Nexus between the Extent of Disinvestment and Financial Performance: A Study on Disinvested Central Public Sector Enterprises

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Abstract

Disinvestment of central public sector enterprises(CPSEs) was considered to be a catalyst to bridled the unbounded expenditure of PSEs, cumulative debt burden and bring out the Indian economy from the financial disaster in the 1990s. Hence, it was viewed as a means of improving the PSEs. Whether disinvestment has impacted the performance of PSEs or not? To what extent the varying degree of disinvestment impact the profitability and operating efficiency of these PSEs? Therefore, the present study aims to examine the financial and operating performance of disinvested PSEs. This study examines the financial performance of thirty-two disinvested PSEs that were sold between 2000 and 2021. Disinvestment results were compared using the non-parametric Wilcoxon signed-rank test. In addition to this, how varying degree of disinvestment affect the performance of PSEs is also examined. The Wilcoxon signed-rank results show no improvement in the profitability parameters like ROE and ROA. In contrast, improvement in efficiency and the dividend pay-out ratio has been observed. Various accounting performance metrics have been used as proxies for performance. Using Random panel regression, the study investigates the factors that influence the firm's financial performance. Liquidity, Asset utilization ratio, size, and age are the four factors reported to impact the company's financial success positively. The findings suggest that a significant shift in the disinvestment policy is required to reduce state ownership in government firms.

Keywords: privatization; disinvestment; state ownership; financial ratios; panel data

Introduction

Massive privatization efforts were conducted in industrialized and developing countries from the 1980s to the early 1990s, resulting in significant growth in research on state-owned firms throughout the last three decades. The notion that only private ownership could ensure the efficient operation of SOEs drove these large-scale privatizations.

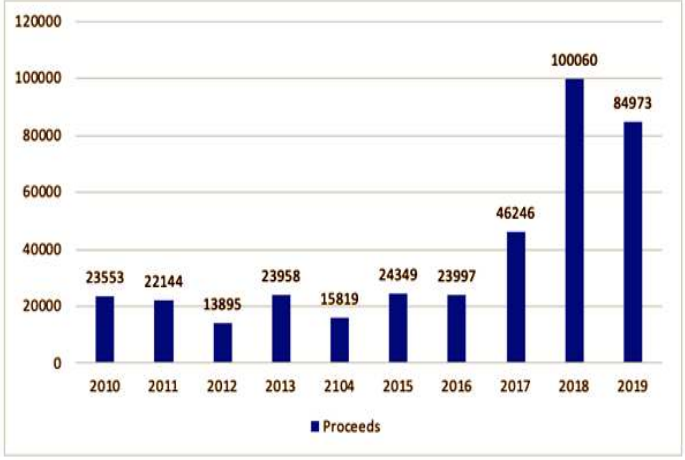
Second, SOEs have been officially regarded as vehicles of national development policies in the BRICS (Brazil, Russia, India, China, and South Africa) countries. They have played a substantial role in contributing to the national economy (OECD, 2015). Privatization is one of the economic reforms implemented in India to improve the performance of Public Sector Enterprises (PSEs). Until 2000-2001, the government disposed of the equity piecemeal. From 2000-01, the government's perspective evolved, emphasizing increasing the amount of disinvestment (strategic disinvestment) and shifting from passive to active disinvestment. Over the last ten years, disinvestment proceeds have also increased (Figure 1).

There is renewing interest in the effects of disinvestment on state-owned enterprise performance prompted by recent research that reveals state-owned enterprises to be more competitive than private companies. Many academics believe that SOEs have been transformed into a unique hybrid organizational form with good performance repercussions due to economic reforms introduced, such as partial disinvestment. However, a never-ending stream of research showing lower performance of enterprises due to dilution of state equity was also taken into account (Ng et al; Alipour, 2013; Bruton et. al., 2015). India's emerging economy accounts for 25 percent of GDP and 5 percent of jobs in the organized sector (Deka, 2014). This article seeks to examine the immediate impact of disinvestment five year pre and post disinvestment, considering those firms that have gone for disinvestment after 2000 onwards.

Further, to get more clarity, it investigates the impact of varying levels of PSE's disinvestment on the operating efficiency and profitability. The Wilcoxon signed-rank test reports that profitability does not lead to improvement post disinvestment, whereas operating efficiency improves probably due to the reduction of excess manpower. The panel regression results show that as the percentage of disinvestment gets higher, profitability and operating efficiency improvement. It is also revealed that the disinvested firms are less dependent on debt post disinvestment, which further positively affects the performance of PSEs. Because they can't sell equity to private investors, SOEs have historically had exceptionally high debt levels. Debt guarantees and initial public offerings are their sole options for raising capital. However, because privatisation provides equity cash from initial public offerings, these former SOEs are more likely to reduce their debt levels. (Alipour, 2013; Chadha & Sharma, 2015; Chang & Boontham, 2017; Phukon & Gakhar, 2018; Mandiratta and Bhalla, 2020). The government's removal of debt guarantees increases their borrowing costs. More prominent firms have shown positive performance due to economies of scale. The results are in align with previous studies such as (Ghosh, 2008; Peter, 2010;Hermansjah et al., 2021).

The study's framework, which includes this one as well, has been split into five sections for a clearer explanation. A review of the literature can be found in the second part. The research approach used for the study is covered in section three. Section 4 discusses the results and findings. Part five presents the study's conclusion and recommendations.

Figure1: It shows disinvestment proceeds for the period 2010-2019



Source: Public Enterprise Survey Report, 2020

Overview of literature

Theoretical review

Important theories to consider while thinking about privatisation include theory of property rights, theory of agency, and theory of allocative efficiency.

Theory of Property rights

When it comes to the utilization of a firm's resources, property rights are crucial for both allocating and producing efficiently (Vickers & Yarrow, 1988). Abolishing public sector property rights has been shown to improve a company's productivity and innovation (Erbetta & Fraquelli, 2002).

