strictly exogenous. That is, such variables are correlated with the past and the current realizations of the error term, the individual effects, and heteroskedasticity and autocorrelation within individuals (Ibid). Therefore, examining equation (12), the dynamic panel model, using the ordinary least squares (OLS) and the static models leads to biased and inconsistent coefficient estimates (Arellano and Bond, 1991; Caselli et al., 1996; Green, 2003; Blundell-Bond, 1998; and Roodman, 2009). It also does not exploit the time dimension of the dataset.

Though ω_i is uncorrelated with predictors of X_{it} , ω_i is inherently correlated with the lagged outcome variable (Y_{it-1}), and there is a need to use valid instrumental variables (Ibid). The difference GMM estimator is consistent in eliminating the fixed effects by taking the first difference transformation data (Arellano and Bond, 1991). Conversely, this first differencing removes previous observations and some company-specific fixed effects that worsen the weakness of unbalanced panel data (Ibid).

According to Anderson and Hsiao (1982), as cited in Hadush et al. (2023), the new difference GMM estimator is defined as shown below, and let's see how the difference GMM removes the time-invariant fixed effects.

$$Y_{it} - Y_{it-1} = \alpha (Y_{it-1} - Y_{it-2}) + \beta (X_{it} - X_{it-1}) + (\omega_i - \omega_i) + (\epsilon_{it} - \epsilon_{it-1}) \dots\dots\dots (15)$$

Or equivalently, it is frequently stated as presented below.

$$\Delta Y_{it} = \alpha \Delta Y_{it-1} + \beta \Delta X_{it} + \Delta \varepsilon_{it} \dots\dots\dots (16)$$

Note that the company-specific fixed effects are removed through differencing in equation (15) as $v_{it} = \omega_i + \varepsilon_{it}$ and $\Delta v_{it} = v_{it} - v_{it-1} = (\omega_i - \omega_i) + (\varepsilon_{it} - \varepsilon_{it-1}) = \varepsilon_{it} - \varepsilon_{it-1} = \Delta \varepsilon_{it}$.

As we can observe from (16) above,

The endogeneity issue still exists because Y_{it-1} and ε_{it-1} are correlated, or $\text{Cov}(Y_{it-1}, \varepsilon_{it-1}) \neq 0$ (Roodman, 2009). Therefore, this also calls for the use of valid instruments that are highly correlated to the lagged profitability regressor but orthogonal to the error terms.

Besides, the system GMM estimator, which is more robust to gaps in such an unbalanced dataset than the difference GMM (Arellano and Bover, 1995; Roodman, 2009; checked by Bostanci et al., 2018) and uses the two-equation approach with additional instruments (Blundell and Bond, 1998). It is specified as,

$$\text{Equation 1: } Y_{it} = \beta_0 + \alpha Y_{it-1} + \beta X_{it} + v_{it} @ \Delta Y_{it-2} \Delta X_{it-1} \Delta Y_{it-3} \Delta X_{it-2} \dots\dots (17)$$

$$\text{Equation 2: } \Delta Y_{it} = \beta_0 + \alpha \Delta Y_{it-1} + \beta \Delta X_{it} + \Delta v_{it} @ Y_{it-2} X_{it-1} Y_{it-3} X_{it-1} \dots\dots\dots (18)$$

Note that the '@' function separates the equation part from the list of instruments. Unlike the difference GMM, this system GMM estimator doesn't remove time-invariant variables (Roodman, 2009) but rather uses orthogonal deviations as well as subtracts the average of all future available observations of the variable(s) instead of subtracting the previous observation from the contemporaneous one (Arellano and Bover, 1995; Blundell-Bond, 1998; and Roodman, 2009).

However, the analysis using the dynamic linear panel model is a step-by-step analysis that must start with the static panel regression models and go through the dynamic linear panel model of the System GMM estimator (Arellano and Bover, 1995; Roodman, 2009). In this research some observations are missing due to the reason that almost all companies had stopped business activities during the war; three companies (named as HSLF, ALTF, and HAMO) were very late to start again in the postwar reconstruction period. Thus, based on the theoretical validation, the researcher employed the system GMM. This is because of the presence of the

heterogeneity issues and the endogeneity problem (i.e., Y_{it-1} 's are naturally correlated with ε_{it-1}) that need to be solved with the application of the system GMM estimator, which consistently and efficiently estimated α and β coefficients in such panel data (Arellano and Bover, 1995; Blundell and Bond, 1998; and Roodman, 2009).

Having considered these facts, to make clear decision between using the two GMM estimators, the rule - of - thumb offered by Bond (2001) is presented as: first, the dynamic model should be initially estimated by pooled OLS and the LSDV approach - using the 'within' or fixed effects approach; second, the pooled OLS estimate for α (persistence parameter) should be considered as an upper-bound estimate, while the corresponding fixed effects estimate as a lower-bound estimate; third, if the difference GMM estimate obtained is close to or below the fixed effects estimate, this suggests that the former estimate (DGMM) is downward biased because of weak instrumentation and the system GMM estimator should be preferred instead, moreover, always check the efficiency improvement and validations in the last one.

The theoretical instrumenting has also been modeled, as we are building an estimator for general application, in which we don't choose to assume that the researcher has excellent instruments waiting for him in the wings; we must draw the possible instruments from within the functional form or the dataset (Greene, 2002; Roodman, 2009). According to these authors, internal instruments (lagged differences and lagged levels) are suitable; therefore, the natural candidate instrument for one period lag (Y_{it-1}) is Y_{it-2} , and if the data are transformed by differencing, it becomes ΔY_{it-2} . Then, both Y_{it-2} level and ΔY_{it-2} in the differenced case are mathematically related to $\Delta Y_{it-1} = Y_{it-1} - Y_{it-2}$ but orthogonal to the error term $\Delta \varepsilon_{it} = \varepsilon_{it} - \varepsilon_{it-1}$ as long as the ε_{it} are not serially correlated (Arellano and Bond, 1991; Roodman, 2009; Hadush et al., 2023). The simplest way to incorporate either (Y_{it-2} or ΔY_{it-2}) is with 2SLS, which leads us to the Anderson and Hsiao (1982) of difference and levels estimators. From these two estimators, the levels estimator, which is instrumenting with Y_{it-2} instead of ΔY_{it-2} , seems preferable in order to maximize sample size or to minimize missing

values (Roodman, 2009), though it depends on the use of either GMM estimators based on the decision-making rule-of-thumb.

Therefore, estimating Eq. (14) using pooled OLS and that of fixed and random effects models still leads to biased and inconsistent estimates. It is due to the correlation that exists between $(Y_{it-1} - Y_{it-2})$ and $(\epsilon_{it} - \epsilon_{it-1})$. That is, the Y_{it-1} term in $\Delta Y_{it-1} = Y_{it-1} - Y_{it-2}$ is correlated with the ϵ_{it-1} term in $\Delta \epsilon_{it} = \epsilon_{it} - \epsilon_{it-1}$. Thus, the endogeneity concern is solved by means of the levels Y_{it-2} or ΔY_{it-2} and X_{it-1} , ΔX_{it-1} , or more of the valid instruments for ΔY_{it-1} ($Y_{it-1} - Y_{it-2}$). We do these to consistently estimate the parameters of α and β . Because such instruments are correlated with $(Y_{it-1} - Y_{it-2})$ by construction, though uncorrelated or orthogonal to $(\epsilon_{it} - \epsilon_{it-1})$ given that the new error term $(\epsilon_{it} - \epsilon_{it-1})$ is serially uncorrelated (Arellano and Bond, 1991; Roodman, 2009; and Hadush et al., 2023).

The GMM diagnostic tests first began testing for instrument validity using the Hansen (1982) J test and the Sargan (1985) test of over-identifying restrictions after GMM estimation (Roodman, 2009). That is, we test the null hypotheses of ‘overall validity of the instruments’ used. Then, failure to reject this null hypothesis gives support to the choice of the instruments. Here, the instrument validity is established when the p-value is above Roodman’s common sense minimum threshold of 0.25 but <1.0 . That is, $0.25 < p\text{-value} < 1.0$ is the best outcome to accept the null, whereas $p < 0.25$ is the undesirable result that enables us to reject the null hypothesis (Roodman, 2009). The Sargan-Hansen test checks whether $m - k$ instruments (i.e., the over-identifying restrictions) are valid, assuming that there are already k valid instruments, where m is the number of instruments and k is the number of regressors and $m > k$ (Kiviet and Kripfganz, 2021).

Secondly, we tested for serial correlation between the error terms. It tests the null hypothesis that ‘the differenced error term is second order (AR2) serially correlated’ as our valid level instruments begin at Y_{it-2} but not at Y_{it-1} , which is for AR (1) (Roodman, 2009; Arellano and Bond, 1991; Blundell and Bond, 1999). Then, failure to reject the null hypothesis of no second-order serial correlation, when the p-value $>$

0.05, implies that the original error term is serially uncorrelated. It, in turn, indicates correctly specified moment conditions. Thirdly, we tested the coefficient of the lagged dependent variable (αY_{it-1}), the LDV. Because the LDV coefficient tells us the persistence effect of past performance on the current one and thereby the endorsement of the linear dynamic panel model specification. Fourthly, testing would also drag on to the significance and effect level of other X_{it} (X_{it-1}) regressors and dummies on Y_{it} . Last but not least is the Wald test to diagnose the joint validity and significance of all the predictors, including the lagged variables (Arellano and Bond 1991; Blundell and Bond, 1999).

