Cost Inefficiency, Size of Firms and Takeovers

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Abstract. This study, using the Cox proportional hazards model, finds that the risk of takeover rises with cost inefficiency. It also finds that a firm faces a significantly higher risk of takeover if its cost performance lags behind its industry benchmark. Moreover, these findings appear to be remarkably stable over the nearly two decades spanned by the sample. The effect of the variables used to measure the risk-size relationship, however, indicates temporal changes. Lastly, the study presents evidence from fixed-effects models of ex post cost efficiency improvements that support the hypothesis that takeover targets are selected based on the potential for improvement.

Key words: corporate finance and governance, mergers, acquisitions, econometric methods, models with panel data, truncated and censored models.

JEL Classification: G3, G34, C2, C23, C24

Corporate takeovers have been a permanent feature of the American business landscape since the mid-1800s (Pound, 1992). Mergers and acquisitions continue to play an important role in allocating resources in the U.S. economy. The same number of mergers and acquisitions were completed in the first five years of the 1990s—about 23,000—as in the entire previous decade (Mergers and Acquisitions, September–October, 1995). Furthermore, in the peak years of each decade, the value of takeovers equaled about one-fourth of GNP (Fortune, March 2, 1998.)

The prominent role of takeovers in reallocating control over capital in the U.S. economy has generated vigorous debate over whether takeovers actually improve efficiency. Two issues dominate the debate: the pre-takeover performance of targets and the post-takeover changes in performance. As discussed in more detail in the next section, earlier studies of the ex ante performance of target firms did not reach a definitive conclusion about the effect of efficiency on the risk of takeover. Moreover, there is no consensus on the ex post effect of takeovers on firm performance.
A variety of variables were used to measure performance across the different sample periods in takeover studies. The examination of measures of profit and market value as performance measures in this study did not yield consistent results (Trimbath, Frydman and Frydman, 2000), however, one measure of performance that did provide consistent, stable results over time was cost inefficiency.1 We present those results here.

This study demonstrates that a temporally consistent contributing factor to a firm’s risk of takeover is the relatively inefficient use of resources, and that the combination of firms in a takeover results in the ex post improvement in cost efficiency as measured by the cost per unit of revenue. The bearing of cost inefficiency on the risk of takeover and the resulting improvements in cost efficiency appear to be remarkably stable over the nearly two decades examined.

The paper also investigates the effect of firm size on the risk of takeover. Prior analyses of takeovers suggest and often find that size has a negative effect on the risk of takeover. (See, for example, Singh, 1975; Hasbrouck, 1985). This negative effect of size on risk has been attributed to the difficulties in financing large takeover transactions. However, size may also have a positive effect on risk. The specification of our model, therefore, has been designed to test for such a possibility. Since the cost variable includes overhead costs, and post-takeover cost restructuring is likely to entail economies of scale, the marginal increase in size tends to enhance the potential for post-takeover savings in cost per unit of revenue. Thus, the effect of size on the risk of takeover can be positive or negative. It is also expected to vary over time depending on the accessibility of financing for corporate control activity and the relative strength of the opposing effects. Evidence consistent with this interpretation is presented: while the effect of firm size on the risk of takeover is always significant, the magnitude and the sign of this effect are significantly different across the sample period.2

The literature on takeovers has predominately used logistic and probit regressions to analyze takeover data.3 These techniques estimate the probability of takeover over a fixed period as a function of a firm’s characteristics at the beginning of the period. As such, these techniques are not suitable for an investigation of the temporal profile of risk. This paper employs the Cox regression model, which is particularly appropriate for the study of a time-varying risk profile. The Cox model is a dynamic technique that incorporates time-dependent covariates and estimates the hazard rate of takeover at any time during the study period as a function of these covariates. To study the ex post effect of takeovers, this study uses fixed-effects panel data models that control for how firms performed before the takeover occurred.

This paper is organized into six sections. The first section summarizes prior studies on takeovers. The second section describes the sample, defines the efficiency measure and looks briefly at descriptive statistics for our analysis of the ex ante determinants of takeover risk. The third section introduces the Cox regression model and discusses the results of estimations of alternative specifications of models for the risk of takeover. The fourth section describes the modifications made to the data set for our analysis of the ex post effect of takeovers on firm performance. The fifth section applies the fixed-effects panel data model and presents the results of regressions for models of the takeover effect on firm performance. The final section concludes.