Memorandum of Understanding and firm performance: A performance assessment of MoU adopted public sector enterprises in India

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SUMMARY: The unsatisfactory performance of public sector made the Government introduce Memorandum of understanding and disinvestment. This study has been undertaken to analyze the performance of memorandum of understanding signed firms over the years. In addition, the performance of MoU-signed disinvested and MoU-signed non-disinvested firms have also been examined. Performance has been analysed using different ratios; return on equity, return on assets, net income productivity per employee and sales productivity per employee. In-line to analyze the effectiveness of data, random effect panel regression has been used to study the performance of sixty MoU signed PSEs for 15 years (2004-2018). The results indicate that the profitability of MoU signed non-disinvested firms is better than MoU signed disinvested firms. This could be possibly due to the more substantial managerial autonomy impact on the performance. Assets turnover ratio, leverage, and age have a significant effect on the performance of firms.

KEYWORDS: Memorandum of understanding; Disinvestment; Performance contract; Economic reforms; Financial performance
JEL-CODES: L25, E60, L32, G38
DOI: https://doi.org/10.35551/PFQ_2024_2_5

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1. Introduction

Public sector enterprises (PSEs) play a significant role in the economy of a country. It contributes to the GDP, generates employment, provides input support, and bridges deficit. The fact that Indian PSEs[3] were performing well in terms of delivering social profits, however, failed to generate enough profits for the organization (Trivedi, 1989; Mishra *et al.,* 2014; Kumar, 2018). PSEs provide social—cost benefits, not profit. However, earning profits should also be the priority. Unsatisfactory performance of PSEs led the Government to develop two significant economic policies for public sector enterprises; Memorandum of understanding and disinvestment.

MoU[4] is a negotiated document signed between the management of the enterprises and the administrative Ministry to specify the task PSEs are to achieve annually. In 1960s, the French Government, had introduced this concept to provide more operational autonomy and increased accountability to the enterprises (Mishra *et al.,* 2014). Gradually, countries like Bangladesh, China, Korea, Pakistan, Sri Lanka, Ghana, and India have adopted this system. Disinvestment implies dilution of state ownership in the enterprise. Whereas, non-disinvested PSEs are those firms where the ownership of government is 100%.

MoU was initially introduced as a performance management system, but it has gone through several changes over the years such as equal weightage to both financial and non-financial indicators, stronger institutional structure, more focus on corporate governance parameters etc. (Sarkar and Mishra, 2013; Kumar, 2018). A council was set up, National Council of Applied Economic Research (NCAER)[5] (2004), revamped the Memorandum of Understanding for public sector enterprises.

NCAER recommended focusing equally on both financial and non-financial indicators, giving equal weightage to both the indicators. In addition to this, the disinvestment process was also introduced to generate commercial and operational vitality in the PSEs. Further, some of the disinvested-PSEs, have also signed. MoU. Moreover, there is an increasing focus of Government on disinvesting the PSEs, and at the same time, it is seen that a large number of PSEs are voluntarily adopting the agreement. Therefore, a need has been realized to determine whether disinvestment and MoU have together enhanced the performance or only MoU has impacted the performance of PSEs.

3 Public Sector Enterprises (PSEs) – The organisations owned and managed by the government are known as Public Sector Enterprises or Public Sector Undertakings. It can be held either by the Central Government or one state government

4 Memorandum of Understanding (MoU) can be defined as a negotiated document signed between the Government (represented by the administrative Ministry) and the company for set targets to be achieved at the end of the year.

5 National council of Applied Economic Research (NCAER)- It was established in 1956, it is India's oldest and largest independent, non-profit, economic policy research institute and it was assigned the task in 2003-04 to revamp the MoU system followed in public sector enterprises

The performance of PSEs is not solely driven by firm-specific factors, external and internal factors both influence the performance. Internal factors include leverage, age, firm size. Whereas, external factors comprise of political environment, government policies, stable financial institution, this shapes the business conditions affecting the organization performance (Jain, 2017, 2021). Huang and Yuan (2016) found that corruption prevails in the PSEs, which disrupts the innovation spending via two channels the cultural effect and disincentive effect. In addition, firm makes several decisions include financial, operating and investing, which are usually dependent on the macroeconomic conditions. Egbunike (2018) argued that the stability of the economy such as inflation rates, exchange rates, expenditure level, interest rates among others usually impacts the performance of the organization. Lemma and Negash (2013) found that macroeconomic variables varied from industry to industry in Nigeria.

The majority of the studies conducted in India related to MoU have favored that it leads to improvement in MoU signed PSEs (Gupta *et al.,* 2011; Mishra and Sarkar, 2013; Jain *et al.,* 2014). However, the literature on MoU is mostly limited to conceptual papers and is scarce in empirical studies. Therefore, this is the first study that analyses the financial and operating performance of MoU signed disinvested and non-disinvested PSEs for 15 years.