3.6. Variables' Measurement

Based on the quantitative approach to profitability ratios stated by Dicu, C. et al., (2019), this study investigated the profitability performance, which is the most important dependent variable. The gross profit margin (GPM), return on assets (ROA), and return on capital employed (ROCE) were used as indicators of performance healthiness. These indicators aim to measure profitability trend healthiness. In addition, the measurement of factors influencing the profitability and the war damage dummy variables is offered as follows:

Table 2: Design of Variables' Definition

S.No	Variable	Indicator(s) (proxies)	Measurement used by	Measurement/definition
1	Profitability (dependent Variable)	Gross Profit Margin (GPM)	Hayes(2023) (newly added)	Gross Profit to Total sales
		Return on Assets (ROA)	Isik and Tasgin (2017) and Tayyaba (2013)	Net Profit before Tax to Total Assets
		Return on Capital Employed (ROCE)	Damodaran, A.(2010)	Net Profit before Tax to Total Capital Employed (TAss-CL)
Design of Independent Variables				
S. No	Variable type	Independent Variables	Measurement used by	Measurement/definition
1	Independ Company	Past profitability (Y_{it-1})	Isik and Tasgin (2017), & Odusanya et al. (2018)	Net Profit before Tax to Total Sales/revenue
2		Managerial Efficiency	Hossain (2020)	Total revenue to Total assets

S.No	Variable	Indicator(s) (proxies)	Measurement used by	Measurement/definition
		(Meff)		
3		Cost efficiency (Coeff)	Alarussi and Gao (2023)	Total cost to total sales
4		Company Growth (Cgr)	Zambrano Farias et al.(2022)	Assets Growth Formula
5		Company Age (Cag)	Aman (2014) and Odusanya et al. (2018)	Log of years of company existence
6		Capital Intensity (Capint)	Pervan et al. (2019)	Total Fixed assets to Total Sales
7		Liquidity (Liq)	Syahbandar and Lestari (2022)	Networking Capital (CA – CL) to Total Assets
8		Working capital (Wcl)	Al-Jafari and Samman (2015), Susilo et al.(2020)	CA to CL(Current ratio)
9	Industry level	Competitiveness (Comp)	Bolarinwa et al. (2021)	Price-cost margin ((P-MC)/P) or by interpreting the autoregressive coefficient
10	Macroeconomic level	Economic growth (Egr)	Pervan et al. (2019)	Annual growth rate of GDP
11	War effect dummy variable	-Treated dummy variable(Tdv); -Post treatment dummy variable (Tdv); -Average Treated Effect.	Self-selected	0 = if there is small war damage 1 = if there is large war damage 0 = pre-war period 1 = post-war period

NB:

- CA and CL stand for current assets and current liabilities, respectively.
- TAss stands for the total assets.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

Based on different theoretical backgrounds and empirical findings, the researcher has a mandate to interpret the meanings and forward policy implications of the secondary data analysis tests and results that are presented hereunder.

4.1. Descriptive Statistics

The descriptive statistics provide necessary information regarding features of census statistics. Table 2 presents the results of the descriptive statistics, indicating that the median values of all variables fall within the minimum and maximum values. This data indicates that the series maintains consistency. Both the outcome variable profitability performance (proper) and its lag demonstrate negative means (-27.82 and -29.63, respectively) with extreme variability. These show consistent patterns between current and lagged periods in profitability performance. However, the extreme values in these preceding and the upcoming variables mainly arose due to consistent losses in a few (25%) of the companies and significant war-driven losses in all groups during the Tigray war period.

A deeper look at the variables further reveals more information. E.g., EFFORT companies have a median average of approximately 40% managerial efficiency level. That is, 60% of human capital resources are wasted due to the internal managerial inefficiency. The best-managed company achieves around a 3.13 managerial efficiency ratio, or 313% of these human resources' efficiency, whereas the loser company, or the lowest one, achieves a 0 managerial efficiency ratio on average. This statistical result contradicts the perfect competition or neoclassical viewpoint that all firms or companies have the same internal managerial efficiency levels, supporting the third hypothesis of this thesis. This disparity highlights the

critical importance of effective management practices in determining a company's success. Organizations that prioritize training, strategic planning, and resource allocation can significantly enhance their operational efficiency, ultimately leading to better performance in competitive markets.

Similarly, both high levels of profitability and business risks exist in the market where EFFORT companies have been engaged, similar to the statement by Grant (2003). These are signposted by profitability itself and by its indicators, which are gross profit margin (GPM), return on assets (ROA), and return on capital employed (ROCE). The highest profitability achieved by companies during the period was 10.15, and the worst was 5,605.96. The highest GPM achieved by EFFORT companies was 1, the worst was 258.4 (i.e., -258.4), and for ROCE they were 18.2 and -2.3, respectively. The descriptive result also indicated that 25% of EFFORT companies experienced consistent loss, while 50% of them achieved modest profit and 25% were the top performers of profitability.

In addition, EFFORT companies exhibit an average of 19% overall growth in the study period. The best growing company shows an 11.37% annual growth rate in assets' value, while the worst has retarded growth at the rate of -1% on average. The high growth rate indicates expansion, whereas the lowest negative one suggests stagnation or downsizing. Finally, several variables show exceptionally high coefficients of variation (CoV). ROA leads with a CoV of 23.24, followed by capital intensity (13.98) and cost measures (13.37 and 12.96). These indicate the sizeable existence of heterogeneity in companies' industry engagement, efficiency (highest, medium, and lowest profit performers), high risk and uncertainty, and facing instability in political and market conditions (Penrose, 1959 and Grant, 2003). In particular, the long negative tail, with some companies experiencing catastrophic losses (profitability as low as -5605.96), signals critical operational distress, e.g., war and other shocks in the Tigray case. Moreover, potential restructuring, or unsettled market conditions, confirm the results of Primasatria et al. (2025) and Drury (2006) as cited in Brierley (2016).

Generally, the corporate sample demonstrates distorted profitability performance with a mean of -27.82, significantly below the median of 0.082. This dramatic divergence indicates the typical company maintains marginally positive profitability. The extreme underperformers create substantial negative skewness in overall EFFORT performance, which accords with Murniati and Oktris's (2025) empirical findings. Conversely, there was an average profitability improvement of 1.81 points from the lagged period (-29.63 to -27.82), suggesting some recovery in overall EFFORT profitability performance. Furthermore, median profitability remained essentially stable (0.083 to 0.082), indicating that typical company performance shows little change over time.

Table 3: Descriptive Statistics (Proper => Profitability and Var => Variable)

Variables	mean	Sd	Min	p25	p50	p75	Max
Proper	-27.81578	371.9016	-5605.96	-.188	.082	.1845	10.147
Proper L1	-29.62771	383.8593	-5605.96	-.184	.0825	.184	10.147
Managerial efficiency	.5050657	.4852721	0	.2106875	.3994905	.6492295	3.132351
Cost efficiency	4.335097	25.48712	.532	.845948	.969647	1.247943	268.4943
Company age	1.269674	.1871324	.6021	1.1761	1.301	1.415	1.5185
Capital intensity	107.1919	1498.289	.03105	.24109	.604545	1.61825	22501
Company growth	.1901744	.8541508	-1	-.020384	.0709297	.2121881	11.36925
Liquidity	.2238732	.4561867	-4.58438	.0944235	.2739069	.4400484	.8233444
Working capital	3.156787	3.735932	.137988	1.326714	2.152419	3.393982	28.53143
Competition	-19.9367	233.3277	-3355.19	.72	.94	1.05	18.74
Economic growth	8.420667	2.31083	5.01	6.06	8.65	10.39	12.55
Treatment dummy var	.625	.4851347	0	0	1	1	1
Post treatment var	.2166667	.4128345	0	0	0	0	1
Average Treatment Effect (ATE)	.1666667	.3734568	0	0	0	0	1
Gross Profit Margin	-2.303626	23.02304	-258.3718	.095959	.2534663	.3642776	1
Return On Asset	.007672	.1782776	-1.471582	-.0556952	.0258069	.1122651	.3667638
Return On Capital Employed	.1398409	1.279725	-2.298927	-.0591781	.050202	.1643293	18.21297
<i>N</i>	240						

Source: Researcher, 2025.

4.2. Data Analysis and Testing Intuitions

The maximum number of the sample size in this dataset is 240 observations ($N = 16 * T = 15$), where N is the number of groups and T refers to the 2010 to 2024 business running period of EFFORT companies. The variables investigated as factors influencing profitability performance (Proper) were lagged profitability (proper L1), managerial efficiency (Meff), cost efficiency (Coeffr_ce), capital intensity (Capint), company growth (Cgr), liquidity (Liq), working capital (wcl), competition (comp_resid), company age (Cage), and economic growth (Econgr). Besides, variables studied to analyze the trends in profitability were also return on asset (ROA), gross profit margin (GPM), and return on capital employed (ROCE), and those of estimation of war effect on the same outcome variable were also treatment dummy variable (Tdv), post-treatment dummy variable, and average treatment effect (ATE). However, variables of company age and economic growth were dropped due to their disturbance and insignificance and the instability they created on the estimators' efficiency and consistency, as well as the irrational changing of variables' coefficients and variances (Wooldridge, 2019; Burnham and Anderson, 2002; Bolarinwa, 2021).

4.2.1. Common Empirical Testing Results

In order to decide whether to use the dataset with missing observations as it is or solve the missingness, this study checked the type of panel structure and percentage level of missingness. When the dataset is declared, it becomes strongly balanced, but still there are some missing values. To diagnose the MCAR, MAR, and MNAR types of random missing or systematic missing, the researcher used "mcartest" on control variables, resulting in $\text{Prob} > \text{chi-square} = 0.0000$, which shows that we are able to reject the null (panel data is MCAR). Therefore, our data is not MCAR at the first test but is likely of the MAR or MNAR type. Likewise, the second stage of testing used the missing dummy variable (x1) for MAR-type data missingness, using the "gen missing_Meff and logit missing_Meff" of the fully observed variables of company age and economic growth. The significant relationship existed with

'missing_Meff' (=x1) and “logit missing_Meff company age economic growth robust,” which gives significant p-values at 5%.

