PERFORMANCE CONSEQUENCES OF DISINVESTMENT ON COGNATE GROUPS OF MANUFACTURING SECTOR IN INDIA

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ABSTRACT

The study compares the pre- and post disinvestment financial and operating performance of the selected disinvested Central Public Sector Enterprises (CPSEs) of Indian Manufacturing sector based on cognate groups after disinvestment. A sample of 12 firms is drawn from five cognate groups from manufacturing sector viz., Fertilizer, Heavy Engineering, Medium & Light Engineering, Petroleum (refinery & marketing) and Transportation Equipment of Indian CPSEs. The period of analysis covers 5 years before and 5 years after disinvestment. Hence, the full sample is partitioned into respective cognate groups which might lead to difference in the profitability, operating efficiency, output, employment, solvency and stock indicators to test our predictions, the technique of Megginson et al. (1994) was followed in order to determine post disinvestment performance changes. The analysis is based on ratio analysis, mean, median, Wilcox on Signed-rank test and sign test are used as principal methods for testing significant changes in variables. To test the significant differences among the groups Kruskal-Wallis test is applied for the subsample based on cognate groups is adopted. Based on the results obtained from the study, it is documented that greater performance improvement for the Heavy Engineering groups of companies in majority of the performance indicators when compared to the other cognate groups after disinvestment. However, the performance of Transportation Equipment was very far from satisfactory after disinvestment. Thus, the empirical analysis revealed that there is no significant difference among cognate groups after disinvestment.

KEYWORDS: Disinvestment; Cognate groups; Profitability; Operating Efficiency; Output; Employment; Solvency; Stock Indicators.

Introduction and Conceptual Framework

The economic policies of liberalization and globalization, post-1991, sectors that were exclusive preserve of the public sector enterprises were opened to the private sector. "The CPSEs, therefore, are faced with competition from both domestic private sector companies (some of which have grown very fast) and the large Multi-National Corporations (MNCs). Disinvestment of government equity in CPSEs began in 1991-92 following the Industrial Policy Statement of 1991, which stated that the Government would divest part of its holdings (minority share-holding) in select CPSEs. Till 1999-2000, disinvestment was primarily through sale of minority shares in small lots. From 1999-2000 till 2003-04, the emphasis of disinvestment changed in favor of strategic sale. The current policy on disinvestment envisages people's ownership of CPSEs while ensuring that the Government equity does not

fall below 51 per cent and Government retains management control. Public enterprises in most of the countries of the world, so as also in India were created to accelerate economic and social development. Jawaharlal Nehru, the first prime minister of independent India called the public sector units (PSUs) the "Temples of modern India". The serious budgeting and fiscal deficits of the government and severe pressure on the country's balance of payments created the 'necessity. The Nehruvian 'commanding heights' concept was seen to have lost its relevance.

Disinvestment has been a major political and economic phenomenon over the past few decades, and researchers continue to target it for both theoretical and empirical work. Since first application in Britain in 1979 under Thatcher government, privatization has come to be accepted and employed throughout the world, often under conditions of considerable controversy. Given that most socialist and communist economies from every region in the world have recently started implementing economic reform programs, the reduction in size of the public sector through disinvestment has become an important part of such programs. Privatization has being a subject of intense global debate in recent years. The concept has received so much criticism from labour unions, academia and individuals. However in recent times, we are witnessing sweeping changes in the economics of both developed and developing countries. Several developing and transition economies have embarked on extensive privatization programs in the last two and a half decades as means of attaining macroeconomic stability, fostering economic growth and managing public sector borrowing arising from corruption, subsides and subventions to State Owned Enterprises (SOEs). Investment and disinvestment are two sides of the same coin. When we deal with the investment management, it automatically encompasses disinvestment also, as what is investment for one is disinvestment for another, particularly in the secondary market. A company or a government organization will typically disinvest an asset either as a strategic move for the company, or for raising resources to meet general/specific needs. Disinvestment is a wider term extending from dilution of the stake of the government to a level where there is no change in the control to dilution that results in the transfer of management. The transfer of ownership may occur when in an enterprise the dilution of government ownership is beyond 51 per cent. The disinvestment implies that the government will sell to public or private enterprises / public institutes' part of its holding in public sector enterprises.

Disinvestment Status in India

The objective of Disinvestment policy is to promote people's ownership of Central Public Sector Enterprises through increased participation of retail investors. For the first four decades after Independence, the country was pursuing a path of development in which the public sector was expected to be the engine of growth. However, the public sector overgrew itself and its shortcomings started manifesting in low capacity utilization and low efficiency due to over manning, low work ethics, over capitalization due to substantial time and cost over runs, inability to innovate, take quick and timely decisions, large interference in decision making process etc. Hence, a decision was taken in 1991 to follow the path of Disinvestment. The change process in India began in the year 1991-92, with 31 selected PSUs disinvested for Rs.3, 038 crore. In August 1996, the Disinvestment Commission, chaired by G V Ramakrishna was set up to advice, supervise, monitor and publicize gradual disinvestment of Indian PSUs. It submitted 13 reports covering recommendations on privatization of 57 PSUs. However, the Disinvestment Commission ceased to exist in May 2004. The Department of Disinvestment was set up as a separate department in December,

1999 and was later renamed as Ministry of Disinvestment from September, 2001. From May, 2004, the Department of Disinvestment became one of the Departments under the Ministry of Finance. Against an aggregate target of Rs. 54,300 crore to be raised from PSU disinvestment from 1991-92 to 2000-01, the Government managed to raise just Rs. 20,078.62 crore (less than half). The reasons for such low proceeds from disinvestment against the actual target set were: unfavorable market conditions, offers made by the government were not attractive for private sector investors, lot of opposition on the valuation process, no clear-cut policy on disinvestment, strong opposition from employee and trade unions, lack of transparency in the process and lack of political will. This was the period when disinvestment happened primarily by way of sale of minority stakes of the PSUs through domestic or international issue of shares in small tranches. The value realized through the sale of shares, even in blue chip companies like IOC, BPCL, HPCL, GAIL & VSNL, however, was low since the control still lay with the government. Most of these offers of minority stakes during this period were picked up by the domestic financial institutions. Unit Trust of India was one such major institution.