The present study aims to determine the financial and operating performance of MoU-adoptedPSEs over fifteen years. Therefore, the performance of MoU signed non-disinvested PSEs[6] and MoU signed disinvested PSEs[7] has been analyzed to understand the policy decision impact. The paper has been divided into five sections, including this section. Section 2 deals with the literature review conducted at national and international level. Section 3 describes the method, followed by results and analysis in section 4. Conclusion of the study is presented in the last section.

1.1. Objectives of the study

Following are the objectives of this study:

1. To assess the performance of MoU signed over a period of study.
2. To examine the performance of MoU-signed disinvested and MoU-signed non-disinvested PSEs during the period of study.

6 MoU signed non-disinvested PSEs are those firms, that have signed the performance contracts with the government and these firms have not been disinvested.

7 MoU signed non-disinvested PSEs are those firms, that have signed the performance contracts as well as these firms have also been disinvested. Disinvested firms are those firms where the state government has diluted its state ownership.

1.2 Hypotheses

On the basis of the arguments given, the following alternative hypothesizes are formed:
H_1 : There is an impact on the profitability for MOU signed non-disinvested PSEs.
H_2 : There is an impact on operating efficiency for MOU signed non-disinvested PSEs.
H_3 : There is an impact on the profitability for MOU adopted disinvested PSEs.
H_4 : There is an impact on operating efficiency for MOU adopted disinvested PSEs.

2. Literature Review

Table 1: Studies related to Memorandum of Understanding and firm performance

Authors	Years	Findings
Awan et. al.	2020	MoU impacted employee's performance
Melo	2020	Performance contracts is merely on the papers in Portugal. Not fully adopted
Kumar	2018	MoU is relevant
Sahlin and Angelis	2019	Weak correlation between performance contract and dynamics
Dooren and Hoffman	2018	Positive correlation between legal requirements and MoU adoption
Bhardwaj	2016	Enhanced performance
Miana	2015	Transparency and fairness etc. stimulate MoU
Chibber and Gupta	2018	Improved performance of MoU adopted PSEs
Mishra et al.	2015	Found benchmarks are essential for MoU
Gunasekar and Sarkar	2014	Significant positive impact on RoA
Jain et. al.	2014	MoU enhanced top and bottom-line efficiency
Sarkar and Mishra	2013	Inefficient system of PSEs affects performance
Gupta et. al.	2011	Better performance of MoU signed PSEs than non-MoU signed PSEs
Mathur	2010	Found SoEs weak performance
McCrimmon and Fanning	2010	MoU works on principal-agency theory
Sean	2009	Observed that work plan management, skill development, performance monitoring, and performance reward are four primary steps
Plasman	2008	MoU ensured autonomy

Authors	Years	Findings
Kaur	2005	Suggested PSEs should be evaluated on a 1 to 5 scale
Lixin	2005	Difficult to implement MoU in practice
Sangeeta	2005	Improved performance of MoU signed firms
NCAER	2004	Equal weightage to financial and non-financial indicators
Sengupta	2002	Proposed PSEs be evaluated on their overall results
Naik	2001	Rising rivalry of domestic and foreign market players
Rooland and Sekkat	2000	Managerial labor markets motivates managers
Byrd	1991	MoU strengthens and legitimize manager's roles
Trivedi	1991	MoU is technocratic and realistic approach
Murthy	1990	MoU combination of favorable and unfavorable aspects
Trivedi and Gopal	1990	Suggested composite score

Property rights and agency theorists Alchian (1977); Di (1987); Levy (1987) argued that the primary reason for inefficiency in the public sector enterprises is the ownership structure, the presence of private ownership is beneficial for the organization and advocated disinvestment. On the other hand, other researchers opined that environmental imperfection or distortion such as lack of competition, lack of autonomy, and no incentive to managers are some of the imperfections that lead to the underperformance of PSEs, not ownership structure. Going by the latter arguments, MoU (performance contracts) is a solution to the environment imperfections (Gunasekar and Sarkar 2014).

MoU was designed to help companies better concentrate their efforts and maximize the value they can provide to their shareholders (Trivedi,1991). Mishra et al. (2015) asserted that establishing benchmarks for Indian and international companies to compare their performance is essential for implementing the Memorandum of Understanding (MoU) system. Gunasekar and Sarkar (2014) examined the impact of managerial autonomy measured by performance contracts on the performance of public sector enterprises during a period of 1981-2011 using regression analysis. Byrd (1991) stated that the fundamental advantage of performance contracts over traditional government oversight is that they strengthen and legitimize factory managers' roles.