This supports the first MCAR test results, indicating that the panel data is MAR; missingness depends on the fully observed variables, but not on the value of the missing variable itself (which would lead to MCAR type). This is due to the significant relationships of “missing_Meff” with the two predictors (see appendix1,2).

Repeating the same action on other variables with missing values confirmed the evidence of MAR-type missingness. Even though the test result recommends the use of multiple imputation in order to handle the missing values, the literature or findings by Schafer and Graham (2002) on missing data review show that “if missingness is at random (MAR) and low (5% - 10%) on average, it is 'often tolerable' and rarely distorts results or coefficient estimates but minor efficiency declines.” In our case, the average degree of missingness in all variables is safely below 5%. Therefore, missingness should be handled without imputations by appropriately testing the results of our model analysis (Little and Rubin, 2002; Bennett, 2001) (See appendix3).

Correlation Analysis: the study also examined the correlation among series. The results of the correlation test presented in table 4 shows that most of the series are low or non-correlated. However, few correlation coefficients were higher than 50%, which are values for competition with lagged profitability and economic growth, with company age having the corresponding correlates of e.g., 0.964 and 0.527. As the second relationship is still safe and theoretically healthy, the first correlation case was resolved by residualization of competition to remove its past effect on profitability, and then its correlation level changed to an uncorrelated level. Equally, that of between cost efficiency and competition variables and the first with lagged profitability were solved by the same technique.

In addition, asset turnover rate as a control variable was included in the LDPD model. However, during testing it became perfectly correlated with managerial

efficiency so that it was dropped early in the data cleaning stage. Similarly, cost efficiency and capital intensity variables are highly correlated with the outcome variable (proper). However, a further look at such a correlation matrix shows that the results (high correlations with DV) agree with theoretical submissions of Wooldridge (2010) and Greene (2012). In other words, having satisfied all diagnostics, these control variables are theoretically justified in helping with omitted variable bias and clarifying causal inference.

Table 4: Correlations Analysis (Proper = Profitability)

Variables	(Proper)	(PropeL1)	(Managerial efficiency)	(Cost efficiency)	(Capital intensity)	(Company growth)	(Liquidity)	(Working capital)	(Competition)	
Proper	1.000									
Proper L1	-0.001 (0.985)	1.000								
Proper L2.	0.014 (0.844)	0.115 (0.110)	1.000							
Managerial efficiency	0.080 (0.231)	-0.018 (0.799)	0.055 (0.443)	1.000						
Cost efficiency	-0.998* (0.000)	0.002 (0.981)	-0.012 (0.866)	-0.141* (0.035)	1.000					
Capital intensity	-0.797* (0.000)	0.003 (0.964)	-0.009 (0.907)	-0.076 (0.252)	0.303* (0.000)	1.000				
Company growth	-0.008 (0.910)	0.000 (0.996)	-0.064 (0.371)	-0.028 (0.678)	0.016 (0.823)	0.007 (0.919)	1.000			
Liquidity	-0.040 (0.546)	0.057 (0.406)	0.213* (0.003)	0.106 (0.106)	-0.044 (0.510)	0.041 (0.538)	-0.022 (0.747)	1.000		
Working capital	-0.446* (0.000)	0.045 (0.510)	-0.241* (0.001)	-0.133* (0.042)	-0.029 (0.669)	0.469* (0.000)	0.090 (0.187)	0.324* (0.000)	1.000	
Competition	0.000 (0.996)	0.000 (1.000)	-0.108 (0.141)	-0.132 (0.059)	0.000 (1.000)	-0.163* (0.020)	-0.017 (0.804)	-0.179* (0.010)	0.007 (0.922)	1.000

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; *p-values in parenthesis*

The Stationary Test: the So Kyung Im, Pearson and Shin test (IPS-test), which is more flexible and allows for heterogeneity across cross-sectional units (So Kyung Im et al., 2003), resulted in an indicated p-value for $Z\text{-t-tilde-bar}$ of less than 0.05; therefore, at least some companies' profitability measures (panels) are stationary, implying we can safely apply them in GMM without differencing profitability (LDV) (see Table 5 below).

Table 5: Presentation of Stationarity Test

Im-Pesaran-Shin unit-root test for proper				
Ho: All panels contain unit roots	Number of panels = 16			
Ha: Some panels are stationary	Avg. number of periods = 14.25			
AR parameter: Panel-specific	Asymptotics: T, N -> Infinity			
Panel means: Included	sequentially			
Time trend: Not included				
ADF regressions: No lags included				

		Fixed-N exact critical values		
	Statistic	p-value	1%	5% 10%

T-bar	-6.6184	(Not available)		
T-tilde-bar	-2.1448			
Z-t-tilde-bar	-4.3199	0.0000		

The Cross-Sectional Dependence Test (CD-test): The CD-test introduced by Pesaran (2004), and refined by the same author in 2015, to diagnose whether the residuals for different cross-sectional units (companies here) are correlated at the same time or not. When the researcher tried the ‘xtcsd Pesaran abs’ after the xtreg Stata command of fixed effects estimation, Stata warns an error that the panel is unbalanced and this CD-test is not efficient or not applicable. This result reflects exactly what Pesaran (2004) notes that the “tests standard asymptotic justification works best for panels that are reasonably balanced”. Therefore, “following the dynamic panel data literature (Arellano-Bond, 1991; Blundell-Bond, 1998; Roodman, 2009), we rely primarily on the standard GMM specification tests of the AR (2) serial correlations test, the Hansen/Sargan tests of over-identifying restrictions which are in the good rang of $0.25 < p < 1$, the difference-in-Hansen test for instrument subsets and the instrument count is reasonable”. Because, this places the LDPD GMM model in what Bond (2002) calls a well behaved dynamic panel setting where GMM is much more reliable than the OLS and FE estimators. Besides, the CD-test is useful, it is not a pre-requisite for using the GMM technique, the System GMM. Therefore, once the Stationarity test is established and the core

standard GMM specification tests are satisfactory, then the LDPD System GMM model is well specified and the empirical results are robust, valid and consistent.

The Persistence Test: The Persistence test result also showed that the LDPD model is correctly specified as a dynamic GMM specification, as the coefficient of α in Y_{it-1} is strongly significant and positively affects the achievement of current profitability supporting the conclusions of Green(2008), Piper(2023) and Roodman (2009) thereby confirming a moderate persistence in the dependent variable.

The F-statistics result in the benchmarks of OLS/FE and the GMM estimators indicated that the researcher was able to strongly reject the default null hypothesis in which the coefficients of all control variables are zero. Having large F-statistic values and effectively zero p-values in all the step-by-step LDPD models, the empirical results in this study indicated that all the regressors as a group are strongly and statistically significant. In turn, a large F-statistic instead of a Wald statistic in the system GMM assured strong validity of the LDPD model estimations and gave confirmations to the propositions of the first hypothesis of this study. This result also supports the contributions and explanations of Arellano-Bond (1991), Blundell-Bond (1998), Roodman (2009), and *Hanck et al.* (2025) on the joint significance of a model and the predictors.

4.2.2. Empirical Analysis of Profitability with Pooled OLS

It is evident that with the Pooled OLS approach there is the likely importance of company level unobserved heterogeneity, which we have accounted for potential correlation between companies' errors overtime with the cluster-robust VCE. However, this does not address the potential effect of unobserved heterogeneity, but the within transformation.

Table 6: Linear regression result of Profitability using Pooled OLS

Profitability (Proper)	Coeff.	St.Err.	t-value	p-value	Sig
Proper.L1	.387	.082	4.74	0.000	***
Proper.L2	-.126	.077	-1.63	0.105	
Proper.L3	.039	.019	2.11	0.036	**
Managerial efficiency	.278	.211	1.32	0.190	
Cost efficiency	-.974	.031	-31.74	0.000	***
Cost efficiency.L1	.235	.068	3.46	0.001	***
Cost efficiency.L2	-.057	.063	-0.91	0.365	
Capital intensity	.149	.041	3.63	0.000	***
Company growth	.037	.103	0.36	0.717	
Liquidity	.139	.228	0.61	0.542	
Working capital	.02	.036	0.56	0.579	
Competition	.159	.032	4.92	0.000	***
Competition L1	-.077	.029	-2.60	0.010	**
Competition L2	.027	.018	1.55	0.124	
Intercept	.689	.233	2.96	0.004	***
Mean dependent var	-1.833	SD dependent var			20.246
R-squared	0.997	Number of obs			170
F-test	3217.454	Prob > F			0.000
Akaike crit. (AIC)	569.316	Bayesian crit. (BIC)			616.353

*** $p < .01$, ** $p < .05$, * $p < .1$

Therefore, as the lagged dependent variable is endogenous to the company fixed effects in the error term, estimates of pooled OLS (POLS) are inconsistent and upward biased. This is because, it inflates the coefficient of lagged profitability by attributing predictive power to it that belongs to the fixed effects. Thus, one must expect the true value to be lower than the upper bound, the inflated coefficient of variable of interest (Y_{it-1}).

4.2.3. Empirical Analysis of Profitability with Fixed effects

Before creating the plausible range for the GMM estimators in the step-by-step LDPD models, this study first examined the efficiency of FE versus RE, using the Hausman test, for setting the lower boundary (Nickell, 1981; Hausman, 1978), resulting in the FE estimator being preferred. This result confirms the conclusions of Bond (2002) in which the RE is usually rejected once the dynamics or endogeneity matters.