During the period from 2001-02 - 2003-04 the maximum number of disinvestments took place. These took the shape of either strategic sales (involving an effective transfer of control and management to a private entity) or an offer for sale to the public, with the government still retaining control of the management. The valuations realized by this route were found to be substantially higher than those from minority stake sales. During this period, against an aggregate target of Rs. 38,500 crore to be raised from PSU disinvestment, the Government managed to raise Rs. 21,163.68 crore. The issue of PSU disinvestment remained a contentious issue during the period from 2004-05 – 2008-09. As a result, the disinvestment agenda stagnated during this period. In the 5 years from 2003-04 to 2008-09, the total receipts from disinvestments were only Rs. 8515.93 crore. A stable government and improved stock market conditions initially led to a renewed thrust on disinvestments. The Government started the process by selling minority stakes in listed and unlisted (profit-making) PSUs. From 2009-10 onwards period saw disinvestments in companies such as NHPC Ltd., Oil India Ltd., NTPC Ltd., REC, NMDC, SJVN, EIL, CIL, MOIL, etc. are made through public offers. However, from 2011 onwards, disinvestment activity has slowed down considerably. As against a target of Rs.40, 000 crore for 2011-12, the Government was able to raise only Rs.14, 000 crore.

Review of Literature

Megginson, Nash and Van Randenborgh (1994)[1] developed a proxy variable methodology to test whether a significant operational and financial performance changes exist between pre and post privatization period of divested firms. They compare both pre and post privatization 3-year average performance ratios for 61 firms in 18 countries over the period 1961-1989. The finding indicates significant increases in output, operating efficiency, profitability, capital investment spending and dividend payments are found along with significant decreases in leverage. The changes in employment after privatization are found to be insignificant. **Boubakri, Narjess, and Jean-Claude Cosset(1998)[2]** examine post-privatization financial and operating performance of 79 companies in 21 developing countries and 32 industries between 1980-1992.The study concludes that there are economically and statistically significant post-privatization increases in output (real sales), operating efficiency, profitability, capital investment spending, dividend payments, and employment as well as significant decreases in leverage.

D' Souza and Megginson (1999)[3] compared the pre- and post–privatization financial and operating performance of 85 companies in 28 countries and 21 industries that were privatized through public share offerings for the period between 19901 and 1996. Reported that privatization has led to significant increases in profitability, output, operating efficiency and dividend payments as well as a significant decrease in leverage ratios. **La Porta and Lopez-de-Silanes (1999)[4]** address significant improvements in output and sales efficiency of 218 Mexican privatized firms through June 1992, and find that the gap in performance between privatized firms and privately controlled firms narrows. They also find a significant decrease in the level of employment. **Harper (2000)[5]** examined privatization in the Czech Republic and concluded that this process resulted in improved profitability, higher efficiency and lower employment levels in divested firms in the second wave of privatization but caused the opposite results in the first disinvestment round. **Harper (2001)[6]** documents different findings for 178 Czech firms that were included in the first wave of voucher privatization. He concludes that profitability and efficiency decreased immediately following privatization. **Ray and Maharana (2002)[7]** have attempted to examine the progress of the process of PSEs disinvestment in India during the decade of 1991 to 2001. In terms of action to the PSEs disinvestment, very little has actually materialized. They suggest that the controversies and criticisms against disinvestment can be largely avoided through a transparent process.

Sudhir Naib (2003)[8] examined the impact of the partial divestiture of disinvested enterprises in India. The results indicate that in case of partial divestiture, where divested equity is thinly spread with the majority shareholding still the government, there has been no improvement in terms of profitability and operational efficiency. **Torero (2003)[9]** analyses the impact of privatization through a detailed statistical and econometric analysis of first difference (the difference between pre- and post-privatization performance), and second difference (change in performance of privatized firms relative to the change in performance of SOEs) of several indicators on profitability, operating efficiency, employment, leverage and convergence. The results indicate that privately owned firms are more efficient and profitable than state-owned firms. **Omran (2004)[10]** examines the performance of 54 newly privatized Egyptian firms against a matching number of SOEs. By matching sample firms (privatized) with control firms (SOEs) 94 over 1994–98.The analyses show that privatized firms do not exhibit significant improvement in their performance changes relative to SOEs.

Alovsat Muslumov (2005)[11] analyzed the impact of financial and operating performance of privatized companies in the Turkish cement industry. Document that privatization in cement industry results in significant performance deterioration. **Isnurhadi Banaluddin (2007)[12]** evaluated the impact of privatization on operating and financial performance of the privatized firms in Malaysia. The results showed that the performance proxies ROS, ROA and ROE deteriorated and real sales and net profit of the firms improved upon privatization. **Ravinder and Rupinder's (2007)[13]** study compares the pre- and post-disinvestment financial and operational performance of 15 PSEs of India that experienced partial disinvestment during the period of 1991-92 to 2002. The empirical evidence supports the positive effects of privatization on PSEs' performance. These privatized units have significantly improved the level of profitability, sales, operational efficiency, earnings per share and dividend payments after disinvestment. **Gagan Singh and Deepak Paliwal (2010)[14]** assessed the impact of disinvestment on the financial and operating performance of competitive and monopoly units in Indian public sector enterprises. Documents that

performance of monopoly firms show an improvement during the after-disinvestment period when compared to competitive firms. **Gupta Seema et al. (2011)[15]** assessed the financial performance of disinvested Central Public Sector Enterprises in India. Disinvestment has not yielded desired results in majority of dimensions, Concludes that government's intervention in operational functioning and managerial decision-making should be a matter of last resort.

Yahya Zakari Abdullahi et al. (2012)[16] investigates the financial and operating efficiency of the privatized firms in Nigeria. The period of analysis covers 5 years before, and 5 years after privatization. To test their predictions, we follow the techniques of **Megginson et al. (1994)** in order to determine post privatization performance changes. The mean values of each variable for each firm over the pre and post privatization periods are calculated. Then T-Test and Wilcoxon sign rank test are used as a principal method of testing for significant changes in the variables. Results obtained from this study are mixed. However in spite of the mixed results, the overall picture shows improvement in profitability for at least half of the firms in their sample. **Kishor C.Meher and Samiran Jana (2013)[17]** studied the impact of ownership due to strategic sale on financial performance of the privatized Pubic sector enterprises between pre and post privatization of Paradeep Phosphates Ltd, India. The various statistical tests have confirmed the significance of financial performance through improvement of short term financial position bringing liquidity in case of Paradeep Phosphates Ltd.