Theory of agency

According to agency theory, agents only act in their own self-interest, hence incentives must be provided to encourage them to align their goals with the company's. Privatization, say agency theorists, spurs innovation in macroeconomic systems, including accounting (Macias, 2002). The capital market discourages managers from behaving in a non-profit manner since privately owned enterprises are assumed to be guided by business objectives (Ott & Hartley, 1991).

Many question the theory's empirical validity because of the views it is built on. Because complete information is challenging to come by in real life, information processing is complicated. Internal disagreements also make it difficult for employees to communicate with one another. Additionally, competitive marketplaces in LDCs are still poorly organized, and economic ties and motivations are far more complex than what the agency theory portrays them to be. This theory makes it difficult to model them. For instance, there is no consideration of trust (Armstrong, 1991; Neu, 1991). For another thing, establishing the link between a manager's efforts and the company's profitability is far more complicated than the theory suggests.

Theory of allocative efficiency

Evidence supports Adam et al. (1992) that competition resulting from private ownership is critical to achieving allocative efficiency, as the necessary information is released throughout this process. If there is little competition, it will be more challenging to discover signals that can be used to calculate an appropriate input-output balance. Profits may also fall because of poor management or reduced levels of demand. In the view of neoclassical economics, public firms have low allocative efficiency because legislators, managers, and employees are all motivated by different goals than those of the company itself.

Rather than state ownership, private ownership is expected to result in more efficient businesses that benefit customers, the industry, and the country as a whole (Ogden, 1997).

Arguments in Favour of disinvestment

Several studies in the past, such as Nagaraj (2005), Mathur and Banchuenvijit (2007), Alipour (2013), Mandiratta and Bhalla (2017), and Gakhar and Phukon(2018), have examined the relevance of privatization and showed a positive, negative or weak relationship between privatization and performance indicators.

Boycko (1996) examined the financial and operating performance of 106 privatized companies. Using the Wilcoxon test, he studied the performance proxies and found that privatization will increase profitability, operating efficiency, output, and dividend payments. On the other hand, privatization is expected to decrease firm leverage and employment. However, the results were found to be insignificant.

Gupta et al. (2011) investigated the financial performance of disinvested CPSEs by comparing their pre-and post-disinvestment performance. The financial performance was studied using 18 financial ratios, including profitability, leverage, efficiency, and productivity. The findings reveal the positive impact of privatization on the variables, which implies improvement in the performance of disinvested public firms.

Ghosh (2008) and Gakhar and Phukon (2018) showed that firm efficiency improved dramatically after privatization. They stated that privatization boosts business efficiency by eliminating government involvement and refocusing on the economic goal of maximizing profits over time. They also argued that privatization or private ownership is more efficient as there is a minor degree of bureaucratic control, which helps to expedite decision-making. Shliefer(1998) stated that privatized firms perform better than state-owned firms because of stakeholder theory. He further noted that the primary source of funds for State-Owned Enterprises (SOEs) is government rather than the market. Since these firms have high political interference, their efficiency and

performance are negatively affected. Bachiller (2009) studied the impact of privatization on the efficiency of five Spanish SOEs, and he used techniques like Data Envelopment Analysis (DEA) and Tobit analysis to measure the efficiency of firms. The results revealed that the post-privatization improvement inefficiency is not due to a change in ownership of firms but due to other factors that affect the efficiency of the firms.

(Rosyda & Raharja, 2020)argue, privatization, is one of the most successful strategies to strengthen the governance of State-Owned Enterprises (SOEs). It is believed that SOEs do not properly take advantage of their resources, particularly labour, which seems to be the biggest concern for SOEs. The goal of the study is to understand what is important in privatisation. The privatization would be successful or not, depends on several factors that includes CSR activities undertaken by the privatized firms. SOEs are likely to have seen an increase in performance in terms of achievement and income, as well as a fall in CSR, as a result of privatisation. (Wu, 2007)opined that the government plays a crucial role by rolling out different supporting policy measures, which includes, corporate restructuring pre privatization, government participation post privatization and market openness.

Jain (2016) studies the technical efficiency of PSEs by applying stochastic frontier analysis. The study's significant contribution is that the government's political ideology affects the performance and disinvestment decisions of PSEs. She asserts that if the state government and central government belong to different parties, it affects the performance of PSEs.

Analyzing the 81 disinvestments that have taken place in India till 2016, it is found that the disinvestment decision was mainly influenced by a mixture of compelling forces and competing forces. Compelling forces such as the high fiscal deficit increase the number of sick units while competing forces include a high level of competition focus on efficiency enhancement and transparency (Phukon & Gakhar 2020). Further, the author opined that dilution of state ownership should be rationally undertaken, it may enhance the optimal utilization of resources, however, recklessness, can be detrimental for the organization (Singh, 2015). In the long run, the quality of management matters the most, not per se ownership.

Arguments against disinvestment

On the other hand, studies like Nagaraj (2005), Gupta (2005), Gupta et al. (2011), and Alipour (2013) found that privatization has no substantial impact on the firm's performance. In addition, Chen(2008) examined the sample of China's 1078 PSEs and found the performance has considerably not shown any improvement post privatization. Mandiratta and Bhalla (2017) studied the disinvested firm's performance and found no profitability parameters.

Tian & Estrin (2008) studied the empirical relationship between the performance of state-owned firms and post-privatization firms considering countries with poor governance in the context of investor protection. The relationship between residual state ownership and firm performance indicates the influence of political interference in the organization. High state ownership boosts investors' confidence as there is easier availability of institutional knowledge, finance, and administrative support (Yu, 2013). Boontham and Chang(2017) opined that the government should not bring down the state ownership at once, it should be done phase-wise. Otherwise, it would indicate the removal of government support and facilities to the firm, which would further negatively impact the value of PSEs. On the other hand, promoting SOEs by increasing public shareholding must be transparent. It cannot be based on secret, skewed or advantageous contracts (Locke & Duppati, 2014), and state ownership should gradually decrease.

