Do Restructurings Improve Post-restructuring Productivity?

Menghistu Sallehu
Eastern Illinois University

This study examines how normal and excess restructuring charges affect future productivity. I estimate normal restructuring charges necessitated by economic fundaments using a Tobit model. Next, I estimate post-restructuring firm productivity using Data Envelopment Analysis and investigate how normal and excess restructuring charges are associated with future productivity. Using a sample of 1,182 restructurings by 398 unique U.S. firms, I show that normal restructuring charges lead to improvement in future productivity while excess restructuring charges are associated with lower future productivity. Results also show that investors seem to fail to utilize the information contained in excess restructuring charges.
Keywords *Normal restructuring charges, Excess restructuring charges, DEA, Productivity.*

INTRODUCTION

The purpose of this study is to examine the impact of restructuring charges on future productivity. Specifically, I investigate how restructuring charges necessitated by economic determinants and excess restructuring charges affect future productivity.

The desirability of restructuring efforts and the accounting for restructuring has been a subject of debate. With respect to desirability of restructuring, proponent argue that the objective of restructuring activities is to make the company more efficient, focused and profitable in the long-run (Jennings et al., 1998; Bowman et al., 1999). In this regard, prior research suggests that restructuring involves reshaping organizational boundaries or product portfolio to create more efficient organizations that can effectively respond to external shocks (Bowman et al., 1999; Budros, 1999; Cascio, 2002, and Freeman and Cameron, 1993). At the same time, restructurings potentially cause organizational disruption with adverse effect on organizational learning, long-term performance, and competitiveness (DeRue et al., 2008; Holder-Webb et al., 2005). Critics assert that restructurings strain firms' capabilities making them ill equipped to adapt to changing environments (Lin et al., 2008; Fisher and White, 2000; and Lei and Hitt, 1995).

Regarding the accounting for restructuring costs, controversy lies in how managers use their discretion to report restructurings. The Generally Accepted Accounting Principles (GAAP) allows discretion over the measurement and recognition of restructuring related costs. While most managers use this flexibility to reveal bad news quickly, some managers may use it opportunistically. Specifically, critics claim that managers may prematurely recognize future expenses as restructuring charges to boost future earnings (Mohrle, 2002; Levitt, 1998; Schilit and Perler, 2010).

Thus, assessment of whether restructurings improve operational performance requires analyzing the economic effect and the accounting for restructuring costs. Accordingly, this study examines the effect of restructuring in two steps. In the first step, I use external and internal economic variables to estimate normal restructuring charges using a Tobit model suggested by Bens and Johnston (2009). Then, I

determine excess restructuring charges as the difference between the actual restructuring charges and expected restructuring charges. I posit that excess restructuring charges represent deviations from the optimal level of restructuring justified by economic fundamentals. In order to assess whether and how productivity of firms changes, I calculate firm productivity using Data Envelopment Analysis (DEA).

In the second step, I analyze how normal and excess restructuring charges affect future productivity. I posit that normal restructuring charges are related to the amount needed to change the scope and manner of business in response to economic factors while excess restructuring charges represent the amount not justified by economic fundamentals. My prediction relies on the premise that normal restructuring charges contributes toward streamlining operations.

The results of this study, based on a sample of 1,182 restructurings by 398 firms, provide evidence that normal restructuring charges improve productivity while excess restructuring charges are negatively related with future productivity. Specifically, as normal restructuring charges increase, the one-year to three-year ahead productivity increases. In contrast, increases in excess restructuring charges are associated with decrease in future productivity. These results suggest that restructurings lead to improvement in efficiency if such initiatives are justified by economic fundamentals. In addition, the results suggest that restructurings undertaken following weak performance may lead to improvement in efficiency to the extent that the amount of restructuring is justified by economic fundamentals.

This study also examines whether investors utilize the information contained in normal and excess restructuring charges. Specifically, I examine how restructuring charges are related to contemporaneous and future returns. My empirical results show that excess restructuring charges are positively associated with one year ahead cumulative abnormal returns. These results suggest that investors do not use the information in excess restructuring charges. The results also suggest that investors reward managers when they release the excess amount into future earnings.

This study provides several contributions to the literature. First, the study provides evidence that normal and excess restructuring charges affect future productivity in different ways. Atiase et al. (2004), Brickley and Van Drunen (1990), and Holder-Webb et al. (2005) provide mixed evidence regarding performance of firms after restructuring. These studies examine the impact of restructurings on operational performance by focusing on performance before and after the restructuring event. In cases where they examine restructuring charges, they focus on the total restructuring charges. This study extends prior literature by showing that restructuring charges consist of two elements with opposing effect on future performance. Specifically, this study shows that restructurings necessitated by economic fundamentals improve productivity. However, the productivity gains from such efforts could be negated by excessive restructurings.