Table 7: Regression results of Profitability using Fixed Effect (FE)

Profitability (Proper)	Coeff.	St.Err.	t-value	p-value	Sig
Proper.L1	.281	.085	3.31	0.001	***
Proper.L2	-.218	.085	-2.56	0.012	**
Proper.L3	.038	.019	2.01	0.046	**
Managerial efficiency	.412	.292	1.41	0.161	
Cost efficiency	-.979	.033	-29.44	0.000	***
Cost efficiency L1	.145	.071	2.04	0.043	**
Cost efficiency L2	-.15	.07	-2.13	0.035	**
Capital intensity	.154	.044	3.48	0.001	***
Company growth	.056	.106	0.53	0.600	
Liquidity	.078	.242	0.32	0.747	
Working capital	.039	.042	0.93	0.355	
Competition	.153	.035	4.37	0.000	***
Competition L1	-.055	.031	-1.77	0.079	*
Competition L2	.053	.03	1.80	0.074	*
Intercept	.774	.268	2.88	0.005	***
Mean dependent var	-1.833	SD dependent var			20.246
R-squared	0.997	Number of obs			170
F-test	3008.176	Prob > F			0.000
Akaike crit. (AIC)	548.576	Bayesian crit. (BIC)			595.613

*** $p < .01$, ** $p < .05$, * $p < .1$

The FE estimator allows correlations. However, excluding the individual company specific effects (ω_i in the errors) through first differencing does not eliminate the dynamic panel bias or the endogeneity bias. Because it essentially makes every observation of transformed data endogenous to the error terms. As one cannot use previous lags as instruments to handle the endogeneity bias, correlation of predictors with the errors, the FE estimates still remained downward biased and inconsistent.

Therefore, the plausible benchmarks of GMM estimations should lie between the static overestimated POLS and underestimated FE coefficients of first lagged profitability value. Here the use of deeper lags has meaningful effect in OLS/FE estimations which is mainly exploratory and diagnostic in creating the credible benchmark for the coefficient of variable of interest, even though they still remain biased estimators in dynamic panel contexts (Arellano-Bond, 1991; Blundell and Bond, 1998).

4.2.4. Empirical Analysis of Profitability with the GMM Technique

In the Arellano- Bond approach the assumption is that the necessary instruments are internal (mainly lagged values of instrumented variables) and external instruments. This study used the internal lagged variables as valid instruments to resolve the endogeneity problem thereby find unbiased and consistent estimates of the LDPD model.

Table 8: Regression results of Profitability using DGMM Estimator

Profitability (Proper)	Coeff.	St.Err.	t-value	p-value	Sig
Proper.L1	.356	.107	3.32	0.004	***
Proper.L2	-.062	.12	-0.52	0.611	
Managerial efficiency	5.521	3.967	1.39	0.183	
Cost efficiency	-.818	.229	-3.58	0.003	***
Cost efficiency L1	.089	.141	0.63	0.538	
Capital intensity	.114	.428	0.27	0.794	
Company growth	2.565	2.492	1.03	0.319	
Liquidity	3.354	4.274	0.78	0.444	
Working capital	-.674	.742	-0.91	0.377	
Competition	.401	.215	1.86	0.081	*
Competition L1	-.076	.133	-0.57	0.575	
Mean dependent var	-1.992	SD dependent var		21.266	
Number of instruments	= 13	Number of groups		= 16	
F-test	29302.992	Prob > F		= .000	
Number of obs	154	Arellano-Bond test for AR(2)		Pr > z = 0.791	
Hansen test of overid. restrictions:	Prob > chi2 = 0.993	Difference-in-Hansen tests		Prob > chi2 = 0.993	

*** $p < .01$, ** $p < .05$, * $p < .1$

The difference GMM approach used first differencing the equation that removes the unobserved individual effect (ω_i) and its associated omitted-variable bias. However, this was done at the cost of introducing a correlation between the ΔY_{it-1} and Δu_{it} due to (t-1) term in both cases. This in turn magnifies the gaps in unbalanced data panels. Here, the estimate of the lagged dependent variable lies within the credible range of POLS and FE estimators. However, according to Blundell-Bond (1998) the DGMM underestimates persistence values when the series is not strongly persistent. This DGMM estimate has only two significant control variables added to LDV so that makes it less efficient to handle the endogeneity bias. As a result we need to proceed

to the SGMM in order to analyze the data more efficiently as recommended by the same author and Roodman (2009) for such data.

Table 9: Regression results of Profitability using SGMM Estimator

Profitability (Proper)	Coeff.	St.Err.	t-value	p-value	Sig
Proper.L1	.383	.156	2.45	0.027	**
Proper.L2	-.016	.037	-0.43	0.673	
Managerial efficiency	3.674	1.931	1.90	0.077	*
Cost efficiency	-.67	.23	-2.92	0.011	**
Cost efficiency L1	.013	.086	0.15	0.883	
Capital intensity	-.124	.298	-0.42	0.684	
Company growth	1.467	1.199	1.22	0.240	
Liquidity	1.394	1.049	1.33	0.204	
Working capital	-.351	.169	-2.07	0.056	*
Competition	.553	.26	2.13	0.051	*
Competition L1	-.022	.043	-0.52	0.612	
Intercept	.625	1.315	0.48	0.641	
Mean dependent var	-1.833		SD dependent var	20.246	
Number of instruments	= 15		Number of groups	= 16	
F-test	34617.13		Prob > F	= .000	
Number of obs	170		Arellano-Bond test for AR(2)	Prob> z = 0.918	
Hansen test of overid. restrictions:	Prob > chi2 = 0.964		Difference-in-Hansen tests	Prob > chi2=0.743	

*** $p < .01$, ** $p < .05$, * $p < .1$

According to these authors, the SGMM is more preferred than DGMM in unbalanced dataset, short panels, number of time span is less than number of groups, existence of heterogeneity and autocorrelation within individual units' error, but not across them. These all characters happened in this study and the estimation results of SGMM estimator proofed this empirically. Because, the coefficient of LDV showed improvement (being closer to the POLS) and two additional predictors become strongly significant, in which they are indications of the estimator's relative efficiency.

Dragging-on the comparison of analysis using the Generalized Method of Moments (GMM) estimators, it was proved that the LDPD model's estimated coefficient of alpha (α) lies within the upper limit of POLS and the lower limit of FE estimations, supporting the literature of Roodman (2009) in both the DGMM and SGMM estimators. Therefore, it is not difficult to decide between the appropriateness of these estimators, as the coefficient value result of the SGMM became very close to

the upper limit. This result implying two main pieces of empirical evidence: first, the SGMM estimator suggests the validity of the extra instruments employed; second, it confirms that SGMM is more efficient than DGMM to correct the biases in the POLS estimator due to endogeneity existence (Blundell-Bond, 1998 and Flannery and Hankins, 2013).

Furthermore, the serial-correlation test result at the AR (2) level of the Arellano-Bond (1991) indicated that we are unable to reject the null hypothesis of no 2nd-order serial correlation, with p-values of 0.791 for DGMM and 0.918 for SGMM estimators. This result shows the correct specification of the moment conditions (instruments). Likewise, the Hansen/Sargan test results of over-identifying restrictions lie between $0.25 < P < 1$ (Hansen, 1982; Sargan, 1958). This empirical result is the best outcome in DGMM and SGMM, with the exception of the Sargan test being equal to unity in DGMM, though the SGMM is preferred. Therefore, instruments are jointly valid or uncorrelated with the error term. In turn, the output supported the validity of the linear dynamic panel data model's specification (Arellano-Bond, 1991; Blundell-Bond, 1998). Besides, the validity and consistency of the coefficient for Y_{it-1} (α) to be used as inputs for decision-making is insightful and confidential (Blundell and Bond, 1998; Roodman, 2009) in order to select the most relatively efficient estimator of SGMM for final interpretations of the LDPD model's results (Ibid).

Similarly, the Difference-in-Hansen tests (Roodman, 2009) validated the additional level of moments and exogeneity of instrument subsets in the system-GMM that significantly improved the efficiency of the model. Because, the p-value is 0.743 ($0.25 < p = 0.743 < 1$), backing the conclusions of the Arellano-Bover (1995) and Blundell-Bond (1998) literature. Similarly, this study only employed internal moment conditions following the theory that internal instruments are suitable and easy to access (Green, 2002; Roodman, 2009). The rule that the number of instruments must be less than the number of groups did hold, as $13 < 16$ in DGMM and $15 \text{ instruments} < 16 \text{ groups}$ in SGMM; therefore, the instrument proliferation

issue is well controlled. This thesis also used the options of collapsing instruments and lag depth limiting together with the two-step robust small correction choices to improve the model's estimation efficiency which is in line with the Windmeijer (2005) and David Roodman (2009) recommendations.

The use of deeper lags has a more deterministic and meaningful effect as instruments in the GMM estimations by fixing the endogeneity issues and correcting the inconsistency in OLS/FE estimations (Arellano-Bond, 1991; Blundell and Bond, 1998). Similarly, they inform the choice of lag depth for instruments in GMM, helping avoid instrument proliferation and for endogeneity bias correction purposes (Baum et al., 2013; Blundell-Bond, 1998). Finally, according to these authors, the AR (2) tests and Hansen J-tests are sufficient for consistency, which was strongly confirmed in this LDPD specification.

4.3. Interpretation of Results

4.3.1. The Intuitions on Factors affecting Profitability

Based on the data analysis and testing results presentation in section 4.2, let's discuss the detailed interpretations of the main objective of this study, which is the determinants of profitability in the LDPD Model. These empirical results indicated that there are significant differences among results for firm-specific, industry specific and the model. Thus, it is appropriate to provide the results in the SGMM estimator separately for each variable at the aggregate level. Notice that all interpretations are given assuming 'other things being constant' in each control variable.