The above discussion indicates no clear evidence regarding privatization's positive or negative impact on firm performance. The present study makes a modest attempt to fill this gap as the earlier studies in an Indian context-focused mainly on disinvestment done during 1990-2000. As a result, it would be interesting to investigate the influence of disinvestment on non-financial disinvested CPSEs' financial performance after 2000. The study contributes to the body of knowledge by examining the financial and operating performance of disinvested PSEs. Furthermore, standard pre- and post-disinvestment

comparisons have not considered the firm-specific control variables that may influence firm's performance. According to the current study, other factors that affect the financial performance of disinvested PSEs are the Current ratio, total asset utilization ratio, size, risk, age, leverage, and sector.

The government has been continuously making efforts to strengthen the process ofdisinvestment. In the year 2021, an announcement was made by the government to reduce the government ownership in these enterprises is a considerable step in this direction. Realizing the need for the study has motivated us to analyze the financial performance of both partially and strategically disinvested PSEs. By examining both partially and strategically disinvested PSEs, this study adds to the body of knowledge on disinvestment, as previous research has mostly concentrated on partially disinvested PSEs. Furthermore, the effect of the degree of disinvestment on the result was also examined.

The hypothesis of the study:

- Disinvestment has no significant impact on return on equity of disinvested PSEs.
- Disinvestment has no significant impact on return on assets of disinvested PSEs.
- Disinvestment has no significant impact on sales efficiency of disinvested PSEs.
- Disinvestment has no significant impact on net income efficiency of disinvested PSEs.

Research methodology

The study is limited to non-financial central PSEs in India for partial and strategic disinvested firms. The present study has considered thirty-two PSEs. Although disinvestment was initiated in 1992, the sample considered those divestitures from 2000 onwards. This period marks the on boarding of institutional investors, professional practices incorporated, strategic disinvestment introduced, and global participation in equity. This study has considered both partial and strategically disinvested PSEs. The disinvested PSEs are core PSEs that have had less than 50 percent, and more than 50 percent of their equity disinvested up to 2015-16. Secondary data has been considered for the study and the data has primarily been collected from sources namely Department of Public Sector Enterprises website and the capital line. The annual public enterprise survey compiles all central government-owned businesses' financial accounting and profit and loss accounts. Dipam.in has been used to gather information about disinvestment. The Department of Investment and Public Asset Management oversees all aspects of central government equity investments and equity disinvestment in central public sector enterprises. The study employs parametric and non-parametric techniques to examine the performance covering 2000-01-2020-21.

Statistical Tools

The performance of the disinvested PSEs have been studies using parametric and non-parametric tests namely, Wilcoxon signed rank test and panel regression model. The author examines the financial performance over an 11-year period using several ratios. Since the year of disinvestment is set to zero, it is not taken into account. Each CPSE's mean values for each variable from (-5 to -1) to (+1 to +5) before and after disinvestment. Furthermore, for more profound clarity, as the percentage of disinvestment is different for each disinvested firms, the paper seeks to investigate the extent of disinvestment impact on the financial and operating performance of these PSEs, controlling the firm-specific variables over the study period.

Variables description

The variables and models used to conduct the research are discussed in detail in this section. The study included three variables: dependent, independent, and control variables.

• Dependent variables

Profitability

Return on equity (ROE) measures how efficiently the firm manages the funds contributed by equity shareholders. It has been calculated as profit after tax divided by shareholder's fund ((Dewenter & Malatesta, 2001; chen et al., 2006 and Homaidi et al., 2021).Lastly, the income that the company's assets provide is measured by return on assets, or ROA. This assesses how better the company is utilizing the total assets to generate profits. It has been

calculated as EBIT divided by the total assets of the firm Tan (2020).

Operating efficiency

A significant number of jobs creation is one of PSEs' social obligations, even though there may be overstaffing. However, successful operation and productivity depend primarily on the workforce's skills employed. Therefore, it becomes necessary to calculate the productivity of employees. For this, the following two proxies have been taken as productivity of employees. Net income productivity has been calculated as profit after tax/ no. of employees Kharist (2012). The second proxy variable is sales productivity, calculated as net sales/ no. of employees.

• Independent variable

The extent of disinvestment was considered while calculating the impact of disinvestment and it has been categorized into four categories of disinvestment, namely 11-20%, 21-35%, 36-50% and more than 50%. The extent of disinvestment is a dummy variable. It has been categorised as 1, if the PSEs fall under the certain disinvestment category as mentioned above for a particular year, otherwise zero. (Gupta et al., 2020).

• Control Variables

Current ratio: A firm that has a better liquidity position tends to have a positive performance. The current ratio has been calculated as current assets /current liabilities (Chen et al., 2006).

TATR: The better utilization of a firm's assets positively affects the financial performance of firms. In order to calculate this, the study employed the total assets turnover ratio, which is calculated by dividing average net sales by average total assets. (Gitman, 2009).

Size of the firm: Log of total assets has been taken as the proxy for the size of the firm (Huang & Wang, 2010; Alipour, 2013)

Age of the firm: Years since the firm's incorporation (Pham, 2019).

Risk: It depicts the effect of investment risk on the firm's profitability. For this, the standard deviation of return on assets has been considered to measure the impact of risk (Alipour, 2013).

Leverage: The debt structure of a company affects the firm's performance. It is calculated as total debt/total equity (Astami et al., 2010; Boontham, 2017).

Sector: A dummy variable, the manufacturing sector has been assigned as 1, and service as 0 (Marda, 2012).