The study by Chibber and Gupta (2018) recommended that Government should aggressively follow strategic disinvestment, the funds raised through disinvestment and liquidation should be reinvested in public infrastructure through National investment fund. Jain (2016) studied the technical efficiency of PSEs by applying stochastic frontier analysis. The study's major contribution is that the political ideology of the Government plays a great role on the performance and disinvestment decisions of PSEs. Gupta *et al.,* (2011) reported that partial privatization did not lead to have a positive impact on the profitability, efficiency, and productivity parameters.

The reasons attributed to the bureaucracy, government interference and low level of disinvestment.

Compelling forces such as the high fiscal deficit, increasing number of sick units and competing forces include a high level of competition, focus on efficiency enhancement, transparency affect the disinvestment decision (Phukon and Gakhar, 2020). Further, Singh (2015) opined that disinvestment can increase efficiency through optimal utilization of resources, but negligent privatization decisions can be negative for the firms.

A study by Venkastasan (2008) showed MoU system is now more focused on 'business performance appraisal'. On the other hand, Xu (2005) argued that it is actually challenging to implement real autonomy in practice due to attenuation of property rights. Plasman (2008); Maes (2008) opined that cooperation and involvement of PSEs while setting the annual targets is necessary for successful implementation of MoU.

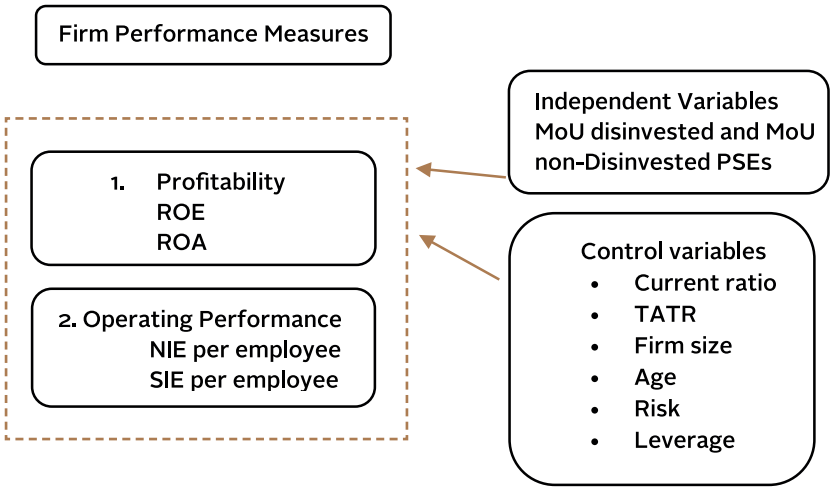
Studies by Nagaraj (2005); Kousadikar (2013); Porter (2015) stated that privatization does not lead to performance improvement. Researchers argued that it's not due to the inherent inefficiency of PSEs. But, privatization comes with a certain cost such as price level shot up, an artificial shortage of resources, employee reduction, lack of social security, and corporate social responsibility. Phukon and Gakhar (2020) argued that merely privatization can't bring the performance improvement, unless accompanied by intuitional and structural changes. Privatization gains should not be taken for granted. Wu (2007) identified three institutional arrangements affect the post-privatization performance; market openness, government support, corporate reforms undertaken before privatization. Malema and Kaelo (2013) argued privatization policy could be harmful in nations where unemployment and poverty are prevalent. Chakrabarti & Mondal, 2017 argued that repeated disinvestments appear to harm SOE performance. Therefore, it has been suggested that rightful ownership, management, and corporate structures be used to improve privatization performance. These methods can minimize a variety of agency issues in poor governance.

Van (2018); Melo (2020) revealed that the Portuguese public sector firms prepared and reported performance data due to the mandatory requirement of laws, not because the management wants to bring in the sense of learning and improvement. Sahlin and Angelis (2019) found a correlation between performance measuring systems and dynamics. Awan et al. (2020) showed that performance management systems and work engagement substantially impacted employees' task and contextual performance. As a mediator between PMSE and performance (task and context performance), employee job engagement was also supported. MOU ensures autonomy in the working of PSEs and hence managing the enterprise's performance (Plasman, 2008).

3. Methods

The study has considered a sample of 60 PSEs to analyze the performance of MoU adopted PSEs based on the benchmark year 2003-04. Since the major NCAER recommendations were introduced in that year to revamp and strengthen the MoU system. Based on this, initially, 91 PSEs out of 226 had signed MoU (MoU report 2003-04). However, only 60 PSEs have been continuously signing the MoU till 2017-18 since NCAER recommendations. These 60 MoU-adopted PSEs have further been bifurcated as 38 MoU -signed non-disinvested and 22 MoU-signed disinvested PSEs. Continuously signing means that these PSEs have not dropped performance contracts in between and they have been continuously rated for their performance every year since 2003-04. The study is based on secondary data and has been collected from the capital line database, annual reports of PSEs, and the department of investment and public asset management. The panel data approach has been used to analyze the performance from the period 2004 to 2018. STATA 14 software is considered for analyzingthe data.