Statement of the Problem

The most important criticism levied against public sector undertakings has been that in relation to the capital employed, the level of profits has been too low. Even the government has criticized the public sector undertakings on this count. Of the various factors responsible for low profits in the public sector undertakings, most important among them are; price policy of public sector undertakings, under – utilization of capacity, problem related to planning and construction of projects, problems of labour, personnel and management and lack of autonomy. The government in order to put an end to these problems, decided to disinvest its stake in the PSUs (Public Sector Undertakings). The companies traditionally established as pillars of growth have now become a burden on the economy. Except few

mighty oil and petroleum companies, almost all other PSUs are incurring losses. The national gross domestic product and gross national savings are also adversely affected by low returns from PSUs. About 10 to 15 per cent of the total gross domestic savings are reduced on account of low savings from PSUs. With the equity markets having come off their historic lows in March 2009, there are certain signs of recovery. However, this should not be of any concern to the Government as PSUs, being high quality paper, would always find ready investors if the pricing is reasonable. PSU disinvestment of 10 per cent as per the Government's announced intentions, at attractive prices to retail investors, could ensure a strong message to the investment community about the Government's resolve to continue with reforms. Hence, it very important to analyze the financial and operating performance of disinvested Central Public Sector Enterprises in India which are very far from satisfactory. Therefore, the present study is undertaken to analyze the financial and operating performance of disinvested Central Public Sector Enterprises of Indian Manufacturing Sector based on cognate groups.

Objectives of the Study

The general objective of the study is to empirically analyze the effects of financial and operating performance based on cognate groups of the selected disinvested CPSE's of manufacturing sector in India.

Hypothesis

On the basis of the objectives of the study the following two main alternative hypotheses were developed for the purpose of the present study.

Ha_1 - According to the cognate groups in which disinvested CPSEs operate, there is significant difference across changes in operating performance of subsample groups following disinvestment.

Ha_2 - According to the cognate groups in which disinvested CPSEs operate, there is significant difference across changes in financial performance of subsample groups following disinvestment.

To support the above two hypothesis, six sub-hypotheses are in need of examination. These six sub-hypotheses are as follows:

1) There is a significant difference between profitability before and after disinvestment.
2) There is a significant difference between operating efficiency before and after disinvestment.
3) There is a significant difference between output before and after disinvestment.
4) There is a significant difference between employment before and after disinvestment.
5) There is a significant difference between solvency position before and after disinvestment.
6) There is a significant difference between stock indicators before and after disinvestment.

Methodology and Empirical Model

As noted earlier the main purpose of this study is to examine the impact of disinvestment on the financial and operating performance of disinvested CPSEs of manufacturing sector in India based on cognate groups. The study used secondary sources of data, which are collected from the capital market database called Centre for Monitoring Indian Economy Private Limited (Prowess CMIE). The research design used in the study is a "before- and-after" design (also known as the pre-test/post- test design). A "before and after" design can be described as two sets of cross section observations on the same population to ascertain the nature of the change in the phenomenon or variable (s), between two points of time. The change is measured by comparing the difference in the phenomenon or variables at the before and after periods. The most appropriate method in such a research is a post-event research methodology known as casual comparative method.

The research design adopted is similar to those employed by **Megginson et al. (1994), Boubakri and Cosset (1998) and D'Souza and Megginson 1999)**. Data on disinvested CPSEs for an eleven years, five years prior to the disinvestment and a five years period after the year of disinvestment for each disinvested firm in manufacturing sector were collected. According to purpose, the present research is classified as an applied research. Based on methodology and (nature, it is also presented as descriptive research. To measure the effects

of disinvestment on firm performance, at first performance measures for every firm for the years before and after disinvestment was calculated. Then, the mean of each measure is computed for each firm over the before disinvestment (years –5 to –1) and after disinvestment (years +1 to +5) periods. The main objective of the study is to do a comparative analysis of disinvested firms before and after disinvestment mainly in manufacturing sector. Therefore, the research design tries to identify whether the CPSEs perform better after disinvestment.

Sampling Design

Disinvested practices have started to implement in India since 1991. India has opted for the disinvestment for the period of 23 years (1991-92 to 2013-14). There are 260 CPSEs in India at present. Out of which only 80 CPSEs were disinvested during the period 1991-92 to 2013-14. Total disinvested enterprises till 6th July 2013 consist of 158 CPSEs. CPSE's consist of five sectors namely; Agriculture, Electricity, Manufacturing, Mining and Services. The analysis of the sectoral breakdown of the disinvestment in CPSEs in India within 1991-92 to 2013-14 shows that disinvested enterprises in manufacturing sector constitute 40.50 per cent of the total disinvestment of CPSEs which is higher than other sectors in India since 1991-92. (Table 1).

Keeping in view the scope of the study, it is decided to include all the 28 CPSEs in manufacturing sector which was disinvested during the period 1991-1992 to 2013-2014. But, owing to several constraints such as non-availability of financial statements, it was compelled to restrict the number of sample enterprises to 12 (Table 2). Thus, Multi-stage sampling technique is used. The final sample which constitutes 42.85 per cent of disinvested CPSEs of manufacturing sector in India during the time period 1991-1992 to 2013-2014 is selected using the following criteria: (i) Disinvested CPSEs should operate in manufacturing sector; (ii)Disinvested CPSEs are requested to have financial data for a period of eleven years encompassing five years before disinvestment and five years after disinvestment and (iii) The latest year of disinvestment is taken into account for the selection of sample and where there is no further dilution of stake by the government till 06 July 2013.

Selection of Variables

The variables that refer to the different factors that may influence disinvested firms' performance. Specifically, the study seeks to determine whether, following disinvestment, the disinvested CPSEs of manufacturing sector in India: improved their financial and operating performance. In the present study, an attempt has been made to cover financial and operating performance of disinvested firms based on cognate groups after disinvestment. As firms move from public to private ownership or both, their profitability should increase. More specifically, the present studies seek how firms' (1) profitability ratio, (2) operating efficiency, (3) output, (4) employment, (5) leverage, and (6) stock indicators are affected by disinvestment. The empirical evidence of these studies suggests that disinvestment could lead to an improvement in profitability, efficiency, outputs and stock indicators. On the other hand, although there is no consistent result with regard to the employment level and debt it is expected to decline after disinvestment. Table 3 presents variable description, performance measurement and expected results of the performance measure after disinvestment used in the present study. It focuses on the characteristics, which are examined for changes resulting from divestiture. The symbols A and B in the testable predictions stand for 'after' and 'before' divestiture.