Modeling and estimation approach

Many authors have used the ordinary least square regression model to gauge the effects of disinvestment on the performance of disinvested PSEs. However, this model has the drawback of not accounting for time or group heterogeneity. A random-effects regression panel model based on the Hausman test is used to overcome this issue. The study examines the panel data assumptions. To measure the impact of degree of disinvestment on the financial performance, four models have been formulated.

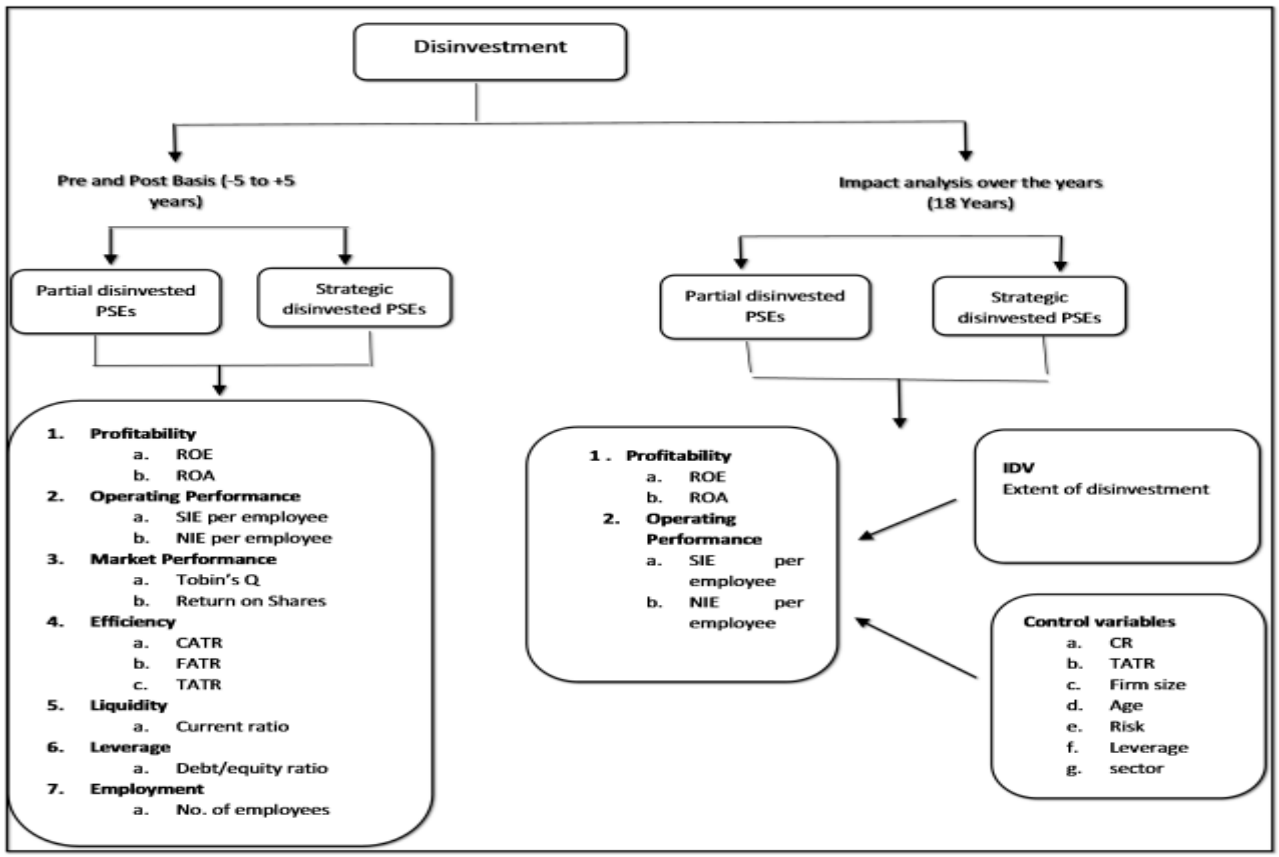
$ROE_{it} = \alpha_{it} + \beta 1 \text{extent of disinvestment}_{it} + \beta_2 CR_{it+} \beta_3 TATR_{it} + \beta_4 \text{Firm size}_{it} + \beta_5 Age_{it} + \beta_6 Risk_{it} + \beta_7 \text{leverage}_{it} + \beta_8 \text{sector}_{it} \xi_{it}$ (Model 1)

$ROA_{it} = \alpha_{it} + \beta 1 \text{ extent of disinvestment}_{it} + \beta_2 CR_{it+} \beta_3 TATR_{it} + \beta_4 \text{Firm size}_{it} + \beta_5 Age_{it} + \beta_6 Risk_{it} + \beta_7 \text{leverage}_{it} + \beta_8 \text{sector}_{it} \xi_{it}$ (Model 2)

Net income efficiency per employee $= \alpha_{it} + \beta 1$ extent of disinvestment$_{it} + \beta_2 CR_{it+} \beta_3 TATR_{it} + \beta_4 \text{Firm size}_{it} + \beta_5 Age_{it} + \beta_6 Risk_{it} + \beta_7 \text{leverage}_{it} + \beta_8 \text{sector}_{it} \xi_{it}$ (Model 3)

Sales efficiency per employee $_{it} = \alpha_{it} + \beta 1$ extent of disinvestment$_{it} + \beta_2 CR_{it+} \beta_3 TATR_{it} + \beta_4 \text{Firm size}_{it} + \beta_5 Age_{it} + \beta_6 Risk_{it} + \beta_7 \text{leverage}_{it} + \beta_8 \text{sector}_{it} \xi_{it}$ (Model 4)

Where dependent variables are return on equity, return on assets, sales productivity efficiency, and net income efficiency α is the constant term, and β_1 to β_5 are the coefficients calculated for firms (1, 2…..32) calculated for the T period (2001, 2002….2018). E is the error term and other variables as discussed above.