The lagged dependent variable, which is to investigate its effect on the current profitability, has an approximately alpha (α) coefficient of 0.4, which is significant at 5%. This result confirmed that there is a positive and medium past memory effect on current profitability success, which is associated with Isik and Tasgin (2017), Odusanya et al. (2018), and Bolarinwa et al. (2021). This implies that fifteen years back there was relatively modest market competition pressure, monopolistic competition, on the majority of EFFORT companies, in which this pressure has been

increasing and become strong at current times. Furthermore, this coefficient result suggests that EFFORT companies' profitability performance mainly depends on contemporaneous activities of each year plan and less on past performance. Therefore, profitability history matters less than current opportunities and capacities. Another implication of this moderate persistence is that the recovery period or adjustment to shocks (e.g., cost shocks, growth opportunities, political intervention, war conflict, etc.) and to the optimal level of profitability would be moderately fast, endorsing the theories of Bond (2002) and the findings of Godard (1999 & 2005), Athanasoglou et al. (2008), McMillan & Wohar (2009), and Cable (2008). Because the case of modest persistence reflects medium-lived dynamics and adjustment to optimality. This dynamic empirical result and its policy insights are also concurrent with the theoretical and empirical literature of Arellano-Bond (1991), Arellano-Bover (1995), Blundell-Bond (1998), and Roodman (2009), supporting the second hypothesis of persistence theory, but not higher as supposed

The practical findings established a significant effect of managerial efficiency in achieving higher profitability. Measured by the total revenue to the total assets ratio, this efficiency variable shows a positive effect at the 10% level of significance. This, in turn, indicates that utilization of human capital resources in EFFORT companies essentially determines their levels of profitability more than unity to the extent of a 3.67 proportional rate of return. This empirical result is in accord with the theory of Peristiani (1997) and Mintzberg (1975) and the extant empirical findings of Keramidou et al. (2013), Bolarinwa et al. (2021), and Hossain (2022). An additional important implication is that this result contradicts or disproves the neoclassical economic position (Walker, 1987), which assumes that managerial efficiency among companies is the same. However, the result is in line with the third proposition of this study, like that of the descriptive statistics and the trend analysis results.

The empirical results of cost efficiency which is strongly significant at 5%, negatively affects the profitability to the level of 0.67 proportional units ratio. This major determinant variable measured by total costs to total sales implies that there

had been recorded high cost of production and operational costs of business activities which in turn greatly let down profitability. Because, the negative sign of cost efficiency, which is against the theoretical expectation of positive relationship with profitability, shows that there hadn't been efficiency record on average in all the major costs of EFFORT companies or it implies average inefficiency record in all the major costs of EFFORT companies. This empirical result contradicts with the findings of Alarussi and GAO (2023) using similar GMM estimator in which they assured that profitability is positively related to cost efficiency in their study of profitability determinants of Chinese' companies. This result calls for the managers and higher officials to focus on cost leadership business activities and take necessary remedial reforms or breakthrough changes.

Concerning the industry-level effect, this study adopts the variable of competition measured by the price-cost-margin. This residualized variable captures only the variation in competitiveness which is independent of its past effect on profitability (Kennedy, 2008 and Wooldridge, 2010). The empirical results show that competition has a significant positive impact on profitability at 10% significance level. This is expected since most EFFORT companies similar to African countries' companies do not have anticompetitive policies like developed countries of Western and Europe that could put dominant firms to check. Thus, large EFFORT companies with economies of scale tend to exploit this loophole to increase their profitability. This is consistent with the results of Boțoc and Anton (2017) and Bolarinwa et al. (2021). The practical result here which rounds to 0.6 (0.553 coefficient of competition variable) is similar with that of the result obtained in moderately persistent dynamic lagged profitability in the second paragraph, implying the existence of both competition pressure and moderate market power.

Similarly, the negative effect of working capital (WCL), measured by the current assets to current liabilities ratio, has confirmed a significant effect in the short run on profitability at 10% significance level. The negative sign indicates that this reverses the findings of Susilo et al. (2020), Al-Jafari and Samman (2015),

Maneerattanarungrot and Donkwa (2018), Martins and Lopes (2016), Mun and Jang (2015), and Ukaegbu (2014), whom they found effective working capital controlling positive impacts on profitability by optimizing resource utilization and operational performance. However, this empirical result is consistent with the results of Mengstie (2024), Kayani et al. (2024), Vukovic et al. (2024), and Kiymaz et al. (2024). The economic implications of the negative 0.351 coefficient are that more assets or resources are tied up in liquid form (cash, receivables, and inventory), but the opportunity cost of generating returns on time is lost; there are high carrying and financing costs and a signal of inefficiencies, e.g., operational inefficiency. To sum up, this estimate reflects the liquidity-profitability trade-off; that is, too much liquidity mitigates risk but hurts returns, therefore, needs balancing (Alnaim, M et al., (2023); Eryatna, E. N. et al., (2021)).

Finally, the study investigates the role of factors regarding company growth, liquidity, and capital intensity influences on profitability. However, it is observed that these variables weren't validated to the significance level by this study, except for the sign of importance for company growth. Since the F-statistics as a replacement to the Wald-statistic test are strongly significant, they still could have influence on the outcome variable, especially since company growth played an important role as a valid instrument. These findings lend support to other works in the literature, such as Isik & Tasgin (2017) on capital intensity, and they contrast with Susilo et al. (2020), Godard et al. (2005), Pattitoni et al. (2014), and Bolarinwa et al. (2021) on liquidity and company growth variables.

Table 10: Comparison of Results of Profitability in the Step-by-step LDPD Analysis

Profitability (= proper)	(Estimator1) (OLS)	(Estimator2) (FE)	(Estimator3) (DGMM)	(Estimator4) (SGMM)
Proper L.1	0.387*** (0.0816)	0.281*** (0.0850)	0.356*** (0.107)	0.383** (0.156)
Proper L.2	-0.126 (0.0773)	-0.218** (0.0854)	-0.0622 (0.120)	-0.0159 (0.0369)
Proper L.3	0.0391** (0.0185)	0.0376** (0.0187)		
Managerial efficiency	0.278 (0.211)	0.412 (0.292)	5.521 (3.967)	3.674* (1.931)
Cost efficiency	-0.974*** (0.0307)	-0.979*** (0.0332)	-0.818*** (0.229)	-0.670** (0.230)
Cost efficiency L.1	0.235*** (0.0680)	0.145** (0.0713)	0.0890 (0.141)	0.0128 (0.0859)
Cost efficiency L.2	-0.0572 (0.0629)	-0.150** (0.0704)		
Capital intensity	0.149*** (0.0410)	0.154*** (0.0444)	0.114 (0.428)	-0.124 (0.298)
Company growth	0.0373 (0.103)	0.0557 (0.106)	2.565 (2.492)	1.467 (1.199)
Liquidity	0.139 (0.228)	0.0782 (0.242)	3.354 (4.274)	1.394 (1.049)
Working capital	0.0203 (0.0364)	0.0391 (0.0421)	-0.674 (0.742)	-0.351* (0.169)
Competition	0.159*** (0.0323)	0.153*** (0.0349)	0.401* (0.215)	0.553* (0.260)
Competition L.1	-0.0767** (0.0295)	-0.0550* (0.0311)	-0.0762 (0.133)	-0.0225 (0.0434)
Competition L.2	0.0274 (0.0177)	0.0531* (0.0296)		
Constant	0.689*** (0.233)	0.774*** (0.268)		0.625 (1.315)
N	170	170	154	170
R-sq	0.997	0.997		

Standard errors in parentheses
 * p<0.10, ** p<0.05, *** p<0.01

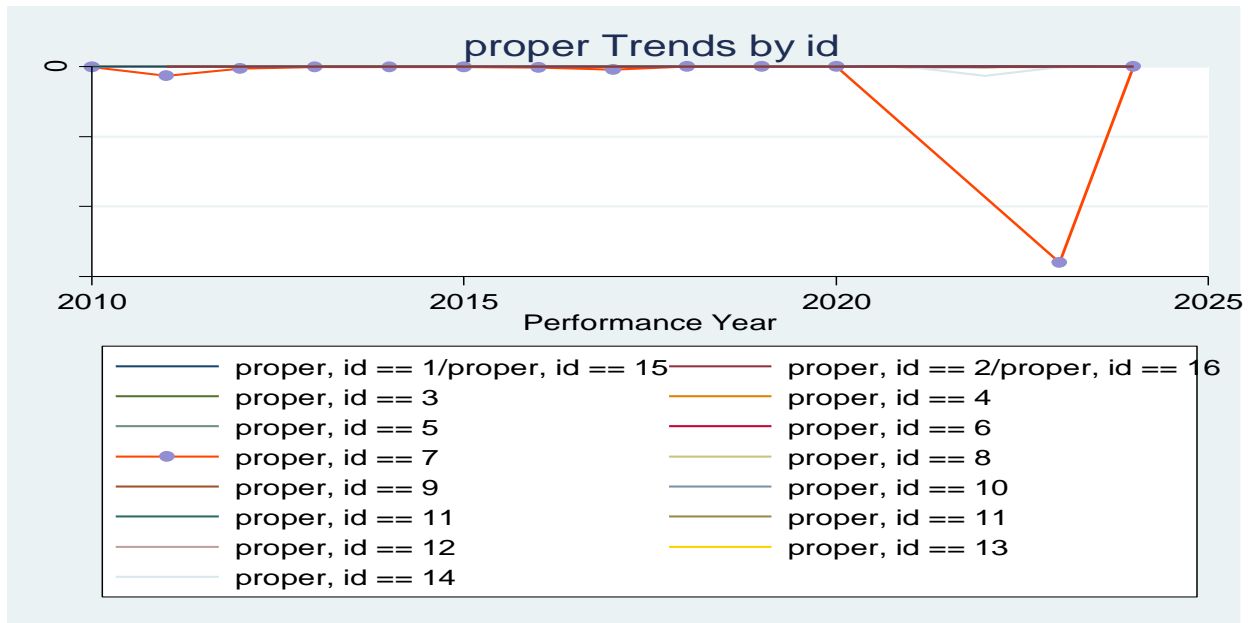
4.3.2. Interpretations of Profitability Trends Analysis

The interpretations of the results from the static panel data model are also part of this article. The model employed here is the panel trend analysis. It focused on the analysis of the second objective of this study which is forwarded as follows:

The panel data trend analysis mainly examined the average profitability performance movement for the last fifteen years (2010–2024), with one exception in figure 1, which is to show individual company profitability efficiency. The empirical results showed that there had been a significant but generally unstable or inconsistent profitability trend in EFFORT companies during the study period. However, profitability trends had been relatively stable or consistent for the years 2012–2020 except before and after these periods.