Tools of Analysis

The tools used for the purpose of analysis of the present study are: ratio analysis, mean, median, Wilcoxon signed-ranked test is adopted to test for significant changes in the variables before and after disinvestment. The proportion test to determine whether the proportion (P) of companies experiencing changes in a given direction is greater than what would be expected by chance, typically testing whether $P = 0.5$ based on Sign test has been employed. The Kruskal-Wallis test has been used for analyzing the significant difference in variables among the cognate groups.

Empirical Model

To overcome the problem of different past performance among subsamples, the following methods are used to measure the variables.

(a) Absolute Performance Change Method

To test for the significant difference in performance change of each subsample groups, the data are adjusted to ensure that such comparison is valid. In this method, the absolute change in mean performance for each firm and subsample are calculated as follows:

$$APC = Pi,t - Pi,t -1$$

Where: *APC*   is absolute performance change,

                    Pi,t   is the mean performance after -divestment period, and

                    Pi,t -1 is the mean performance before -divestment period.

(a) Relative Performance Change Method

Since absolute changes are problematic as a measure of performance when the measure of performance is itself is an absolute measure. However, it is of important to take into consideration the history of companies' performance by calculating the performance after divestment relative to performance before divestment. Accordingly, the relative performance change of for subsamples is calculated as follows:

$$RPC = (Pi,t - Pi,t -1)/ Pi,t -1$$

Where: *RPC*   is relative performance change,

                    Pi,t   is the mean performance after -divestment period, and

                    Pi,t -1 is the mean performance before -divestment period.

Overall, the data analysis is conducted using a general-purpose statistical package called SPSS. Basically, SPSS is a collection of statistical analysis routines. SPSS provides a broad range of data manipulation and transformation procedures, statistical procedures, and charting facilities. The version IBM SPSS Statistics 20 for Windows of SPSS has all the necessary statistical routines for conducting the tests required in this research. The entire set of data has been analyzed by using SPSS.

Empirical Analysis

This section, present and discuss the empirical results for financial and operating performance. It is examined whether the financial and operating performance of selected 12 disinvested manufacturing Central Public Sector Enterprises based on cognate groups have improved after they were disinvested. In the present study, an attempt has been made to cover financial and operating performance of disinvested firms. To determine whether disinvestment performance varies by cognate groups, the sample is made split into five subsamples namely Fertilizer, Heavy Engineering, Medium and Light Engineering, Petroleum (refinery and marketing) and transportation Equipment. This section presents data analysis regarding sub-sample groups based on cognate groups. As firms move from public

to private ownership or both, their profitability should increase. More specifically, the present studies seek how firms' (1) profitability ratio, (2) operating efficiency, (3) output, (4) employment, (5) leverage, and (6) stock indicators are affected by disinvestment. The empirical evidence of these studies suggests that disinvestment could lead to an improvement in profitability, efficiency, outputs and stock indicators. On the other hand, although there is no consistent result with regard to the employment level and debt it is expected to decline after disinvestment.

Analysis of changes in profitability based on cognate groups

Table 4 presents the changes in performance of profitability based on cognate groups following disinvestment. According to outcomes, except some cognate groups such as Fertilizers and Heavy Engineering, both mean and median reveal a positive improvement in OPM and NPM after disinvestment. The findings documents that cognate groups such as Fertilizers and Heavy Engineering, reveal an insignificant improvement in OPM and NPM after disinvestment. According to statistical results, average of ROC has been decreased for the cognate groups Transportation Equipment only after disinvestment. While the criteria shows an insignificant improvement following disinvestment in other cognate groups. The Medium and Light Engineering and Transportation Equipment cognate groups showed a decline in ROA. The changes in ROE showed negative for the cognate groups Fertilizers and Transportation Equipment. To sum up, the profitability performance of Heavy Engineering among cognate groups showed improvement in profitability performance after disinvestment in almost all the indicators. Though, the improvement is statistically insignificant based on Wilcoxon test at 1 per cent and 5 per cent level of significance. Transportation Equipment showed a decline in all the profitability measures after disinvestment. Table 10 compares the profitability performance changes of selected disinvested CPSEs among cognate groups. With regard to Kruskal-Wallis test, difference among subsamples is not statistically significant based on absolute performance change method. The performance change in profitability measure during post-disinvestment period in relation to pre-disinvestment period also showed that there is no significant difference among cognate groups under relative performance change method. Hence, there is no significant difference among the cognate groups in all the profitability measures. Thus, the hypothesis is rejected.

Analysis of changes in operating efficiency based on cognate groups

The Table 5 presents the changes in performance of operating efficiency based on cognate groups following disinvestment. According to outcomes, both mean and median reveal a positive improvement in sales efficiency after disinvestment for the entire cognate groups. The change in sales efficiency was statistically significant for Petroleum (refinery and marketing based on Wilcoxon test at 1 per cent and 5 per cent level of significance. Though, the sales efficiency is positive after disinvestment for Transportation Equipment but it tends to decline by 7.10 per cent. The net income efficiency was declining for Fertilizer, Heavy Engineering, and Transportation Equipment after disinvestment. Table 10 compares the operating efficiency performance changes of selected disinvested CPSEs among cognate groups. With regard to Kruskal-Wallis test, difference among subsamples is not statistically significant based on Absolute Performance Change Method. The performance change in operating efficiency measure during post-disinvestment period in relation to pre-disinvestment period also showed that there is no significant difference among cognate groups under Relative Performance Change Method. Hence, there is no significant difference among the cognate groups in operating efficiency. Thus, the hypothesis is rejected.