Figure 1: Research framework



Source: Author's compilation

3.1 Variables used

Table 1: Variables used in the study and the measuring values and proxies used for measuring each of these variables.

Variables	Formulas	References
Profitability		
Return on assets	EBIT/average total assets *100	D'souza and Megginson, 1999, Boubkari (1997) et al , Gupta (2005), Ghosh (2008)
Malatesta (2001), Homaidi et al. (2021).	PAT/average shareholder's fund*100	D'souza and Megginson, 1999, Boubkari (1997) et al , Gupta (2005), Ghosh (2008), Tan (2020), Chhabra et al. (2021)
Operating efficiency		
Sales efficiency per employee	Net sales/no. of employees	Gupta (2011), Mandiratta and Bhalla (2017)
Net income efficiency per employee	Net income/no. of employees	Ghosh (2008), Mukherjee et al. (2021)
Assets turnover ratio		
Total assets turnover ratio	Average net sales/ average total assets	Gitman, 2009
MoU	1- MoU signed non-disinvested PSEs 0- MoU signed disinvested PSEs	Gunasekar (2014), Chibber and Gupta (2018)
Liquidity	Current assets/current liabilities	Sur and Jafar (2006), Breuer et al. (2012), Pathak (2019)
Firm size	Log of total assets	Estami et al (2010), Alipour (2012)
Age	Years of study-incorporation of firm	Tran (2007), Mandiratta and Bhalla (2020)
Risk	Standard deviation of ROA	Alipour, 2013
leverage	total debt/total equity	Nagaraj (1997), Gupta (2011)
Sector	0- Service sector, 1-manufacturing sector	Hallara (2012)

Source: Author's compilation

3.2 Regression equations

Objective 1
Profitability (ROE, ROA)it = αit + β1 CRiit+ β2 TATRit + β3 Firm sizeit + β4 Ageit + β5 Riskit+ β6 leverage it + β7 Sectorit ξit (Model 1 and 2)
Operating efficiency (SIE ,NIE) = αit + β1 CRiit+ β2 TATRit + β3 Firm sizeit + β4 Ageit + β5 Riskit+ β6 leverage it + β7 Sectorit ξit (Model 3 and 4)

Objective 2
Profitability (ROE, ROA)it = αit + β1Dummyit + β2 CRit+ β3 TATRit + β4 Firm sizeit + β5 Ageit + β6 Riskit+ β7 leverage it ξit (Model 5 and 6)
Operating efficiency (SIE, NIE) = αit + β1Dummyit + β2 CR it + β3 TATRit + β4 Firm sizeit + β5 Ageit + β6 Riskit + β7 leverage it ξit (Model 7 and 8)
Where Return on Equity (ROE) and Return on Assets (ROA), Sales Efficiency per Employee (SIE), and Net income Efficiency per Employee (NIE) arethe dependent variables, is the constant term, and 1 to 5 are the coefficients determined for firms (1, 2.....60) calculated over the T period(1,2.....15). ξ stands for the error term.

4. Results and Discussion

This section pertains to the financial and operating performance of MoU signed PSEs in India. The descriptive statistics, correlation matrix various diagnostic tests, and data analysis have been discussed.

4.1 Descriptive statistics

Table 2 depicts the summary statistics of variables considered for the study from 2005-2018 for MoU signed PSEs. The mean value of dependent variables ROE, ROA, net income efficiency and sales efficiency are 19.71,16.86 1.793 and 1.881. ROA has the highest mean (19.71) among all the dependent variables. Risk has the highest mean among the explanatory variables that is 10.141 over the period considered for the study. In addition, the variable age reports that the maximum age of the PSE is 90 for the period considered.

Table 2: Descriptive statistics for MoU signed PSEs for the period 2004 to 2018

Variables	Observations	Mean	Std. Dev.	Min	Max
ROE	900	19.71	17.márc	-2.9	80.28
ROA	900	16.86	18.59	-1.481	szept.75
NIE per employee	900	1.793	0.29	-8.86	35.67

Variables	Observations	Mean	Std. Dev.	Min	Max
SIE per employee	900	1.881	0.06	0.524	05.aug
Leverage	900	22.jan	0.89	1.035	52.85
TATR	900	1.198	07.febr	4.624	9.064
CR	900	0.143	1.51	0.355	9.76
Firm size	900	1.637	3 .90	1.61	3.51
Risk	900	10.141	08.szept	1.69	17.89
Age	900	3.120	2.44	18	90

