

Comparison of Efficiency between Workouts and Court Receiverships

Seok-Young Lee¹, Sang-Lyul Ryu², Jayoun Won³

¹ Sungshin Women's University, 34 Bomoon-ro Seongbuk-gu Seoul 136-742, Korea,
sylee@sungshin.ac.kr

² Konkuk University, 120 Neungdong-ro Gwangjin-gu Seoul 143-701, Korea,
slryu2002@konkuk.ac.kr

³ Sungshin Women's University, 34 Bomoon-ro Seongbuk-gu Seoul 136-742, Korea,
jayonce@hanmail.net

Abstract. Workouts under the Corporate Restructuring Promotion Act and court receiverships under the Debtor Rehabilitation and Bankruptcy Act are the most common corporate restructuring methods for financially distressed firms in Korea. Using financial data of 32 court receivership firms and 30 workout firms for a seven-year period, we examine whether two different types of corporate restructuring (i.e., workouts and court receiverships) result in financially distressed firms improving efficiency differentially in the period following workouts or court receiverships. We find that the positive impact of workouts on the aggregate and technical efficiency of financially distressed firms is higher than that of court receiverships on the aggregate and technical efficiency of other financially distressed firms.

1 Research Question

Workouts under the Corporate Restructuring Promotion Act and court receiverships under the Debtor Rehabilitation and Bankruptcy Act are the most common corporate restructuring methods for financially distressed firms in Korea (Kim and Ki 2011). Workouts are a form of corporate restructuring program based on the agreement between a debtor and creditor financial institutions. When the Corporate Restructuring Promotion Act was initially enacted, creditor financial institutions held almost all debts of distressed firms, and it was easy for debtor firms and creditor financial institutions to agree upon a workout program.

Court receiverships, another form of corporate restructuring, target firms on the verge of bankruptcy. This approach is led by the court and tries to adjust the interests of multiple stakeholders from the legal perspective and induce the financially distressed firm's efficient rehabilitation. Either a debtor or a creditor can apply for court receivership with the court in the jurisdiction, which will assess the debtor firm's going concern value and liquidating value to decide whether to commence the restructuring process (Kim and Ki 2011; Hwang 2013).

Taking the differences between these two corporate restructuring programs into consideration, we address the following research question: Do the two different

corporate restructuring approaches result in financially distressed firms improving efficiency differentially in the period following workouts or court receiverships?

2 Research Design

Following Cooper et al. (2007), we apply data envelopment analysis (DEA) in estimating efficiency scores. Specifically, we use the output-oriented three-input one-output model in which the three inputs are (i) cost of goods sold, (ii) selling, general & administrative costs (SG&A costs), and (iii) the average balance of property, plant and equipment, and the output is sales revenue. First, we employ the output-oriented constant returns to scale DEA model of Charnes et al. (1978) to estimate the aggregate efficiency scores of the different observations (i, t) for firm $i = 1, \dots, I$, and year $t = t-3, t-2, t-1, t=0, t+1, t+2$ where $t=0$ is the year of commencement of workouts or court receiverships. Second, we also employ the output-oriented variable returns to scale DEA model of Banker et al. (1984) to estimate the technical efficiency scores of the different observations (i, t) for firm $i = 1, \dots, I$, and year $t = t-3, t-2, t-1, t=0, t+1, t+2, t+3$. Third, we measure scale efficiency of an observation i in year t by dividing aggregate efficiency by technical efficiency (Banker and Thrall 1992).

We analyze financial data of financially distressed firms in Korea for 7-year time frame that covers (i) the year of commencement of each corporate restructuring ($t=0$), (ii) the three years prior to commencement of each corporate restructuring ($t-3, t-2, t-1$), and (iii) another three years after corporate restructuring commencement ($t+1, t+2, t+3$). That is, all financial data for financially distressed firms are aligned in event time with year $t=0$ representing the year of the corporate restructuring's implementation.

Our empirical analysis proceeds as follows. First, pooled data for two different groups of court receivership firms and workout firms for seven-year period are used to estimate the relative efficiency scores for each firm-year observation. Second, we examine the trend of each efficiency scores by year and type of corporate restructuring. Third, we test for the difference in the average efficiency between court receivership firms and workout firms.

3 Empirical Results

3.1 Data and Descriptive Statistics

Our sample consists of 62 financially distressed firms that belong to the manufacturing sector (Korean Industry Standard codes 031001-033302) with fiscal years ending on December 31 and are listed on the Korean Stock Exchange for our sample period. From database TS2000, we obtained financial data for a 7-year period for 32 court receivership firms and 30 workout firms. All monetary value items used in this study have been deflated to 2010 Korean won using the index of consumer prices published by the Bank of Korea.

Table 1 provides descriptive statistics on output, inputs, and efficiency scores. The median values of the output variable and the three input variables are all much smaller than their mean values, indicating that the data are skewed to the left. The mean of the aggregate efficiency scores is 0.728 and the median is 0.737. The lower and upper quartiles for the aggregate efficiency for our pooled data are 0.673 and 0.798, respectively.