Analysis of changes in output based on cognate groups

Table 6 presents the changes in performance of output based on cognate groups following disinvestment. According to outcomes, both mean and median reveal a positive improvement in output after disinvestment in the entire cognate groups except in Transportation Equipment. The change in output was positive for Fertilizer, Heavy Engineering, Medium and Light Engineering and Petroleum (refinery and marketing). Though, the improvement is statistically insignificant based on Wilcoxon test at 5 per cent level of significance except for Petroleum (refinery and marketing). Table 10 compares the output performance changes of selected disinvested CPSEs among cognate groups. With regard to Kruskal-Wallis test, difference among subsamples is not statistically significant based on Absolute Performance Change Method. The performance change in output measure during post-disinvestment period in relation to pre-disinvestment period also showed that there is no significant difference among cognate groups under Relative Performance Change Method. Hence, there is no significant difference among the cognate groups in real sales. Thus, the hypothesis is rejected.

Analysis of changes in employment based on cognate groups

This section examines changes in company's employment level among cognate groups by using average number of employees. To determine whether disinvestment performance varies by cognate groups, the sample is made split into five subsamples namely Fertilizer, Heavy Engineering, Medium and Light Engineering, Petroleum (refinery and marketing) and transportation Equipment. This section presents data analysis regarding sub-sample groups based on cognate groups. Table 7 presents the changes in performance of employment level based on cognate groups following disinvestment. According to outcomes, both mean and median revealed a decline in employment level after disinvestment except Medium and Light Engineering. Though, the decline is statistically significant only for Fertilizers and Transportation Equipment based on Wilcoxon test at 1 per cent and 5 per cent level of significance. Table 10 compares the changes in employment level of selected disinvested CPSEs among cognate groups. With regard to Kruskal-Wallis test, difference among subsamples is not statistically significant based on absolute performance change method and relative performance change method. Thus, the hypothesis is rejected.

Analysis of changes in solvency based on cognate groups

Table 8 presents the changes in performance of solvency based on cognate groups following disinvestment. According to outcomes, the mean value of ICR and LDR for Fertilizers reveal a positive change and DER and PR show a negative change in mean value after disinvestment. The findings documents that Heavy Engineering show a positive change in mean value for DER, ICR, and PR and negative change in LDR after disinvestment. According to statistical results, mean value of ICR and LDR showed positive change a DER and PR showed a negative change in mean values for the cognate groups Medium and Light Engineering after disinvestment. The mean values of Petroleum (Refinery and Marketing) showed positive changes in ICR and negative changes in DER, PR and LDR after disinvestment. The Transportation Equipment showed a positive change in mean value of PR after disinvestment. To sum up, the Solvency of Petroleum (Refinery and Marketing) among cognate groups performed better after disinvestment when compared to other cognate groups. Though, the improvement is statistically insignificant based on Wilcoxon test in some indicators at 1 per cent and 5 per cent level of significance. Hence, the hypothesis is rejected. Table 10 compares the solvency changes of selected disinvested CPSEs among cognate groups. With regard to Kruskal-Wallis test, difference among subsamples is not statistically

significant based on absolute performance change method. The performance change in solvency measure during post-disinvestment period in relation to pre-disinvestment period also showed that there is no significant difference among cognate groups under relative performance change method. Hence, there is no significant difference among the cognate groups in all the solvency measures. Thus, the hypothesis is rejected.

Analysis of changes in stock indicators based on cognate groups

Table 9 presents the changes in performance of stock indicators based on cognate groups following disinvestment. According to outcomes, both mean and median reveal a positive improvement in EPS and Book value per share after disinvestment except in Fertilizer. The mean and median value of dividend payout ratio was positive only for Petroleum (refinery and marketing). However, the improvement was statistically insignificant based on Wilcoxon test. The change in EPS was statistically significant for Fertilizers and Transportation Equipment based on Wilcoxon test at 1 per cent and 5 per cent level of significance. The change in Book value per share was statistically significant for Transportation Equipment based on Wilcoxon test at 1 per cent and 5 per cent level of significance. Table 10 compares the stock indicators performance changes of selected disinvested CPSEs among cognate groups. With regard to Kruskal-Wallis test, difference among subsamples is not statistically significant based on absolute performance change method. The performance change in stock measure during post-disinvestment period in relation to pre-disinvestment period also showed that there is no significant difference among cognate groups under relative performance change method. Hence, there is no significant difference among the cognate groups in all the stock indicators. Thus, the hypothesis is rejected.

Summary and Conclusion

The study examined the overall financial and operating performance of 12 disinvested CPSEs of Indian Manufacturing Sector by comparing before and after divestment performance based on cognate groups after divestment. The indicators used are profitability, operating efficiency, output, employment, solvency and stock indicators. The Fertilizers group showed a decline in EMP, LDR and BVPS after disinvestment. The Heavy Engineering group showed improvement in all the profitability, output, ICR and PR performance indicators except in NIE and DER after divestment. However, it was statistically insignificant based on Wilcoxon test. The findings revealed that Medium and Light Engineering showed improvement in BVPS after divestment and a decline in DER. The Petroleum (Refinery and Marketing) showed an improvement in NIE, DER, EMP and DPR after divestment. Only Petroleum (Refinery and Marketing) showed an increase in DPR, after divestment. It was observed that Fertilizers, two sample companies of Heavy Engineering and Transportation Equipment Group failed to pay dividend to its shareholders before and after divestment during the period of the study. Hence, it is documented that greater performance improvement for the Heavy Engineering groups of companies in majority of the performance indicators when compared to the other cognate groups after disinvestment. However, the performance of Transportation Equipment was very far from satisfactory after disinvestment. Thus, the empirical analysis revealed that there is no significant difference among cognate groups after disinvestment.

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Table 1

Divestment based on Sector from 1991-92 to 2013-14 (As on 06 July 2013)

Sector	No. of Enterprises Disinvested	No. of Divestments	% of Divestment to Total No. of Divestments
Agriculture	-	-	-
Electricity	6	9	5.70
Manufacturing	28	64	40.50
Mining	11	31	19.60
Services	35	54	34.20
Total	**80**	**158**	**100**

Source: Department of Divestment, Ministry of Finance, Government of India.