Second, this study provides evidence that restructuring firms benefit from restructuring efforts as long as the restructuring is justified by economic fundamentals. A key issue in prior studies with respect to evaluating desirability of restructuring is determining how firms would have performed had they not done the restructuring (Dechow, 2004; Bowman et al., 1999). This study provides evidence that restructurings necessitated by economic fundamentals are associated with improvement in productivity. This evidence shows that such restructurings are necessitated by internal and external factors and that failure to respond to these forces will at best lead to lost productivity. Further, this study complements prior research by using a comprehensive proxy of future performance. The productivity measure under DEA provides methodological improvements in that it is a comprehensive measure that is less susceptible to mechanical changes in account balances.

Finally, the study provides evidence that investors do not appear to use information in excess restructuring charges. Prior research shows that restructuring announcements result in modest change in stock price (Brickley and Van Drunen, 1990) and that firms use restructuring reversals to meet earnings thresholds (Mohrle, 2002). The results in this study extend prior research by showing that investors favorably respond to earnings growth that potentially result from excess restructuring charges in prior years.

The remainder of this study proceeds as follows. In section 2, I provide background on accounting for restructuring charges, briefly review related research and develop my hypotheses. In sections 3 and 4, I

describe my research methodology and sample. In section 5, I present and discuss my empirical results. Finally, I provide summary of my findings in section 6.

RELATED LITERATURE AND HYPOTHESES

Related literature

The objective of restructuring activities is to make the company more efficient, focused and profitable in the long-run through actions that range from reducing product diversity to redrawing divisional boundaries (Jennings et al., 1998; Bowman et al., 1999). Thus the restructuring process typically involves multidimensional events that have both accounting and economic implications with differential effects on accounting measures of firm performance (Jennings et al., 1998). Therefore, critical assessment restructurings' performance implication crucially depends on isolating the economic effect from the accounting effect (Holder-Webb et al., 2005). On this premise, Bens and Johnston (2009) identify economic fundamentals that predict the amount of normal restructuring charges. Then they identify the amount of restructuring charges in excess of the predicted amount (excess). In the second stage, they examine whether excess is associated with earnings management under different reporting regimes. Their findings suggest that excess is associated with earnings management to a lesser extent under stricter accounting regimes when the Securities and Exchange Commission (SEC) is vigilant. While their study isolates excess restructuring charge from the normal component, their focus is on whether excess is related to future earnings management. In contrast, this study addresses how normal and excess restructuring charges affect future productivity.

Whether restructurings indeed improve subsequent performance is not clear from the existing literature (Lin et al., 2008). On the one hand, proponents claim that leaner and more efficient organizations emerge after restructuring. Budros (1999), Cascio (2002), and Freeman and Cameron (1993) assert that restructurings aim to improve performance in response to external shocks and poor organizational processes. According to proponents, the organization should reinvent itself as necessary through restructuring to survive in a competitive environment. On the other hand, critics point to organizational disruption and uncertainty that follows after restructuring. In particular, when those actions are not accompanied by comprehensive changes, the cost of restructuring efforts is likely to exceed any benefits from such activities (Holder-Webb et al., 2005; Bowman et al., 1999; Lin et al., 2008). Fisher and White (2000) and Lei and Hitt (1995) argue that some restructurings (e.g. downsizing) could hamper organizational ability to adapt to change or may disrupt existing informal communication networks. DeRue et al. (2008) claims that such disruptions may have an adverse effect on organizational learning, long-run performance and competitiveness. In this study, I posit that normal restructuring charge is related to the amount needed to change the scope and manner of business in response to economic factors. Excess restructuring charges, on the other hand, represent the amounts that are not justified by economic fundamentals. My prediction relies on the premise that normal restructuring charge contributes toward streamlining operations but that excess is related to restructuring with disruptive effect on operations.

Though this study is the first that I am aware of to test how normal and excess restructuring charges affect future productivity, other studies have posited and tested accounting performance after restructuring. Atiase et al. (2004) track the accounting performance of 267 restructurings during 1991-1993 over eight years. Their findings suggest that post-restructuring return on equity and profit margin of restructuring firms is higher compared to that of non-restructuring firms. However, their results seem to be mainly driven by firms with multiple restructurings and loss firms. Brickley and Van Drunen (1990) examine the impact of restructurings on accounting performance and their wealth effect. Their findings suggest that stock prices increase upon announcement of restructurings but that subsequent earnings decline. They provide increase in expenses related to implementation of the restructuring as a potential explanation for the decline in earnings while there is overall positive wealth effect. Finally, Holder-Webb et al. (2005) examine the long-term performance of restructuring after taking into account ex ante firm and industry performance. Overall, they find that restructurings at best have no effect on the long-term operating performance. In summary, prior research generally provides mixed evidence about the impact