Note: We have excluded MoU and sector variables, as these are dummy variables

Table : VIF

Variables	VIF	1/VIF
ROE	2.35	0.2935
ROA	11.febr	0.3122
SIE per employee	12.márc	0.6437
NIE	01.febr	0.6402
CR	11.febr	0.224
TATR	01.márc	0.7121
SIZE	21.márc	0.7341
RISK	11.márc	0.6161
AGE	22.jan	0.2042
MEAN	20.febr	

4.3 Autocorrelation

To see if there is any serial correlation in the data, the researcher has used the Wooldridge test. As it can be seen in the table 3 that the value of χ^2 comes out to be insignificant in all the eight models, it confirms the presence of first-order autocorrelation in the data (Drukker, 2003)

Table 3: Results for autocorrelation using Wooldridge Test for partially MoU-Signed PSEs

Models	Chi-square	P-value	Findings
Model 1	12.477	0.001	Presence of first-order autocorrelation
Model 2	23.877	0.001	Presence of first-order autocorrelation
Model 3	14.júl	0.003	Presence of first-order autocorrelation
Model 4	6.377	0.002	Presence of first-order autocorrelation
Model 5	11.077	0.002	Presence of first-order autocorrelation
Model 6	21.521	0.001	Presence of first-order autocorrelation
Model 7	13.21	0.002	Presence of first-order autocorrelation
Model 8	5.213	0.001	Presence of first-order autocorrelation

Notes: Ho- no first-order autocorrelation

Source: Author's Calculations (STATA 14)

3.4. Heteroscedasticity

The Breusch-Pagan test has been applied to check the presence of heteroscedasticity in the study. The results confirm the presence of heteroscedasticity in the data as the p-value is significant, alternate hypothesis is accepted (Table 4).

Table 4 : Results of Heteroscedasticity using Breusch- Pagan Test for MoU-signed PSEs

Models	Chi-square	P-value	Findings
Model 1	312.11	0.00	Presence of heteroscedasticity
Model 2	484.28	0.00	Presence of heteroscedasticity
Model 3	894.51	0.00	Presence of heteroscedasticity
Model 4	731.5	0.00	Presence of heteroscedasticity
Model 5	301.21	0.00	Presence of heteroscedasticity
Model 6	432.55	0.00	Presence of heteroscedasticity
Model 7	798.21	0.00	Presence of heteroscedasticity
Model 8	760.01	0.00	Presence of heteroscedasticity

Notes: Ho- Constant variance, Ha- fitted values of dependent variables

Source: Author's Calculations (STATA 14)

To solve this problem, robust regression results are shown .The dynamic panel regression model provides robust standard error estimates and controls the heteroskedastic distortions (Hoechle, 2007).

3.5 Hausman test statistics

This section presents the results of GLS dynamic model to study the performance of MoU signed PSEs. Chi-square statistics results are shown in table 5, which shows that the appropriate model is random effect model since the χ^2 comes out to be insignificant in all the eight models.

Table 5: Hausman test statistics for MoU-signed PSEs

Models	$\chi 2$	P-value	Appropriate Model
Model 1	4.51	0.212	Prob≤ $\chi 2$ Random effect model
Model 2	3.52	0.132	Prob≤ $\chi 2$ Random effect model
Model 3	2.81	0.312	Prob≤ $\chi 2$ Random effect model
Model 4	1.52	0.435	Prob≤ $\chi 2$ Random effect model
Model 5	3.31	0.172	Prob≤ $\chi 2$ Random effect model
Model 6	3.01	0.150	Prob≤ $\chi 2$ Random effect model
Model 7	2.51	0.281	Prob≤ $\chi 2$ Random effect model
Model 8	1.35	0.131	Prob≤ $\chi 2$ Random effect model

4.6 Panel Regression analysis of MoU signed non-disinvested PSEs

In this section, the performance of MoU-signed non-disinvested PSEs has been assessed for the sample data. Table 6 reports the results related to the profitability of MoU-signed non-disinvested PSEs. The relationship between the firm's specific variables in relation to return on equity has been discussed. The results indicate an improvement in the profitability position of MoU-signed non-disinvested PSEs since the adoption.

Further, the results reported that the current ratio, TATR, firm size, age, and risk positively impact ROE. It states higher the firm size and age of the firms, higher will be the ROE of MoU-signed enterprises. Further, the negative coefficient value (-0.022) of leverage shows that one unit change will lead to a -0.022 change in return on equity. It indicates there is a decrease in the average share of government loans and subsidies to total borrowings of MoU-signed PSEs. The reason for this can be attributed that there is another door for raising equity capital through initial public offerings, which leads to less dependence on Government for providing debt (D'souza and Megginson, 1999; Malatesta, 2001).