The profitability trend results in figures 1 and 2, which reveal that there were internal and external shocks in the time range of 2010 to 2011. The first case could be managerial and other resources' inefficiency and corruption, as stated in the five-year strategic plan of EFFORT survival and expansion (2012). Likewise, the external shocks like political disruptions beginning in 2016, the COVID-19 pandemic, and the destructive War on Tigray in the years 2020 and after were among the biggest ones. Next to a steady fall of trend in the years 2020-2023, a recovery path in profitability has been recorded during the postwar period.

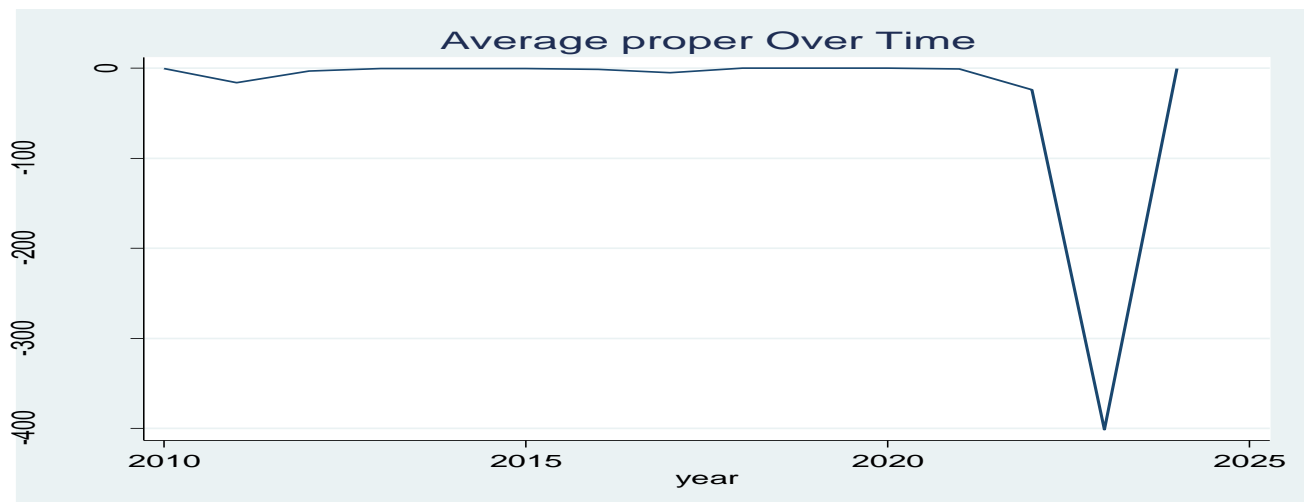
Figure 1: Raw Trends of Profitability Performance(proper) by id



Source: Researcher, 2025 [Explanation to Figure 1.doc](#)

NB: the dots placed on the upper boarder line of this figure represents performance years of 2010-2024, respectively.

Figure 2: Average Trend across Companies

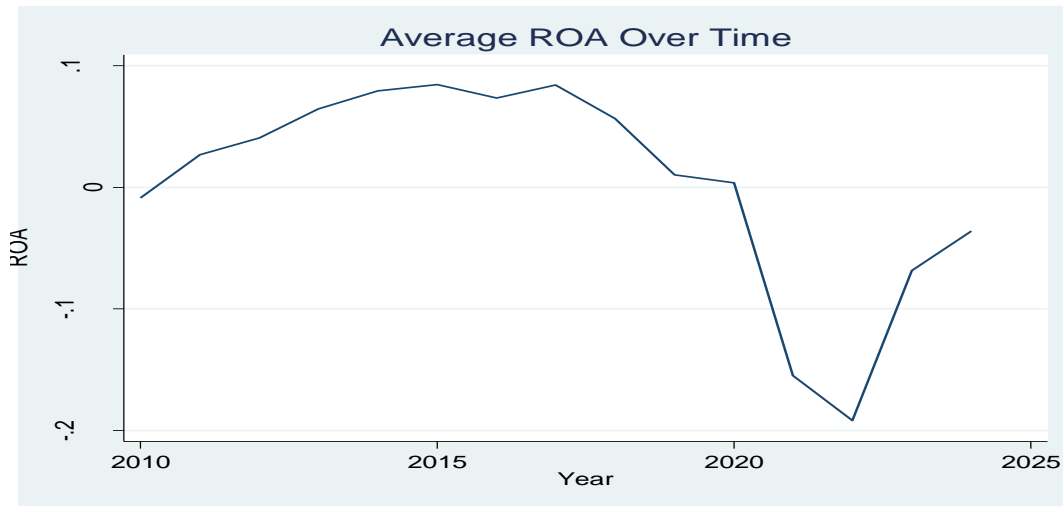


Source: Researcher, 2025

Figure 3 reports the profitability trend proxied by ROA as it had been rising up to the year 2014. Then, it gradually downturned in to its extreme loss from 2015 to 2023. This trend implies that the proportional rate of return on assets had been positively

contributing to profitability performance and then recorded a solid decline from 2016. Then, it recovered in the year 2024. Therefore, it had a fluctuating trend of return.

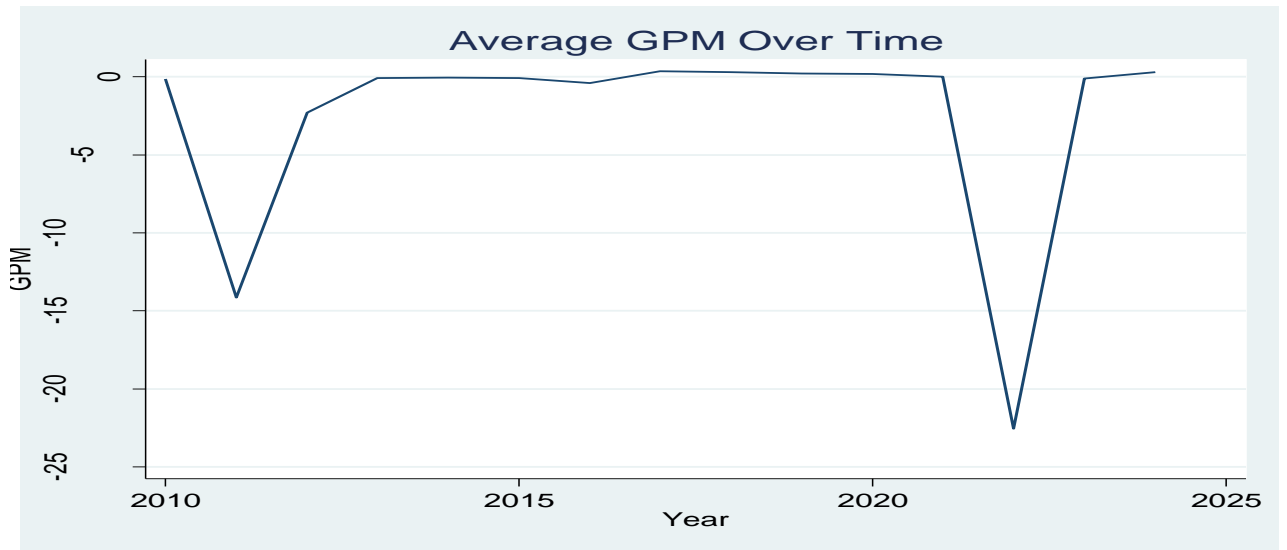
Figure 3: Proper Proxied by Average ROA over Time:



Source: Researcher, 2025

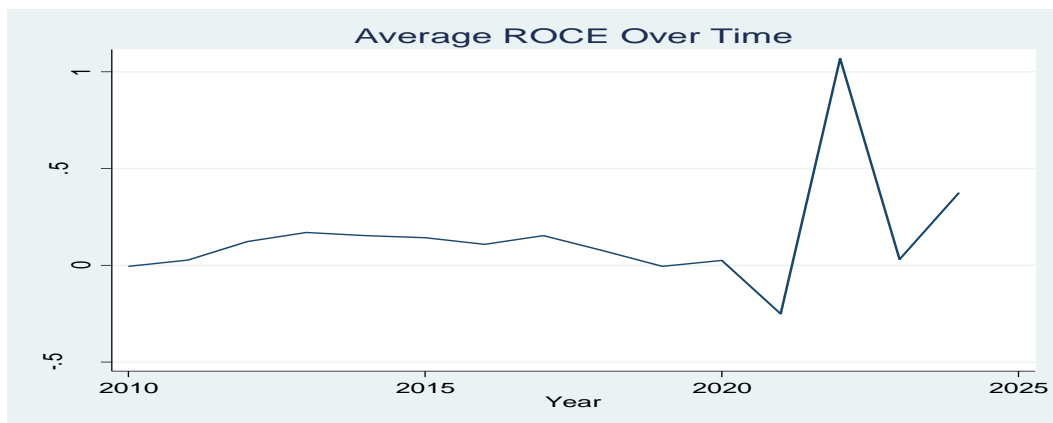
Then again, the trend analysis result on figure 4 is highly similar to the profitability trend observed on figures 2 and 6, in which all experienced two extreme losses before and after the relatively stable trend achieved from 2012 to 2020 for the same reasons stated above stated in paragraph 3. Likewise, the ROCE trend outcome in figure 5 indicated a different and reversed graphical shape of how the return on capital employed (ROCE) had been fluctuating from 2010 to 2024. The graph shows a generally steady ROCE trend, suggesting moderate and consistent capital efficiency to generate profits, with a significant drop around 2020 followed by a sharp peak of downturn and recovery in the years immediately after. Here, the reported upward shape after 2021 has the reverse meaning of insufficient capital due to external disruptions of the war crisis in the Tigrai region, except for the real recovery after 2023. The reversed trend path occurred due to that the total asset minus current liability result becomes negative, then loss divided by negative ROCE gives positive values. To sum up, there had been a significantly inconsistent profitability panel trend in the last 15 years of EFFORT companies' business operations.