Results and discussion

Table 1: Descriptive statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max	P-25%	P-50%	P-75%	Skewness	Kurtosis
ROE	576	21.64	16.77	-15.15	78.25	7.04	13.80	21.29	-17.60	322.749
ROA	576	19.33	13.83	-16.15	76.33	5.213	12.465	24.870	.720	5.665
SIE per empl.	576	3.325	0.151	0.037	41.64	.164	.683	1.701	4.743	31.393
NIE per empl.	576	1.750	0.274	-.619	1.78	.100	0.050	.178	2.131	8.194
CR	576	1.785	2.662	.518	22.45	1.686	2.701	4.492	2.834	13.130
TATR	576	1.655	2.115	.077	12.33	.438	.737	1.448	.732	20.371
Firm Size	576	1.541	3.511	1.23	4.75	7.150	8.241	9.738	0.203	2.905
Risk	576	5.231	5.80	0.13	61.34	.230	1.705	6.441	13.107	223.62
leverage	576	0.662	1.255	-13.35	13.17	0.004	.240	.713	-19.571	491.60
Age	576	2.641	5.685	5	90	24	33	47	1.851	4.597

Note: We have excluded the descriptive statistics for extent of disinvestment and sector as these two are dummy variables.

Table 1 shows the descriptive statistics of the variables considered for the study from 2000-to 2018. The mean, standard deviation, minimum, maximum, Quartiles (25%, 50%, and 75%), skewness, and Kurtosis have been depicted. Among the financial performance variables, the highest mean is for return on equity has been observed as 21.64 percent. It implies that for every one rupee invested by shareholders, 21.64 is being generated by shareholders on the amount invested. ROE is generally considered for the profitability of firms. The thumb rule is that the higher the ratio, the better the firm's financial health. The average leverage of disinvested Indian PSEs is comparatively more. Standard deviation depicts the dispersion of the level debts in disinvested PSEs, the minimum is -13.35, and the maximum is 13.17. In addition, the variable age reports that the maximum age of the PSE is 90 for the period considered.

The data is also described using Skewness and Kurtosis, where "Skewness simply evaluates the symmetry of the distribution, whereas kurtosis indicates to the degree of presence of outliers in the data. If the skewness is 0, the data is perfectly symmetrical and follows a normal distribution. However, this is not possible in the real world. Kurtosis determines whether a distribution's tails contain extreme values. The kurtosis curve for a normal distribution has a value of 3. Therefore, the data is not normally distributed if the value is less than or larger than 3. Since the value of skewness and Kurtosis in all the variables mentioned is more than the cut-off points of normal distribution, it can be inferred that the distribution is highly skewed and does not follow the normal distribution. The possible reasons for the results could be the varying firm size and different firm sectors considered for the sample.

Matrix of Correlation

The correlation matrix has been demonstrated below in Table 2, each cell displaying the pairwise correlation between the two independent variables. The correlation matrix, shown in Table 2, shows the relationship between the independent variables. The correlation matrix is an asymmetrical (K * K) square matrix with the ij entry representing the correlation between columns I and j. Large values in the matrix suggest a strong correlation between the variables (Ferré, 2009). Multicollinearity will not be a problem in the regression analysis because none of the independent variables are considerably and highly associated with each other. According to (Porter D.N, 2009), a degree of correlation of 0.8 or 0.9 causes multicollinearity. According to (Porter D.N, 2009), a degree of correlation of 0.8 or 0.9 causes multicollinearity. The current study has the highest negative correlation between age and firm size, which is -0.6015. The negative correlation shows that the disinvested firms that are bigger in size are pretty old. Apart from that, all independent variables have a correlation coefficient of less than 0.6. The issue of multicollinearity was also tested using the Variance inflation index, with the findings presented in Table 2.

Table 2: Correlation matrix

Variables	CRCACL	TATR	Firm size	Risk	Leverage	Age
CRCACL	1					
TATR	-0.2202*	1				
Firm size	-0.026	-0.2202	1			
RISK	0.0291	0.0595	-0.112*	1		
Leverage	-0.0163	0.0033	0.0432	-0.001	1	
AGE	-0.059***	-0.1282	-0.6015*	-0.1445	0.0326	1

Source: Author's calculation

Diagnostic Tests

All diagnostic tests (refer to Table 3) must be carried out to execute panel data regression analysis to identify the most relevant technique. The Levin-Lin-Chu unit root test is used, used explicitly if the data is balanced, to ensure that all of the variables are stationarily distributed (Levin et al. 2002). The results of Levin-Lin-Chu indicated that the variables are stationary or no unit root exists as the P-value is less than 0.005. The normality of the data was also checked using the Shapiro-Wilk test. The test's null hypothesis is that the data is normally distributed, with the P-value of the test being more than 0.005, which suggests that the data is not normally distributed.

The following assumption checked is autocorrelation using the Wooldridge test for serial correlation. The test's null hypothesis is that there is no presence of first-order serial correlation. The test results indicated the presence of autocorrelation in all four models. Bresuch-Pagan test was conducted to check for heteroscedasticity. Any linear type of heteroscedasticity can be found using the Breusch-Pagan test. Breusch-Pagan evaluates the alternative, which contends that error variances are a multiplicative function of one or more factors, against the null hypothesis, which holds that all error variances are equal.

As the chi-square value for model 3(a) is 315.51, this value is insignificant as P-value is less than 5 percent. Hence, there is a presence of heteroscedasticity in model 3 (a). Similarly, the P-values are insignificant in model 3(b), 3(c) and 3(d). Heteroscedasticity is present in all four models. Additionally, VIF has been used to check for multicollinearity, and the mean VIF score for model 1 is 2.34 and model 2 is 1.71. According to the results of this test, the issue of multicollinearity does not exist because it falls below the threshold of 10. (Field 2013).