Table 2

Sample Based on Cognate Groups

Cognate Groups	Name of the enterprise	Latest year of divestment Year	Type of divestment	% stake disinvested	% residual equity with govt.
Fertilizers	Paradeep Phosphates Ltd.	2001-02	Majority	74	26
Heavy Engineering	Bharat Heavy Electricals Ltd.	1994-95	Minority	32.26	67.72
	Jessop & Company Ltd.	2003-04	Majority	72	27
	Lagan Jute Machinery Company Ltd.	2000-01	Majority	74	26
Medium & Light Engineering	Bharat Electronics Ltd.	1994-95	Minority	24.16	75.86
	Maruti Udyog Ltd.	2007-08	Complete Privatization	45.79	0
Petroleum (refinery & Marketing)	Bongaigaon Refinery & petrochemicals Ltd.	2000-01	Complete Privatization	100	0
	Gail (India) Ltd.	2003-04	Minority	42.65	57.34
	Hindustan Petroleum Corporation Ltd.	1994-95	Minority	48.57	51.07
	Indian Oil Corporation Ltd.	1999-00	Minority	17.84	82.16
	Madras Refineries Ltd.	2000-01	Complete Privatization	68.73	0
Transportation Equipment	Bharat Earth Movers Ltd.	1994-95	Minority	39.26	60.81

Source: Department of Divestment, Ministry of Finance, Government of India.

Table 3
Testable Predictions of Financial and Operating Performance Indicators

Characteristic	Proxies	Testable Prediction
1. Profitability	Operating Profit Margin Ratio (OPM) = PBIDTA/Total Sales*100	$OPM_A > OPM_B$
	Net Profit Margin Ratio (NPM) = PAT/Total Sales*100	$NPM_A > NPM_B$
	Return on Capital Employed (ROC) = PAT/Capital Employed*100	$ROC_A > ROC_B$
	Return on Total Assets (ROA) = PAT/Total Assets*100	$ROA_A > ROA_B$
	Return on Net worth (ROE) = PAT/Net worth*100	$ROE_A > ROE_B$
2. Operating Efficiency	Sales Efficiency (SE) = Real Sales/Number of Employees (Normalized)	$SE_A > SE_B$
	Net Income Efficiency (NIE) = Real Net Income/Number of Employees (Normalized)	$NIE_A > NIE_B$
3. Output	Real Sales (RS) = Nominal Sales/ Consumer Price Index (Normalized)	$RS_A > RS_B$
4. Employment	Employment (EMP) = Number of Employees	$EMP_A < EMP_B$
5. Solvency	Debt-Equity ratio (DER)= Debt/Equity	$DER_A < DER_B$
	Interest cover ratio (ICR) = PBIT/Fixed Interest Charges	$ICR_A > ICR_B$
	Proprietary ratio (PR) = Shareholders Fund/ Total Tangible Assets	$PR_A < PR_B$
	Long-term debt ratio (LDR)= Long-term Borrowing/Total Tangible Assets	$LDR_A < LDR_B$
6. Stock Indicators	Earnings per share (EPS) = (NPAT-Preference Dividend)/ Number of Equity Shares	$EPS_A > EPS_B$
	Book value per share (EPS) = Equity Shareholders Fund/ Number of Equity Shares	$BVPS_A > BVPS_B$
	Dividend Payout Ratio (DPR) = Equity Dividend/Net Profit after tax and Preference Dividend *100	$DPR_A > DPR_B$

Source: Megginson et al (1994).

Table 4

Test for Significance Changes in Profitability Performance following Disinvestment based on Cognate Groups

Profitability Ratios	Cognate Groups	N	Statistics	Disinvestment		Change (After - Before)	Wilcoxon test (After-Before)	
				Before	After		Z-Statistic	P-Value
Operating Profit Margin Ratio	**Fertilizers**	1	**Mean**	-0.018	0.738	0.756	-0.405	0.686
			Median	-1.030	3.170	4.200		
	Heavy Engineering	3	**Mean**	-4.239	9.031	13.270	-1.069	0.285
			Median	-0.893	10.957	11.850		
	Medium & Light Engineering	2	**Mean**	13.811	11.522	-2.289	-1.342	0.180
			Median	14.435	11.860	-2.575		
	Petroleum (Refinery & Marketing)	5	**Mean**	10.567	9.518	-1.048	-0.944	0.345
			Median	10.092	11.226	1.134		
	Transportation Equipment	1	**Mean**	19.732	13.128	-6.604	-2.023	0.043*
			Median	19.410	13.030	-6.380		
Net Profit Margin Ratio	**Fertilizers**	1	**Mean**	-8.034	-1.862	6.172	-1.483	0.138
			Median	-8.070	-0.940	7.130		
	Heavy Engineering	3	**Mean**	-29.836	6.625	36.461	-1.604	0.109
			Median	-34.727	7.220	41.947		
	Medium & Light Engineering	2	**Mean**	5.048	4.959	-0.089	-0.447	0.655
			Median	5.150	4.710	-0.440		
	Petroleum (Refinery & Marketing)	5	**Mean**	5.666	5.389	-0.277	-0.405	0.686
			Median	5.020	6.572	1.552		
	Transportation Equipment	1	**Mean**	5.038	0.990	-4.048	-2.023	0.043*
			Median	4.310	1.100	-3.210		
Return on Capital Employed	**Fertilizers**	1	**Mean**	-14.476	-0.896	13.580	-1.483	0.138
			Median	-11.700	-3.070	8.630		
	Heavy Engineering	3	**Mean**	-37.019	12.488	49.507	-1.604	0.109
			Median	-39.510	10.553	50.063		
	Medium & Light Engineering	2	**Mean**	11.222	12.423	1.201	-0.447	0.655
			Median	12.325	10.865	-1.460		
	Petroleum (Refinery & Marketing)	5	**Mean**	10.885	16.897	6.012	-2.023	0.043*
			Median	10.036	18.420	8.384		
	Transportation Equipment	1	**Mean**	4.404	0.948	-3.456	-2.023	0.043*
			Median	4.140	1.180	-2.960		
Return on Total Assets	**Fertilizers**	1	**Mean**	-6.826	-0.378	6.448	-1.483	0.138
			Median	-6.140	-1.620	4.520		
	Heavy Engineering	3	**Mean**	-10.161	5.229	15.390	-1.604	0.109
			Median	-11.570	4.907	16.477		
	Medium & Light Engineering	2	**Mean**	7.222	6.005	-1.217	-0.447	0.655
			Median	8.035	5.385	-2.650		
	Petroleum (Refinery & Marketing)	5	**Mean**	6.897	9.345	2.448	-2.023	0.043*
			Median	6.390	10.276	3.886		
	Transportation Equipment	1	**Mean**	3.372	0.690	-2.682	-2.023	0.043*
			Median	3.110	0.840	-2.270		
Return on Equity	**Fertilizers**	1	**Mean**	49.278	-16.360	-65.638	-0.944	0.345
			Median	60.730	7.073	-53.657		
	Heavy Engineering	3	**Mean**	6.126	14.264	8.138	-1.604	0.109
			Median	7.016	16.366	9.350		
	Medium & Light Engineering	2	**Mean**	15.188	15.825	0.637	-0.447	0.655
			Median	16.200	15.205	-0.995		
	Petroleum (Refinery & Marketing)	5	**Mean**	17.738	24.509	6.771	-1.214	0.225
			Median	16.268	27.498	11.230		
	Transportation Equipment	1	**Mean**	10.526	2.070	-8.456	-2.023	0.043*
			Median	9.560	2.530	-7.030		

*Significant at 5% level.
   Source: Computed.