Similarly, the beta value shown by sector is 0.041 and significant at 5 percent (Gupta, 2005). Increase in current ratio, and TATR also positively contribute to

the ROE of these enterprises. In-fact CR, TATR. Firm size and risk are found to be statistically significant.

TATR has a significant and positive relation with ROE, with a beta coefficient equal to 0.033, and the P-value is significant at 10 percent. It reveals the MoU signed firm is efficiently utilizing its total assets in generating sales. High sales volume positively affects the profitability of firms. Firm size and risk also positively affect the return on equity with beta coefficients equal to 0.005 and 0.010, significant at 1% and 5%, respectively. The results are consistent with other previous researchers, which stipulate that the broadest privatized enterprises generate more profit due to economies of scale (Wei & Varela, 2003).

The manufacturing sector of MoU-signed PSEs is not generating enough return on assets, and the results are significant at 10 percent.

Table: 6: Results of Random effect panel model for MoU-signed PSEs related to profitability for the period 2004-05-2017-18

IDVs	DV -ROE			DV- ROA		
	Model 1			Model 2		
	Coeffi.	Rbt S.E	P-value	Coeffi.	Rbt S.E	P-value
Constant	1.15	0.013	0.002	1.01	0.031	0.061
CR	0.054	0.024	0.011***	0.019	0.001	0.517
TATR	0.033	0.111	0.003*	0.066	0.032	0.004***
FIRM SIZE	0.005	0.032	0.001***	0.72	0.102	0.000***
AGE	0.011	0.011	0.321	0.009	0.001	0.253
RISK	0.010	0.011	0.042 **	0. 42	0.011	0.004***
LEVERAGE	-0.022	0.005	0.211	-0.45	0.005	0.031**
SECTOR	-0.041	0.002	0.003*	-0.051	0.001	0.001*
R-square b/w	0.51			0.53		
Rho	0.69			0.72		
No. of observations	900			900		

Source: Author's calculation, *** p<0.01, **p<0.05, *p<0.1, STATA14

Table 7 shows the operating efficiency of MoU-signed non-disinvested PSEs during the study period. The empirical relationship between the firm-specific variables and Sales efficiency per employee is significant in the case of current ratio, size, age leverage, and sector. However, leverage and sector show a negative association with sales efficiency. Similarly, the manufacturing sector is having a negative impact on the sales efficiency of MoU-signed firms. The beta value is -1.01 and significant at 95 percent.

On the contrary, the higher the firm's age, the higher the sales efficiency has been found which is significant statistically (Table 6). The total assets turnover ratio

indicates the better utilization of assets leads to a 0.011 change in sales efficiency, though insignificant. The current ratio of the firm also positively impacted the return on equity of firms with coefficients of 0.121 and significant at a 95 percent confidence interval.

The next model 4 shows the performance of MoU-signed PSEs regarding net income efficiency per employee. The results indicate that the performance has indeed improved post-MoU adoption. Comparing the results, it is to be noted that the overall productivity of MoU-signed PSEs has improved.

The empirical relationship of a firm's specific variables and net income efficiency have been significant in the case of current ratio, size, age, and leverage. The results show that these firm-specific variables significantly impact net income efficiency per employee. The positive current ratio shows that the liquidity position of MoU-signed PSEs is good as they can pay return to the shareholders after meeting other liabilities.

Further, it is gratifying to note that the performance of MoU signed enterprises has improved in majority of the cases.

In other words, after signing MoU, the respective PSEs became focused in achieving their specified targets due to more autonomy, less government interference, incentivization of performance related pay, assigned responsibilities etc. However, it is difficult to understand, whether the performance of MoU signed PSEs improved solely by virtue of MoU or due to disinvestment (introduced by government as a policy decision). Therefore, an attempt has been made to examine the performance of MoU-signed disinvested and MoU signed non-disinvested PSEs in the next part. Studies such as Gunasekar and Sarkar (2014) and Chibber and Gupta (2018) have pointed out that the improvement seen in the performance of PSEs is due to the adoption of memorandum of understanding that give them autonomy and brings in the sense of accountability.