The Hausman test assesses two estimators consistent under the null hypothesis, but one is inefficient. Hence, based on the null hypothesis; the hausman test suggests that the preferred model to be employed is random effects. In Table 3, the value of chi-square $\chi 2$ is insignificant in all the four models, so, the preferred model is random regression Panel data.

Table 3- Diagnostic Tests

	VALUES				
Panel data assumption Tests	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Results**
Levin-Lin-chu	$P=\chi^2$	$P=\chi^2$	$P=\chi^2$	$P=\chi^2$	Absence of Unit-root
Shapiro-Wilk	$P=\chi^2$	$P=\chi^2$	$P=\chi^2$	$P=\chi^2$	Absence of Normality
Wooldridge	P=F	P=F	P=F	P=F	Presence of autocorrelation
Breusch-Pagan	$P=\chi^2$	$P=\chi^2$	$P=\chi^2$	$P=\chi^2$	Presence of Heteroscedasticity
VIF	2.34	1.71	3.22	2.01	Absence of multicollinearity
Hausman	$P=\chi^2$	$P=\chi^2$	$P=\chi^2$	$P=\chi^2$	Random Panel Regression

Table 4- Wilcoxon Signed-Rank Test

Performance Indicators	**N**	**Mean (Median) Before Disinv.**	**Mean (Median) After Disinv.**	**Mean Change**	**Z statistics**	**Sig (Two-Tail)**
Profitability						
Return on Assets	32	0.2312(0.2011)	0.2218(0.1941)	-.019(0.007)	-0.507	0.144
Return on Equity	32	0.1551 (0.1364)	0.1422(0.1234)	-.014(0.0131)	-0.633	0.527

Performance Indicators	N	Mean (Median) Before Disinv.	Mean (Median) After Disinv.	Mean Change	Z statistics	Sig (Two-Tail)
Efficiency						
Sales Efficiency	32	0.7822 (0.7979)	1.5124 (1.011)	.0157(0.2142)	-1.202	0.003**
Pay-out						
Dividend Pay-out Ratio	32	20.310 (19.5230)	22.711 (21.3150)	2.4 (1.792)	-1.647	0.04***
Leverage						
Debt to equity ratio	32	0.0038 (0.0010)	0.0019 (0.0008)	-.002(0.0003)	-1.408	0.259
Employment						
Total no. of employees	32	14261 (8235)	11721 (6329)	-2540 (1906)	-2.062	0.019*

Non-parametric test (Table 1) depicts that there is a decline in ROA and ROE after five years of disinvestment. The mean (median) of profitability indicators namely ROA and ROE declines from 0.2312 (0.2011) and 0.1551 (0.1364) before disinvestment to 0.2218 (0.1941) and 0.1422 (0.1234) after disinvestment, respectively. However, the decline is statistically insignificant as P-value is more than 0.05.

On the contrary, sales productivity is showing improvement as the mean (median) value increases from 0.7822 (0.7979) to 1.5124 (1.011) post disinvestment and the p-value < 0.03. After disinvestment, the pre and post mean (median) of dividend Pay-out ratio of all enterprises is observed to increase from 20.310 (19.5230) to 22.711 (21.3150), which implies an average increase in mean (median) by 2.4 (1.790). This result is found to be statistically significant at 1% level.

Further, a decline in the mean (median) of leverage is observed from 0.0038 (0.0010) before disinvestment to 0.0019 (0.0008) after disinvestment, with a p-value > 0.10. However, the mean (median) of the total number of employees decreased from 14261 (8235) to 11721 (6329), showing a mean change of -2540 (1906). The result is found to be statistically significant.

Table 5: Random Panel Regression

Random Panel Regression	Model 3(a) ROE		Model 3 (b) ROA	
Variables	**Coeffi.**	**t-value**	**Coeffi.**	**t-value**
Constant	-3.327	-0.494	-3.049	0.0671
A (11-20%)	-0.045	-0.358**	-1.22	-0.314 ***
B (21-35%)	0.011	0.258	0.29	0.425
C (36-50%)	0.025	0.343***	0.061	0.751*
D(More than 50%)	0.145	1.321*	0.347	1.231**
CR	0.025	0.070***	0.351	0.251***
TATR	0.036	0.064***	0.713	0.123***
FIRM SIZE	0.022	1.222**	0.011	1.355
AGE	0.116	0.048	-0.058	-0.251
RISK	0.021	0.0141*	0.042	0.124**
LEVERAGE	-0.041	-0.027	-0.764	-0.532***
SECTOR	-0.065	0.186	-0.023	-0.761**
R square (b/w)		0.526		0.541
Rho		0.592		0.516
No. of observations	352			352

Source: Author's calculation, STATA 14, ***, ** and * indicate significance level at 1, 5% and 10% respectively.

The influence of the level or degree of disinvestment on the financial and operational performance of disinvested PSEs was explored in this portion of the study. It is believed that a higher level of disinvestment will result in improved financial and operating results.

Dewatripont and Roland (1993) and Zsuzsanna et al., (1996) investigated privatisation dynamics and shed on different patterns of privatization and ownership evolution; the authors were able to separate characteristics of partial privatisation from those of staged privatisation. Proponents (Roland, 1994; (Chang & Boontham, 2017; Ghosh, 2008)favored partial disinvestment as it enhances the focus for proactive socio-economic progress by the phenomena of 'learning by doing effect'. Further, this makes the transition process acceptable, less difficult and smoother for the government and the society in all.

This section examines two important aspects of firm's performance, including whether increasing disinvestment leads to increased profitability and operational efficiency. The disinvestment impact has been captured by employing the variable extent or degree of disinvestment, it has been segmented into four categories 11-20%, 21-35%, 36-50% and More than 50%. . The Extent of disinvestment is a dummy variable, for this, it has been assigned 1-if falls under the category of 11-20%, otherwise-0. Likewise, the other categories of degree of disinvestment has been assigned respectively.