Figure 4: Proper Proxied by Average GPM over Time:



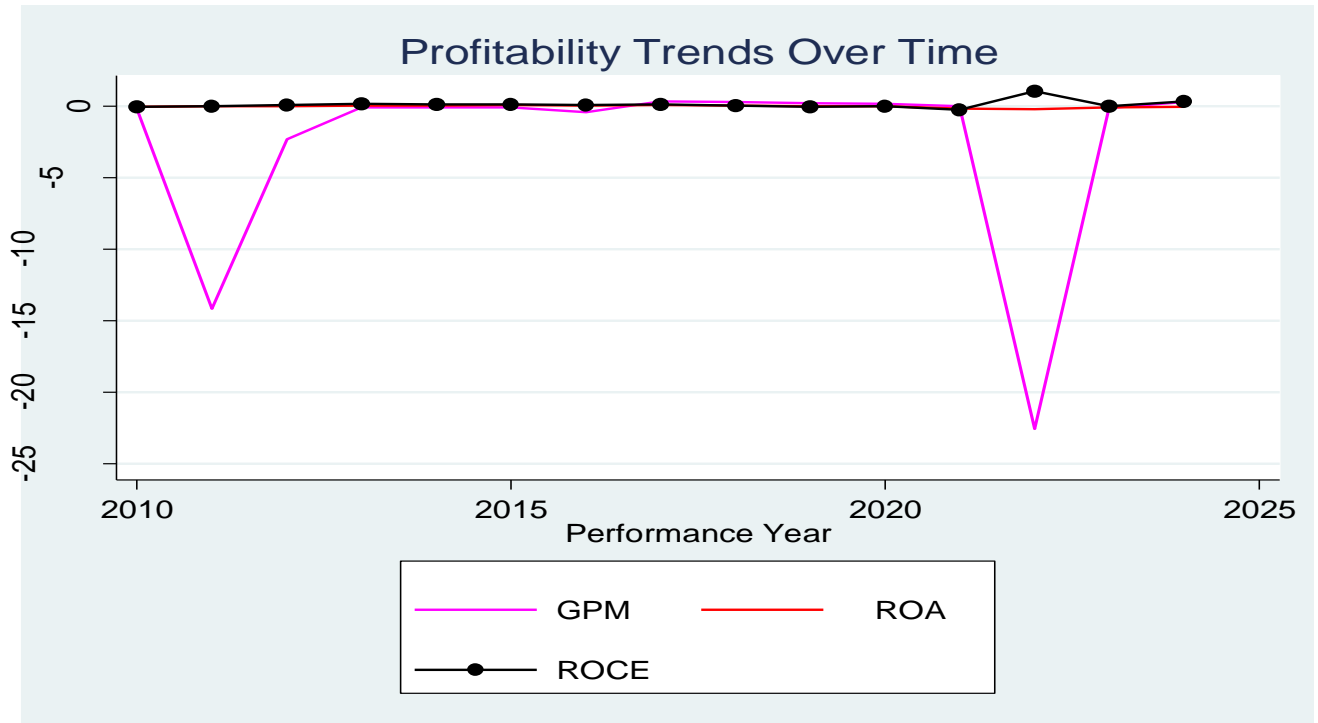
Source: Researcher, 2025

Figure 5: Proper Proxied by Average ROCE over Time:



Source: Researcher, 2025

Figure 6: Plotting Multiple Profitability Matrices



Source: Researcher, 2025

4.3.3. Intuitions of War Effect Estimation on Profitability

The basic econometric equation for the Difference-in-Differences (DiD) estimation to evaluate the effect of war exposure on company profitability can be expressed as:

$$Y_{it} = \alpha + B_1 Treat_{it} + B_2 Post_{it} + \delta(Treat_{it} \times Post_{it}) + \gamma X_{it} + \epsilon_{it},$$

where; Y_{it} is the profitability of company ii at time t , $Treat_{it}$ is a binary indicator that equals 1 if a company was exposed to war and 0 otherwise, $Post_{it}$ is also a binary indicator equal to 1 for the post-war period and 0 for the pre-war period, $Treat_i \times Post_t$ is the interaction term (average treatment effect) indicating war exposure after the war, capturing the causal effect, X_{it} are control variables accounting for other determinants of profitability and α is the intercept.

As a result, the interpretations of the results from the DID estimator of war exposure effects on profitability focusing on the estimation of the third objective of this study is shortly explained hereunder:

Table 11 reports the Difference-in-Difference (DID) model, the last but not the least, estimation of the effect of devastating war exposure on EFFORT companies' profitability. Profitability was measured as the ratio of net profit before tax to total sales, subsequently scaled into percentage points which resulted in a mean of -202.87) for simple interpretability (Wooldridge, 2010; Baltagi, 2021). The coefficient on the treatment effect (Treat x Post) is -213.71 proportional units ratio and statistically significant at 10% using the FE estimator that controls for the time-invariant unobserved heterogeneity. This empirical result indicated that companies located in the war-affected areas experienced, on average, a scaled 105.34 percentage-points reduction in profit margin relative to unaffected companies in the post-war period. Considering that typical profitability values in the dataset ranged from approximately -5606 to +10, this effect represents a substantial negative shift, consistent with large-scale financial losses induced by conflict, supporting the fourth hypothesis of a highly negative and significant war effect. This empirical result supports the findings of Mardini (2019), Siniver and Ruppin (2015), Collier and Duponchel (2013), and Oetzel and Getz (2012).

Table 11: Regression results of War effect on Profitability using DID Estimation

Proper	Coeff	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
ATE	-213.707	117.192	-1.82	.07	-444.819	17.405	*
Intercept	2.783	94.501	0.03	.977	-183.58	189.147	
Year Dummies are not reported							
Mean dependent var		-27.816	SD dependent var			371.902	
R-squared		0.087	Number of obs			228	
F-test		1.255	Prob > F			0.182	
Akaike crit. (AIC)		3336.125	Bayesian crit. (BIC)			3390.995	

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 12: Rescaling the DV for Simple Interpretability

Variable	Obs	Mean	Std. Dev.	Min	Max
Proper	29	-202.871	1040.31	-5605.96	10.147

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. Conclusions:

5.1.1. Summary of Key Points

EFFORT companies have been performing far below their optimal profitability. In order to respond for such a problem, this study examined how different factors affect profitability, its healthiness trends and the impact of war on 16 EFFORT companies in the Tigrai Region from 2010 to 2024. The descriptive statistics indicated that 25% of the companies experienced consistent loss, while 50% of them achieved modest profitability and that of 25% were relatively top performers.

This study employed mainly the panel data models, especially the step-by-step linear dynamic panel data model specification of the GMM estimator to examine factors affecting profitability, though system GMM is preferred, incorporating the role of the dependent variable's persistence effect on current profitability following a few recent studies in the literature. Having fulfilled the necessary testing procedures, the empirical results clearly indicated that lagged profitability, managerial efficiency, cost efficiency, working capital, and market competition affect EFFORT companies' profitability. In addition, using the static panel models of panel trends analysis and the DID estimation, EFFORT companies experienced a kind of mixed profitability trend path or inconsistency throughout the study period. Likewise, it was confirmed that the destructive conflict experienced in Tigrai revealed a significant and large negative shifting effect on companies in war-exposed areas compared to those that were not experienced to the extent of a 105.34 percentage point reduction in profitability.

The major factors determining EFFORT's profitability are managerial efficiency and cost efficiency. These variables' empirical results imply that EFFORT corporate had

been experiencing inefficiencies in human capital utilizations and costs of production as well as operational major activities, though managerial efficiency positively affects profitability. Because, the negative sign of cost efficiency implies managers and professionals of EFFORT corporate were not cost effective leaders. In comparison and in relative sense of argument, more efficient companies are more profitable than less efficient ones, which is also confirmed in the descriptive part analysis results. Therefore, EFFORT leadership in in all levels should give special attention to special trainings of human capital and focus on cost leadership strategies.

Similarly, working capital is an important determinant of profitability in EFFORT, though negatively affecting it. The -0.351 coefficient implies that a one-unit increase in the current ratio is associated with a 0.351 proportional unit ratio decline in profitability, other things being constant. Companies' leaders are overinvesting in current assets (cash, receivables, and stock). This improves short-term liquidity; however, it comes at the expense of returns. This validates the view that excessively high working capital indicating inefficiency in resource utilization and suggests a balanced approach is essential for maximizing profitability.

The final empirical result is market competition, which positively and significantly affects profitability. Integrating this result with that of the result of the profitability persistence coefficient of 0.4 in this study indicated the experience of modest market competition faced by the study companies in the industries they engaged in. Thus, EFFORT should focus on the contemporaneous economic and business efforts to maximize optimal profitability thereby strong competent in local and international markets.

In this research four different hypotheses were predicted in order to be checked against the findings of the specified models. The empirical results indicated that, first the F-statistics result in system GMM signposted that all control variables are jointly and strongly significant, favoring the first hypothesis, which in turn validated the LDPD model specification. Second, even though not as highly persistent as predicted, past memory of the outcome variable becomes strongly significant and has

a positive effect on DV, confirming a moderately persistent role in current profitability. Third, the neoclassical assumption of equal managerial efficiency and efforts among companies was challenged, as companies in this research have different results both at the descriptive statistics (different median values of managerial efficiency) and panel data trend analysis stages. These companies also experienced an inconsistent profitability trend path throughout the study period. Thus, both results endorsed the third hypothesized theory. Fourth, the intensive war experienced in Tigray had also a negative shift and significant effect on profitability, which confirmed the fourth hypothesis.