Table 7: Results of Random effect panel model for MoU-signed non-disinvested PSEs related to operating efficiency for the period 2004-05-2017-18

IDVs	DV: Sales efficiency per employee			DV: Net income efficiency per employee		
	Model 3			Model 4		
	Coeffi.	Rbt. S.E	P-value	Coeffi.	Rbt. S.E	P-value
constant	1.20	0.002	0.001	2.95	0.001	0.004
CR	0.121	0.024	0.040**	0.025	0.012	0.655**
TATR	0.011	0.032	0.238	0.014	0.010	0.637
FIRM SIZE	0.2015	0.0175	0.000**	0.11	0.045	0.000***
AGE	0.1311	0.5569	0.016***	0.33	0.204	0.001**
RISK	0.0025	0.0011	0.551	0.0021	0.0002	0.859

IDVs	DV: Sales efficiency per employee			DV: Net income efficiency per employee		
	Model 3			Model 4		
	Coeffi.	Rbt. S.E	P-value	Coeffi.	Rbt. S.E	P-value
LEVERAGE	-2.10	0.0124	0.091*	-1.45	0.0038	0.000 ***
SECTOR	-1.01	0.002	0.002**	-1.25	0.012	0.121
R-square b/w	0.65			0.68		
Rho	0.82			0.71		
No. of obs.	900			900		

Source: Author's calculations, *** p<0.01, **p<0.05, *p<0.1, STATA14

5.7 Panel Regression analysis of MoU signed non-disinvested, and MoU-signed disinvested PSEs

This part of analysis deals with a comparative analysis of disinvested and non-disinvested MoU signed PSEs with an intent to analyze among policy decisions of MoU and disinvestment, which one has impacted more in enhancing the performance of PSEs.

This section shows the random panel regression results to study the performance of MoU- signed PSEs over fifteen years. For further insight, to check is there any difference between the performance of MoU- signed disinvested and non-disinvested firms. The sample of MoU-signed PSEs has been categorized as MoU-signed disinvested firms and MoU-signednon-disinvested firms

Table 8 shows the empirical results of MoU adoption on firms' profitability. The result shows that MoU signed by non-disinvested companies has a positive relationship with return on equity since the beta coefficient is positive with a value of 1.15 and the p-value is equal to 0.001. Since a P-value of 0.00 is less than 1% (0.00≤0.01), it can be concluded that MoU has brought a significant positive impact on the return on equity of firms. On the other hand, constant captures the results for MoU- signed disinvested firms, it shows that the beta coefficient is 0.95, with a P-value equal to 0.04 and significant at 5%.

Table 8: Results of Random effect panel model for MoU-signed disinvested and non-disinvested PSEs related to profitability for the period 2004-05-2017-18

IDVs	DV -ROE.			DV- ROA		
	Model 5			Model 6		
	Coeffi.	Rbt. S.E	P-value	Coeffi.	Rbt. S.E	P-value
Constant	0.95	0.013	0.042	0,89	0.039	0.061
MoU(dummy)	1.15	0.024	0.001***	1.02	0.013	0.000 ***
CR	0.074	0.034	0.211	0.019	0.011	0.767
TATR	0.027	0.161	0.003***	0.066	0.052	0.004***
FIRM SIZE	0.007	0.042	0.001***	0.72	0.112	0.000***
AGE	0.013	0.001	0.888	0.009	0.002	0.919
RISK	0.001	0.014	0.042 **	42	0.004	0.004***
LEVERAGE	-0.032	0.007	0.821	-0.45	0.005	0.045**
R-square b/w	0.58			0.63		
Rho	0.79			0.82		
No. of observations	900			900		

Source: Author's calculations, ***p<0.01, **p<0.05, *p<0.1, STATA14

Though the performance of both MoU-signed disinvested and non-disinvested firms have improved over the years after signing MoU. The beta value indicates that the performance of MoU signed non- disinvested firms is better compared to MoU signed disinvested firms because the coefficient is higher in the former case. The performance of both the disinvested and non-disinvested firms has improved post-adoption of MoU.The findings are similar to the studies of Gupta et al. (2011), Gunasekar and Sarkar (2014), Kumar (2014), Chibber and Gupta (2018), Phukon and Ghakhar (2020).

Discussing the results about the firm's specific variables, the results reported that current ratio,TATR, firm size, age, and risk positively impact ROE. On the other hand, the firm's leverage has an insignificant negative impact on the performance,. The negative coefficient value(-0.032) of leverage shows that one unit change will lead to a -0.032 change in return on equity. It indicates there is a decrease in the average share of government loans and subsidies to total borrowings (Gupta, 2005, Banchuenvijit, 2007)). Current ratio, age, TATR, firm size and risk are positively affecting the return on equity.

The profitability of MoU signed by non-disinvested firms is comparatively better than those PSEs which have adopted both the reforms (disinvestment and performance contracts). The results of return on assets further validate the results obtained in Model 6. Our Finding is similar to Gupta (2005, 2013), who opined that disinvestment leads to improvement in profitability because new owners inject commercial drive, which helps to improve performance. However, Gunasekar

and Sarkar (2014) opined that much of the performance improvement previously attributed toprivatization is actually due to the adoption of performance contracts by those PSEs. The findings report that the positive effect of privatization disappears once the MoU effect is considered.