Table 5
Test for Significance Changes in Operating Efficiency following Disinvestment based on Cognate Groups

Variables	Cognate Groups	N	Statistics	Disinvestment		Change (After - Before)	Wilcoxon test (After-Before)	
				Before	After		Z-Statistic	P-Value
Sales Efficiency	**Fertilizers**	**1**	**Mean**	1.323	3.489	2.166	-1.483	0.138
			Median	1.306	2.042	0.736		
	Heavy Engineering	**3**	**Mean**	1.084	3.872	2.788	-1.604	0.109
			Median	1.049	3.415	2.366		
	Medium & Light Engineering	**2**	**Mean**	0.776	1.199	0.423	-1.342	0.180
			Median	0.649	1.213	0.565		
	Petroleum (Refinery & Marketing)	**5**	**Mean**	0.793	2.299	1.506	-2.023	0.043*
			Median	0.789	2.359	1.570		
	Transportation Equipment	**1**	**Mean**	1.014	0.942	-0.072	-0.944	0.345
			Median	0.978	0.944	-0.034		
Net Income Efficiency	**Fertilizers**	**1**	**Mean**	0.310	-0.287	-0.597	-1.483	0.138
			Median	0.326	0.059	-0.267		
	Heavy Engineering	**3**	**Mean**	2.911	-1.696	-4.607	-0.535	0.593
			Median	3.379	-1.594	-4.973		
	Medium & Light Engineering	**2**	**Mean**	1.492	1.955	0.462	-1.342	0.180
			Median	1.271	1.897	0.626		
	Petroleum (Refinery & Marketing)	**5**	**Mean**	0.475	1.321	0.846	-0.944	0.345
			Median	0.542	1.567	1.025		
	Transportation Equipment	**1**	**Mean**	5.081	0.935	-4.146	-2.023	0.043*
			Median	4.080	0.997	-3.083		

*Significant at 5% level.
   Source: Computed.

Table 6
Test for Significance Changes in Output following Disinvestment based on Cognate Groups

Variable	Cognate Groups	N	Statistics	Disinvestment		Change (After - Before)	Wilcoxon test (After-Before)	
				Before	After		Z-Statistic	P-Value
Real Sales	**Fertilizers**	**1**	**Mean**	1.323	3.067	1.744	-0.944	0.345
			Median	1.266	1.778	0.512		
	Heavy Engineering	**3**	**Mean**	1.103	3.282	2.179	-1.604	0.109
			Median	1.040	3.194	2.153		
	Medium & Light Engineering	**2**	**Mean**	0.677	1.144	0.467	-0.447	0.655
			Median	0.585	1.153	0.567		
	Petroleum (Refinery & Marketing)	**5**	**Mean**	0.782	2.272	1.491	-2.023	0.043*
			Median	0.774	2.349	1.575		
	Transportation Equipment	**1**	**Mean**	1.054	0.898	-0.156	-2.023	0.043*
			Median	1.044	0.900	-0.144		

*Significant at 5% level.
   Source: Computed.

Table 7
Test for Significance Changes in Employment following Disinvestment based on Cognate Groups

Variable	Cognate Groups	N	Statistics	Disinvestment		Change (After - Before)	Wilcoxon test (After-Before)	
				Before	After		Z-Statistic	P-Value
No. of Employees	**Fertilizers**	**1**	**Mean**	1063	943	-121	-9.066	0.001**
			Median	1063	939	-124		
	Heavy Engineering	**3**	**Mean**	24808	22004	-2804	-1.030	0.411
			Median	24659	22019	-2640		
	Medium & Light Engineering	**2**	**Mean**	11401	11526	124	0.038	0.976
			Median	11416	11449	33		
	Petroleum (Refinery & Marketing)	**5**	**Mean**	10151	9887	-264	-0.493	0.648
			Median	10169	9903	-266		

				16744	15324	-1420	-7.524	0.002**
	Transportation Equipment	1	Mean Median	16657	15349	-1308		

**Significant at 1% level. Source: Computed.

Table 8

Test for Significance Changes in Solvency following Disinvestment based on Cognate Groups