Finally, the empirical results provided certain important understandings of the factors that determine the profitability and role of persistence theory. They also gave insights into the healthiness of the outcome variable's trend and the war exposure effect. The findings from the panel data models are convenient for particular reasons, especially in the first and second objectives' results of this study. Therefore, these insightful findings addressed the reasons why EFFORT companies have been performing below attainable capacities, as they are specified as internal shocks of inefficiencies in the main resources utilizations, cost management and less focus on building industry culture based work behavior mindset on employees; and external shocks of war, market competition pressure as well as unnecessary political interventions. However, there is some limitation in the third objective estimation. During data collection on war exposure, all control variables' data were not accessible, therefore, it needs further study in a comprehensive way. In addition, employing the latent class of stochastic frontier analysis could give specific insights on resource utilization efficiency, following the literature of Bolarinwa et al. (2021). Future studies should investigate these issues using a wide-ranging approach.

5.1.2. Summarized Contributions

There is a large literature concerning the study variable at the international level in the developed world; however, there are limited works in Africa and other less developed continents, especially in the study area of similar industries where EFFORT companies have engaged.

The present study have created clarity in the use of the step-by-step linear dynamic panel data (LDPD) model analysis in case of clear modeling and usage based on the specifications developed by known authors. This study gave also attention to the research gaps of extant literature, as stated in the problem statement in which some of them are the misuse of analysis methods of OLS regression for dynamic models, area-specific profitability study results, and ignoring policy implications of persistence theory. Therefore, this research has achieved some influence in the study area. First, this study has shown clear usage of the step-by-step LDPD model of analysis. Second, it selected the most relatively efficient estimator (the SGMM) and threw out the possible intuitions based on the selected estimator rather than giving mixed interpretations as the extant ones did. Third, the profitability persistence theory and its policy implications are clearly stated in this paper, but the existing studies ignored it by only indicating its existence, without stating the degree of persistence and implications. Fourth, the use of profit margins as cost measures and the use of static panel data trend analysis to investigate performance healthiness make this paper a little bit inimitable and interesting in areas of industries similar to EFFORT companies' business engagements, as the previous studies mainly focus on descriptive statistics methods. Furthermore, the war effect estimation result indicated clues for future detailed study. Last but not least, this paper has drawn both informative and convenient empirical results to be used as an input for decision makers of EFFORT companies, other investors, and researchers. Therefore, this research has achieved insightful findings that addressed the reasons why EFFORT companies have been performing below attainable capacities, as they are identified as internal shocks of inefficiencies in the main resources utilizations, cost

management and less focus on building industry culture based work behavior; and external shocks of war, market competition pressure as well as unnecessary political interventions.

5.2 Recommendations

From the integrated results on the competition variable, a few of the policy implications are needed to be forwarded as follows. EFFORT should focus on maximizing innovation efficiency and productivity by relocating resources to more productive performers. Besides, as current profitability performance largely depends on contemporaneous capacities and efforts, leaders need to give attention to continuous reforms like freeing these companies from political intervention, letting them focus on business agendas only, and thereby improving the unhealthy profitability performance trend.

In addition, making strategic decisions through merging, closing, and making reinvestments based on business appraisals are among the foresight policies (Ball, R. et al., (2015). Especially, the consistently low-performing 25% of EFFORT companies should become an urgent part of future reforms. It is also proved that EFFORT companies collectively have moderate recovery pace or adjustments from both internal and external shocks, implying that they can rebuild back in short time periods for the median and above-performing companies and medium time periods for those 25% of below-median profitability performers to their, from consistent loss and the war exposure damages.

It is also advised that the leaders at EFFORT and the company level should be more far-sighted in using human capital and other major resource utilization to achieve higher profitability. To realize these, the EFFORT management and the board leadership bodies have to pay more attention to special training of managerial staff on the latest cost-efficient techniques. Adding to this, they should introduce a strong cost leadership policy and strategy in all business activities in order to minimize costs, thereby maximizing profit and profitability. More decisively, modern and

comprehensive performance measurement standards focusing on productivity and efficiency in designing, implementation, and continuous evaluations against these standards should become a very urgent strategic concern for all human and non-human resource utilizations. Because these companies haven't introduced such standards except for some trials, working on them could significantly shift the current profitability status.

The negative effect of working capital on profitability is consistent with the argument that excessive quick working capital results in idle resources, higher carrying and financing costs, and weaker asset turnover, suppressing profitability. This improves short-term liquidity risk; however, it comes at the expense of current time returns. Therefore, the policy implication is that companies should strike a balance. That is, maintaining enough working capital to meet obligations but avoiding excessive buildup that eats away profitability. And a detailed study on quick working capital solvency in both local and international currency supply should be done to identify short- and long-term options to be taken. Finally, in the future, studies should extend to the standardization of operational performance in EFFORT companies.

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Appendices:

Appendix 1: The MCAR Test:

- `mcartest Meff Coeffr_ce Cage Capint Cgr Liq Wcl Comp Econgr`

* Results in:
Little's MCAR test
Number of obs = 240
Chi-square distance = 318.8898
Degrees of freedom = 42
Prob > chi-square = 0.0000

Appendix 2: Testing for MAR (Missing At Random)

In order to test the significant `r/ship` with `'missing_Meff'(=x1)` using the logistic regression:

```
. asdoc logit missing_Meff Cage Econgr, robust dec(3) save(MCARtest.trf) replace
(File MCARtest.trf already exists, option append was assumed)
```

```
Iteration 0: log pseudolikelihood = -35.074739
Iteration 1: log pseudolikelihood = -31.250996
Iteration 2: log pseudolikelihood = -30.08598
Iteration 3: log pseudolikelihood = -30.065689
Iteration 4: log pseudolikelihood = -30.065667
Iteration 5: log pseudolikelihood = -30.065667
```

```
Logistic regression                Number of obs   =       240
                                Wald chi2(2)    =       14.96
                                Prob > chi2        =       0.0006
Log pseudolikelihood = -30.065667 Pseudo R2      =       0.1428
```

missing_Meff	Robust					[95% Conf. Interval]	
	Coef.	Std. Err.	z	P> z			
Cage	-4.911027	2.269392	-2.16	0.030	-9.358953	-.4631002	
Econgr	-.7378476	.2421141	-3.05	0.002	-1.212382	-.2633127	
_cons	8.268477	3.232844	2.56	0.011	1.932218	14.60474	

Appendix 3: Testing Result of Missingness Percentage Level

Variable	Missing	Total	Percent
id	0	240	0.000
year	0	240	0.000
proper	12	240	5.000
Meff	8	240	3.330
Coeffr_ce	15	240	6.250
Cage	0	240	0.000
Capint	14	240	5.830
Cgr	12	240	9.170
Liq	8	240	3.330
Wcl	8	240	3.330
Comp	19	240	7.920
Econgr	0	240	0.000
Tdv	0	240	0.000
Potv	0	240	0.000
ATE	0	240	0.000
GPM	12	240	5.000
ROA	8	240	3.330
ROCE	8	240	3.330
proper_lag1	26	240	10.830
GPM_lag1	26	240	10.830
ROA_lag1	22	240	9.170
ROCE_lag1	22	240	9.170
Comp_resid	25	240	14.580

Average Missing Values Percentage Level = 4.44%

Appendix 4: Multicollinearity Tests

- We need to manage the correlation with competition variable either by dropping, combining or by residualization. However, the last option is the best of all options to manage or deal with the high VIF and perfect collinearity problems in order to save data loss and omitted variable biasness.

```
. pwcorr proper proper_lag1 Comp_resid Coeffr_ce, star(0.05) sig
```

	proper	proper~1	Comp_r~d	Coeffr~e
proper	1.0000			
proper_lag1	-0.0013 0.9853	1.0000		
Comp_resid	0.0003 0.9961	0.0000 1.0000	1.0000	
Coeffr_ce	-0.9984* 0.0000	0.0016 0.9813	0.0000 1.0000	1.0000

However, after residualizing comp as comp_resid it looks like;

Variance inflation factor

Variables	VIF	1/VIF
Capint	3.85	.26
Coeffr ce	3.505	.285
Econgr	1.701	.588
Cage	1.396	.716
Meff	1.31	.763
Liq	1.238	.807
Wcl	1.211	.826
Comp resid	1.187	.842
Cgr	1.05	.953
proper lag1	1.024	.977
Mean VIF	1.747	.

Appendix 5: Comparison of the step-by-step- analysis of Profitability

S.no	Comparison Coefficient of	Proper L1	Remark
1	α in OLS	0.387***	Upper Limits (UL)
2	α in FE	0.281***	Lower Limits (LL)
3	α in DGMM	0.356** -This is moderately close to the upper limit	DGMM Lies in the credible range – between FE & OLS. However seems less efficient than SGMM using consistent model specification and instrumenting with the SGMM.
	α in SGMM	0.383*** -This is close to the upper limit more than that of DGMM estimator.	SGMM estimator’s result for the LDV lies in the credible range – between FE & OLS. This is more efficient than DGMM using consistent model specification and instrumenting with the DGMM, due to the LDV coefficient improvement and additional control variables’ significance gains.
	Explanation	- DGMM > FE, moderately close to POLS which is upward biased. - SGMM > FE, very close to POLS- upward biased theoretically & empirically.	There are more benefits from using the System GMM based on LDV Coeff improvement and significance of two more variables. This confirmed the theoretical and empirical recommendations by Blundell-Bond (1998) and Roodman (2009).
4	Decision to go with	DGMM and SGMM estimators tested as an appropriate estimators. However, it is confirmed that the SGMM estimator is more efficient, so that preferred for final result interpretations according to the theories and empirics stated above.	

NB: *= sig at $p < 0.10$ level, **= sig at 0.05 level, ***= sig at 0.01 level.