Table 5 is reporting the panel regression (random) results for the extent of disinvestments. The dependent variable is return on equity. The four dummy variables D1, D2, D3 and D4 are independent variables along with Current ratio, TATR, firm size, age , risk, leverage and sector. Model 3(a) explains that the firms falling under the category of 11-20% is having negative return on equity. It asserts that the profitability position of firms who have gone for partial disinvestment within the category of 11-20% have not improved the performance for the period 2000-2018 with β= -0.045 and the results are statistically significant at 5 percent level. The next category of extent of disinvestment is 21-35%, it shows a positive beta coefficient which is equal to 0.011, though not statistically significant. The third category of extent of disinvestment is 36-50%, it appears firms who have gone for 36-50% of disinvestment, such firms have reported to be having positive return on equity, with beta coefficients equals to 0.025 and statistically significant at 1 percent. The last category of degree of disinvestment is more than 50 % of disinvestment, the beta coefficient is equal to 0.145 and statistically significant at 10 percent. Going by the results, it appears that as the extent or degree of disinvestment gets higher, firms tend to report positive return on equity and it also reveals the beta coefficient is stronger in more than 50% category of extent of disinvestment.

Apart from the dummy variables, the liquidity position of the firm is having a positive impact on ROE, as the coefficient value is 0.351 and significant at 1 percent. The firms are in the position to pay return to the shareholders after meeting other liabilities. The asset utilization ratio, proxied by total assets turnover ratio is also having a positive impact on ROE, with β coefficient equals to 0.0360, significant at 1 percent. It reveals the disinvested firm are efficiently utilizing their total assets in generating sales. High sales volume positively affects the ROA and ROE of firms. Risk and size of the firm are also positively affecting the return on equity with beta coefficients equal to 0.022 and 0.021, significant at 5% and 10% respectively.

The results of the study collaborate with the previous researches, which stipulate that the broadest privatized enterprises generate more profit due to economies of scale (Oladele John, 2013; Wei & Varela, 2003). The impact of leverage is coming out to be negative in relation to ROE, showing coefficient value that is -0.041, though insignificant. Before disinvestment, PSEs were highly dependent on government for debt, disinvestment in these firms paved to way to equity capital and thus reducing the dependent on debts provided by government (Mathur & Banchuenvijit, 2007). The performance of manufacturing disinvested sector has not been performing well as compare to the service sector, as the beta coefficient is -0.0652, but statistically insignificant as the p-value is insignificant.

Table-5 is reporting the panel regression (random) results for the extent of disinvestment on profitability. The dependent variable is return on assets. The four dummy variables D1, D2, D3 and D4 are independent variables

along with Current ratio, TATR, firm size, age , risk, leverage and sector. Model 3(b) explains that the firms falling under the category of 11-20% is having negative correlation with return on equity. The negative relationship means that the profitability position of firms who have gone for partial disinvestment within the category of 11-20% have not improved the performance for the period 2000-2018 with β= -1.22 and the results are statistically significant at 10 percent level. The next category of extent of disinvestment is 21-35%, it shows a positive beta coefficient which is equal to 0.29, though not statistically significant as previously observed in model 3(a). The third category of extent of disinvestment is 36-50%, it appears firms who have gone for 36-50% of disinvestment, such firms have reported to be having positive return on equity, with beta coefficients equals to 0.06 and statistically significant at 1 percent. The last category of degree of disinvestment is more than 50 % of disinvestment, the beta coefficient is equal to 0.347 and statistically significant at 5 percent. Comparing all the dummy variables for proportion of disinvestment, it is inferred that as the proportion of disinvestment is increasing, the impact of disinvestment becoming stronger and positive in relation to ROA of the firms. Even (Gakhar & Phukon, 2018; Jain et al., 2014) observed positive impact on ROA related to disinvestment.

Apart from the dummy variables, the liquidity position of the firm is having a positive impact on ROE, as the coefficient value is 0.025 and significant at 1 percent. It implies that there is enough flow of cash and cash equivalents in disinvested firms. The firms are in the position to pay return to the shareholders after meeting other liabilities. The asset utilization ratio, proxied by total assets turnover ratio is also having a positive impact on ROE, with beta coefficient equals to 0.713, significant at 1 percent. It reveals the disinvested firm are efficiently utilizing their total assets in generating sales. High sales volume positively affects the profitability of firms. Firm size is not significantly having an impact on ROA, but risk is having a positive correlation with ROA, with beta coefficient 0.042, significant at 5 percent. The impact of leverage is coming out to be negative in relation to ROA, showing coefficient value that is -0.076, significant at 1 percent. Before disinvestment, PSEs were highly dependent on government for debt, disinvestment in these firms paved the way to equity capital and thus reducing the dependent on debts provided by government (Mathur & Banchuenvijit, 2007). The performance of manufacturing disinvested sector has not been performing well as compare to the service sector, as the beta coefficient is -0.023 and it is statistically insignificant.