Table 1. Descriptive Statistics for Pooled Data (N=434)

Description		Mean	Std. Dev.	Q1	Median	Q3
Output	Sales Revenue	738,760	1,752,966	136,916	266,309	455,542
Inputs	Cost of Goods Sold	614,531	1,418,133	114,726	224,346	387,760
	SG&A Costs	106,854	298,764	13,792	27,227	69,019
	Plant, Property and Equipment	543,975	1,358,864	46,274	103,269	345,606
Efficiency	Aggregate Eff.	0.728	0.128	0.673	0.737	0.798
	Technical Eff.	0.782	0.125	0.723	0.781	0.851
	Scale Eff.	0.933	0.093	0.917	0.961	0.983

Note: Output and inputs are expressed in one million Korean won.

3.2 Efficiency Analysis

Table 2 reports each efficiency scores by the type of corporate restructuring for each of seven years from t-3 to t+3 where t=0 represents the event year that includes the commencement date of each corporate restructuring program.

Table 2. Average Efficiency Scores by Type of Corporate Restructuring and Year

Year	Types of Corporate Restructuring					
	32 Court Receivership Firms (224 firm-year observations)			30 Workout Firms (210 firm-year observations)		
	Aggregate Efficiency	Technical Efficiency	Scale Efficiency	Aggregate Efficiency	Technical Efficiency	Scale Efficiency
t-3	0.782	0.834	0.939	0.778	0.835	0.934
t-2	0.754	0.793	0.953	0.771	0.832	0.928
t-1	0.731	0.769	0.953	0.760	0.815	0.936
t=0	0.654	0.689	0.941	0.684	0.734	0.933
t+1	0.694	0.769	0.912	0.729	0.774	0.943
t+2	0.698	0.767	0.906	0.721	0.767	0.942
t+3	0.691	0.775	0.900	0.748	0.800	0.938
Average	0.715	0.771	0.929	0.742	0.794	0.936

Average technical efficiency of court receivership firms had been on a steady decline since the year t-3, recorded the lowest score of 0.689 at t=0, but since then have increased. In contrast, since the year t=0, average scale efficiency of court receivership firms has gone down over time. Therefore, we can infer that the

ameliorating effect of aggregate efficiency of court receivership firms is attenuated by decrease in scale efficiency coupled with increase in technical efficiency.

Trend analysis reveals that the efficiency pattern of workout firms is similar to that of court receivership firms. Scale efficiency of workout firms has stayed more or less the same over the entire sample period. Therefore, it is likely that the change in aggregate efficiency of work firms is driven mainly by the change in technical efficiency.

3.3 Statistical Tests of Mean Efficiency Difference

We test the null hypothesis of no difference in mean efficiency between court receivership firms and workout firms against the alternative of the difference in mean efficiency between the two groups. The results in Table 3 indicate that the null hypothesis of no difference in mean efficiency between two groups is rejected at the 10% level by Mann-Whitney U test. However, the result of T-test shows that there is not any difference in mean of the scale efficiency between two groups. Overall, we conclude that the positive impact of workouts on the aggregate and technical efficiency of financially distressed firms is higher than that of court receiverships on the aggregate and technical efficiency of other financially distressed firms.

Table 3. Test of Mean Difference in Efficiency by Type of Corporate Restructuring

Efficiency	Mean			T-test		Mann-Whitney U	
	Court Receivership	Workout	Diff.	t-value	p-value	z-value	p-value
Aggregate	0.715	0.742	0.027	2.195	0.029	2.088	0.037
Technical	0.771	0.794	0.023	1.906	0.057	1.779	0.075
Scale	0.929	0.936	0.007	0.804	0.422	2.986	0.003

References

1. Banker, R.D., A. Charnes, and W.W. Cooper, Some Models for Estimating Technical and Scale Inefficiencies in Data Envelopment Analysis. *Management Science* 30 (9), 1078-1092 (1984).
2. Banker, R.D. and R.M. Thrall, Estimation of Returns to Scale Using Data Envelopment Analysis. *European Journal of Operational Research* 62, 74-84 (1992).
3. Charnes, A., W.W. Cooper, and E. Rhodes, Measuring the Efficiency of Decision Making Units. *European Journal of Operations Research* 2 (6), 429-444 (1978).
4. Cooper, W.W., L. Seiford, and K. Tone, *Data Envelopment Analysis: A Comprehensive Text with Models, Applications, References and DEA-solver Software*, 2nd Edition, Springer Verlag, New York (2007).
5. Hwang, S., Improving Korea's Corporate Restructuring System, *Capital Market Opinion*, Korea Capital Market Institute (July 23, 2013).
6. Kim, M.-C. and H.-H. Ki, The Corporate Restructuring Types and The Financial Factors. *Korean Journal of Accounting Research* 16 (4), 53-71 (2011).