Solvency Ratios	Cognate Groups	N	Statistics	Disinvestment		Change (After - Before)	Wilcoxon test (After-Before)	
				Before	After		Z-Statistic	P-Value
Debt-Equity Ratio	Fertilizers	1	Mean	-3.396	-4.862	-1.466	-0.405	0.686
			Median	-4.960	-3.517	1.443		
	Heavy Engineering	3	Mean	0.125	0.266	0.141	-0.535	0.593
			Median	0.119	0.395	0.276		
	Medium & Light Engineering	2	Mean	0.672	0.341	-0.331	-1.342	0.180
			Median	0.615	0.360	-0.255		
	Petroleum (Refinery & Marketing)	5	Mean	0.650	0.587	-0.063	-0.405	0.686
			Median	0.638	0.506	-0.132		
	Transportation Equipment	1	Mean	1.426	1.162	-0.264	-1.753	0.080
			Median	1.380	1.240	-0.140		
Interest Cover Ratio	Fertilizers	1	Mean	-0.838	0.578	1.416	-1.753	0.080
			Median	-0.800	0.590	1.390		
	Heavy Engineering	3	Mean	-0.449	11.149	11.598	-1.604	0.109
			Median	0.180	7.100	6.920		
	Medium & Light Engineering	2	Mean	20.348	33.153	12.805	-1.342	0.180
			Median	19.230	19.990	0.760		
	Petroleum (Refinery & Marketing)	5	Mean	5.284	22.653	17.369	-2.023	0.043*
			Median	4.868	15.460	10.592		
	Transportation Equipment	1	Mean	1.686	1.134	-0.552	-2.023	0.043*
			Median	1.600	1.190	-0.410		
Proprietary Ratio	Fertilizers	1	Mean	0.066	-0.190	-0.256	-2.023	0.043*
			Median	0.047	-0.211	-0.258		
	Heavy Engineering	3	Mean	-0.473	-0.085	0.389	-0.535	0.593
			Median	-0.414	-0.006	0.407		
	Medium & Light Engineering	2	Mean	0.420	0.375	-0.045	-0.447	0.655
			Median	0.420	0.369	-0.051		
	Petroleum (Refinery & Marketing)	5	Mean	0.416	0.402	-0.015	-0.405	0.686
			Median	0.415	0.417	0.002		
	Transportation Equipment	1	Mean	0.318	0.328	0.010	-0.948	0.343
			Median	0.311	0.320	0.009		
Long-term Debt Ratio	Fertilizers	1	Mean	0.256	0.420	0.164	-1.483	0.138
			Median	0.263	0.470	0.207		
	Heavy Engineering	3	Mean	0.479	0.105	-0.374	-1.604	0.109
			Median	0.444	0.088	-0.356		
	Medium & Light Engineering	2	Mean	0.101	0.115	0.014	-0.447	0.655
			Median	0.104	0.106	0.003		
	Petroleum (Refinery & Marketing)	5	Mean	0.157	0.140	-0.017	-0.405	0.686
			Median	0.153	0.134	-0.019		
	Transportation Equipment	1	Mean	0.266	0.174	-0.092	-1.753	0.080
			Median	0.274	0.136	-0.138		

*Significant at 5% level.
 Source: Computed.

Table 9

Test for Significance Changes in Stock Indicators following Disinvestment based on Cognate Groups

Variables	Cognate Groups	N	Statistics	Disinvestment		Change (After - Before)	Wilcoxon test (After-Before)	
				Before	After		Z-Statistic	P-Value
Earnings Per Share	Fertilizers	1	Mean	-469.624	-37.754	431.870	-2.023	0.043*
			Median	-482.920	-27.680	455.240		
	Heavy Engineering	3	Mean	-135.871	55.219	191.090	-1.604	0.109
			Median	-141.217	24.190	165.407		
	Medium & Light Engineering	2	Mean	16.194	37.949	21.755	-1.342	0.180
			Median	16.790	42.930	26.140		
	Petroleum (Refinery & Marketing)	5	Mean	217.812	28.172	-189.640	-0.674	0.500
			Median	21.654	26.572	4.918		
	Transportation Equipment	1	Mean	748.666	3.344	-745.322	-2.023	0.043*
			Median	1179.000	3.970	-		
Book Value Per Share	Fertilizers	1	Mean	-13.098	-35.356	-22.258	-1.483	0.138
			Median	-19.850	-34.660	-14.810		
	Heavy Engineering	3	Mean	213.628	105.281	-108.347	-1.069	0.285
			Median	246.057	104.197	-141.860		
	Medium & Light Engineering	2	Mean	9.785	25.871	16.086	-1.342	0.180
			Median	9.330	26.180	16.850		
	Petroleum (Refinery & Marketing)	5	Mean	158.370	13.034	-145.336	-0.135	0.893
			Median	221.986	12.530	-209.456		
	Transportation Equipment	1	Mean	12.596	15.462	2.866	-2.023	0.043*
			Median	12.640	15.490	2.850		
Dividend Payout Ratio	Fertilizers	0	Mean	-	-	-	-	-
			Median	-	-	-	-	-
	Heavy Engineering	1	Mean	33.094	11.308	-21.786	-2.023	0.043*
			Median	26.820	11.240	-15.580		
	Medium & Light Engineering	2	Mean	24.516	21.948	-2.568	-1.342	0.180
			Median	23.065	19.715	-3.350		
	Petroleum (Refinery & Marketing)	4	Mean	21.851	29.110	7.260	-1.461	0.144
			Median	20.728	28.680	7.953		
	Transportation Equipment	0	Mean	-	-	-	-	-
			Median	-	-	-	-	-

*Significant at 5% level.
 Source: Computed.

Table 10

Summary of Comparison of Performance Changes in Variables amongst the Cognate Groups

S. No.	Variables	Kruskal-Wallis test					
		Absolute Performance Change Method			Relative Performance Change Method		
		Chi-Square	P-Value	H_a	Chi-Square	P-Value	H_a
Profitability Ratios							
1	Operating Profit Margin Ratio	3.741	0.442	Rejected	6.254	0.181	Rejected
2	Net Profit Margin Ratio	8.541	0.074	Rejected	3.154	0.532	Rejected
3	Return on Capital Employed	6.641	0.156	Rejected	3.741	0.442	Rejected
4	Return on Assets	8.449	0.076	Rejected	3.638	0.457	Rejected
5	Return on Equity	5.792	0.215	Rejected	3.933	0.415	Rejected
Operating Efficiency							
6	Sales Efficiency	4.541	0.338	Rejected	4.233	0.375	Rejected
7	Net Income Efficiency	3.433	0.488	Rejected	5.515	0.238	Rejected
Output							
8	Real Sales	4.295	0.368	Rejected	3.041	0.551	Rejected
Employment							
9	No. of Employees	1.708	0.789	Rejected	3.023	0.554	Rejected
Solvency Ratios							
10	Debt-Equity Ratio	3.126	0.537	Rejected	3.831	0.429	Rejected
11	Interest Cover Ratio	4.333	0.363	Rejected	5.156	0.272	Rejected
12	Proprietary Ratio	1.786	0.775	Rejected	3.564	0.468	Rejected
13	Long-term Debt Ratio	5.103	0.277	Rejected	4.272	0.37	Rejected
Stock Indicators							
14	Earnings Per Share	4.356	0.36	Rejected	4.049	0.399	Rejected
15	Book Value Per Share	2.818	0.589	Rejected	6.856	0.144	Rejected
16	Dividend Payout Ratio	4.821	0.09	Rejected	4.821	0.09	Rejected

Source: Computed.