Table 9 shows that MoU- signed disinvested companies, has a positive performance in relation to sales efficiency since the beta coefficient is 1.91 and the P-value is equal to 0.03. On the other hand, the MoU dummy variable shows the results for MoU signed non-disinvested firms. It shows that the beta coefficient is -3.84, with a P-value equal to 0.00 and significant at a confidence level of 99%. The results show the sales efficiency of MoU signed firms and disinvested firms have improved. On the other hand, sales efficiency has been declining in the case of MoU signed non- disinvested firms.

Table 9: Results of Random effect panel model for MoU-signed disinvested and non-disinvested PSEs related to operating efficiency for the period 2004-05-2017-18

IDVs	DV: Sales efficiency per employee			DV: Net income efficiency per employee		
	Model 7			Model 8		
	Coeffi.	Rbt. SE	P-value	Coeffi.	Rbt. SE	P-value
constant	1.91	0.001	0.036	3.53	0.004	0.006
MoU (Dummy)	-3.84	0.1351	0.000***	-2.21	0.039	0.000***
CR	0.171	0.0443	0.000***	0.031	0.013	0.655
TATR	0.014	0.0444	0.238	0.01	0.013	0.637
FIRM SIZE	0.2235	0.1771	0.000***	0.18	0.052	0.000***
AGE	0.1248	0.7979	0.016***	0.31	0.234	0.001***
RISK	0.0047	0.0015	0.551	0.002	0.0004	0.859
LEVERAGE	-2.77	0.0147	0.000***	-1.45	0.0043	0.000 ***
R-square b/w	0.65			0.68		
Rho	0.82			0.71		
No. of observations	900			900		

Source: Author's calculations, *** p<0.01, **p<0.05, *p<0.1, STATA14

The empirical relationship between the firm-specific variables and sales efficiency per employee is significant in the case of current ratio, size, age, and leverage.

Table 9 shows the empirical results of MoU adoption on the productivity of firms. Since the P-value of 0.03 is less than 5 % (0.03≤0.05), it can be concluded that MoU has positively impacted the sales efficiency of MoU-signed disinvested firms. On the other hand, the MoU dummy variable shows the results for MoU signed non-disinvested firms. The betacoefficient is -3.84, with a P-value equal to 0.00 and significant at 1%. The results show the sales efficiency of MoU signed firms and disinvested firms have improved; on the other hand, sales efficiency has been declining in the case of MoU

signed non- disinvested firms. The empirical relationship between a firm's specific variables and net income efficiency has been significant in the case of TATR, risk, age, and leverage.

5. Conclusion and implications of the study

This study contributes to the existing literature by focusing on both the financial and operating performance of MoU signed PSEs and tries to examine further the difference in performance between the MoU signed non-disinvested PSEs and MoU signed disinvested PSEs. Given that PSEs continue to play an important role in both the developed and developing countries, the various benefits of reforms continue to be debated considering inconclusive data arising from empirical studies. The findings of the present study state that there is a positive impact on return on assets and return on equity in the case of MoU signed non-disinvested PSEs and MoU signed disinvested PSEs. However, the performance of MoU signed non-disinvested PSEs is better than MoU signed disinvested PSEs. Therefore, MoU should merits the attention of policy makers in improving the PSEs performance.

The signing of MoU contracts has proven to be worthwhile, as evidenced by the increase in the profitability of PSEs (Planning commission, 2011). Unfortunately, though, the efficiency has not improved as expected. It is noted that MoU-signed firms probably suffer from the problem of over-staffing compared to disinvested firms. They need to cut down on the excess workforce. However, MoU adoption is still voluntary. The performance of MoU-adopted PSEs has been tremendous. However, the performance of MoU signed non-disinvested is not much good. Therefore, the Government should make it compulsory. Along with this, the Government should closely monitor the performance of MoU disinvested and MoU non-disinvested PSEs. As the results suggest, partial disinvestment has not yielded desirable results.

The improvement in the performance of partially privatized PSEs can be due to the presence of a memorandum of understanding (managerial autonomy), not an ownership structure Gunasekar and Sarkar (2014). The performance of MoU signed firms with no change in the ownership structure has a stronger coefficient than the MoU firm with a change in ownership structure. Our findings affirmed the studies conducted earlier such as (Ghosh, 1997; Gupta *et al.,* 2011; Doan, 2014; Gunasekar and Sarkar 2014; Chibber and Gupta, 2018). The positive impact of MoU can be attributed to the fact that the organizations now have become more focused as there is clarity of goals, higher authority and responsibility and performance-related pay mechanisms. A working group based on the survey of the MoU system found that the system is now developed into a "robust mechanism" and most of PSEs under the MoU system have improved their performance over the years (Rajya Sabha, 2011). ■

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