Table 6

Random Panel data	Model4(c) SIE per employee		Model 4(d) NIE per employee	
Variables	**Coeff.**	**t-value**	**Coeffi.**	t-value
constant	**-9.412**	**0.55**	**-9.502**	0.23
A (11-20%)	-0.054	-0.61 *	-2.581	0.87***
B (21-35%)	0.701	0.59	0.758	0.86**
C (36-50%)	1.036	0.59**	1.371	0.85
D(More than 50%)	1.147	4.57***	1.214	0.21**
CR	0.055	0.029***	0.659	0.08*
TATR	0.88	0.03***	1.301	0.1**
FIRM SIZE	0.85	0.28***	0.93	0.77***
AGE	0.72	0.1***	-0.143	0.28**
RISK	0.007	0.006	0.034	0.018
LEVERAGE	-0.02	-0.211	-0.125	0.035
SECTOR	-0.711	-0.39***	-0.69676	0.56**
R square (Between)	0.64		0.72	
Rho	0.91		0.66	
No. of observations	576		576	

Table-6 is reporting the panel regression (random) results for the sales efficiency per employee. The dependent variable is sales efficiency. The four dummy variables D1, D2, D3 and D4 are independent variables along with current ratio, TATR, firm size, age, risk, leverage and sector. The D1 (11-20%) variable is reporting negative coefficient value of -0.054 and showing that disinvestment proportion from 11% to 20% is leaving negative impact on sales efficiency per employee. D2 dummy variable (coving disinvestment proportion from 21% to 35%) is reporting the positive coefficient value of 0.701 meaning that, it is having positive effect on sales efficiency, but the results are not statistically significant. The next dummy variable is D3 that covers disinvestment proportion from 36% to 50%. D4 is showing coefficient value of 1.036 and indicating that D4 is showing positive impact on the sales efficiency of the firms. Further, D4 is reporting 1.147 value of coefficient. Comparing all the dummy variables for proportion of disinvestment, it is inferred that as the proportion of disinvestment is increasing, the impact of disinvestment becoming stronger and positive in relation to sales efficiency of the firms. As a part of disinvestment policy, retrenchment of employees has taken place, Voluntary retirement scheme (VRS) was also introduced in 2002, as a way to dispose off the extra manpower. It can be inferred that the firms with higher extent of disinvestment, such firms prefer to shed more of its workforce. As the extra manpower gets laid off, it leads to greater productivity corresponding to number of employees.

Apart from the dummy variables, the current ratio and TATR variables are showing 0.055 and 0.88 coefficient value and affecting sales efficiency of the firms positively and significantly. Firm size is also affecting sales efficiency positively with 0.85 and significant at 1 percent. While leverage is negatively affecting Sales efficiency per employee with beta coefficient is -0.02, and risk is positively affecting the sales efficiency per employee, but both are not having a statistically significant impact.

Table-6 is reporting the panel regression (random) results for the extent of disinvestments. The dependent variable is net income efficiency. The four dummy variables D1, D2, D3 and D4 are independent variables along with. The D1 (11-20%) variable is reporting negative coefficient value of -0. 258 and showing that disinvestment proportion from 11% to 20% is leaving negative impact on return on equity. D2 dummy variable (coving disinvestment proportion from 21% to 35%) is reporting the positive coefficient value of 0.758 meaning that, it is having positive effect on net income efficiency. The next dummy variable is D3 that covers disinvestment proportion from 36% to 50%. D3 is showing coefficient value of 1.371 and indicating that D4 is showing positive impact on the net income efficiency of the firms. Further, D4 is reporting 1.214 value of coefficient. If we compare degree of disinvestment, it can be extrapolated that the influence of disinvestment on net income efficiency is becoming stronger and more beneficial with higher degree of disinvestment.

Apart from the dummy variables, the current ratio and TATR variables are showing 0.659 and 1.301 coefficient value and affecting sales efficiency of the firms positively and significantly. Firm size is also affecting sales efficiency positively with 0.93 coefficient . While leverage is negatively affecting Sales efficiency per employee with beta coefficient is -0.125, and risk is positively affecting the sales efficiency per employee showing beta coefficient as 0.034.

Further, the results that have been reported in relation to Table 6 are found to be statistically significant as p-value is coming out to be less than 0.10 except D3, risk and leverage which is having p-value more than 0.10.

Conclusion and Implications

Since the 1990s, India has broadly adopted a partial privatization program. In light of the findings, the Indian government appears to have adopted a policy of strategic disinvestment beginning in 2000-01. Despite this, it hasn't been pursued aggressively. This article aims to examine the performance of disinvested PSEs before and following their disinvestment. Random panel data regression is used to analyze a sample of 32 PSEs over 22 years. Over more than two decades, the study examines the profitability and operational performance of disinvested PSEs.

The results of the Wilcoxon signed-rank test which measures changes in profitability after disinvestment,

reveal no increase in the profitability metrics. Contrary to popular belief, ROA and ROE increase the following disinvestment, albeit in an unnoticeable manner.ROA and ROE, on the other hand, have decreased marginally after disinvestment, but insignificant.After 2000 onwards, there was a change in the disinvestment policy focussing more on strategic disinvestment. Initially, some strategic disinvestments were done. However, the Indian government moved back to its old practice by placing a high value on partial disinvestment.

Since 1992, the government's policy has been on selling fractions of equity in parts. Hence, the government remains the major shareholder in the company, holding to the extent of 51% or more shares in the company even after disinvestment. In his study,Boycko (1996) asserts that improvement in profitability occurs when government transfers management control and cash flow rights to the private investors. The extent of disinvestment analysis show that the performance of PSEs, whose disinvestment fall in the category of 36-49% and more than 50 % is better than those disinvested PSEs who fall in the category of 10-20% and 21% to 35%. A small proportion of disinvestment will not yield much improvement, rather than they are used to bridge the government's fiscal deficit.

During the study period, economic reforms had a positive impact on PSE financial performance. Contrary to popular belief, partial disinvestment has not resulted in improved financial performance. On the one hand, there is a lower share of disinvestment, and on the other, the administration of central PSEs does not yet have full autonomy in their operations. According to the report, the government should strive for strategic disinvestment. The government should curtail its engagement in the PSEs managerial decision-making and operational activities, the interference should be a matter of last resort for the government. The present study is also subject to certain limitations. The study's scope is limited to the sample size and study period, i.e., 2000-2021. Further, the study focuses on only the financial performance of the disinvested PSEs. The socio-economic factors and the non-disinvested firms are not considered in the present study for comparing performance. Future research can include political decision impact on the disinvestment.

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