of restructuring on future accounting performance. Besides, those studies examine the performance of restructuring firms before and after restructuring rarely considering the restructuring amounts. In instances where they include the restructuring amounts in the analysis, they do not examine the effect of normal and excess restructuring charges. Furthermore, their accounting performance measures are potentially susceptible to mechanical changes, making the results difficult to interpret. For example, if other charges (gains) are recognized prior to or after the restructuring year, the performance effect of restructuring will be obscured by those amounts (Holder-Webb et al., 2005). Similarly, if restructuring charge mainly includes accrual write offs, one would expect improvement in return on equity (ROE) purely because the firm has less expense to record (Dechow, 2004). This could be exacerbated, if managers recognize excess restructuring charges and bleed back the excess to earnings in later years (Schilit and perler, 2010; Mohrle, 2002). In this study, I use a more comprehensive proxy of performance (efficiency) based on information from the balance sheet and income statement.[1] In addition, I examine the impact of normal and excessive restructuring charges on this comprehensive measure of performance.

Research hypotheses

Prior research suggests that restructuring affects financial performance through its effect on efficiency. Lichtenberg (1992) suggests that a corporate action affects financial performance primarily through its impact on efficiency.[2] Likewise, Chang et al. (2011) argue that productivity is precursor to firm performance and value. Since restructuring efforts are aimed at improving efficiency, I first ask whether efficiency improves after restructuring. Firms generally restructure in response to poor performance: Atiase et al. (2004), Lee (2008), and Bens and Johnston (2009) document that restructuring firms experience poor accounting performance prior to the restructuring years. However, the amount of restructuring charges accrued may be different from the amount necessitated by economic fundamentals. In other words, restructuring cost may consist of the amount needed to improve firm performance as well as an excess amount with adverse effect on performance.

Firms whose structure matches their strategy become more effective than mismatched firms (Chandler, 1962). In most cases, restructuring involves redesigning operations by management with a view to redirect strategy. In other cases, restructurings aim to rebalance structure that has drifted away from an earlier fit with strategy (Bowman et al., 1999). I posit that restructuring charge necessitated by economic fundamentals (normal restructuring charge) is the amount needed to improve organizational efficiency and performance. Besides, restructurings are aimed at streamlining activities with a general objective of making the firm more efficient. As firms push for cost efficiency and asset parsimony, they will inch toward cost leadership that translates into cost leadership and greater efficiency. Hence, I hypothesize that normal restructuring charge is the amount necessitated by fundamentals and that it leads to improvement in productivity.

In contrast, the restructuring cost beyond that necessitated by fundamentals (excess), represents deviation from the optimal amount of restructuring. Such costs involve terminations or reduction of productive resources in excess of amounts warranted by economic fundamentals, with adverse effect on firms' capacity to meet demand in the future. For example, massive layoff or plant closure force firms to incur substantial rehiring cost when demand recovers. In addition, excess restructuring charges are associated with earnings management (Bens and Johnston, 2009; Lee, 2008; Mohrle, 2002). To the extent that the excess is used to manage earnings, poor internal decisions are likely to result from the distorted accounting information (McNichols and Stubben, 2008). Thus excess restructuring charge most likely represents actions that thwart the restructuring endeavors.

Based on the above discussions, I hypothesize that normal and excess restructuring charges affect future productivity differently. More formally:

$H_{1a:}$ Normal restructuring charges are positively associated with future productivity.

$H_{1b:}$ Excess restructuring charges are negatively associated with future productivity.

Mohrle (2002) reports that some firms use restructuring reversals to beat analysts' forecast and to avoid losses. The amount of reversal that is used to meet these thresholds typically arises from the extra cushion that managers create through excessive recognition of restructuring charges (Levitt, 1998). In

addition to packing future expenses into the restructuring period, managers could create reserves that can be released into future earnings by recognizing excess restructuring charges (Schilit and Perler, 2010). Dechow and Ge (2006) document that the future return of special-item accrual firms is higher than that of other accrual firms. Based on this observation, they conclude that investors fail to understand the lower persistence of special items. By definition, normal restructuring charges are those necessitated by economic fundamentals. As such, these amounts are predictable based on the past performance of the firm. However, excess restructuring charges are potentially ignored by investors at the time of recognition even though they affect future income. Therefore, I predict that the restructuring charges component that is mispriced is excess restructuring charges. Thus my hypothesis concerning pricing is:

H_2: Excess restructuring charges are associated with future stock returns.

RESEARCH DESIGN

Normal and excess restructuring charges

My analysis requires estimation of normal and excessive restructuring charges. Therefore, the first part of the analysis involves estimation of expected restructuring charges using economic fundamentals. This procedure is based on the idea that management determines the need and the amount of restructuring in a two-step process. In the first step, management determines whether economic fundamentals necessitate restructuring. In this step, it is less likely that management will undertake restructuring when economic fundamentals do not necessitate it (Bens and Johnston, 2009). Once the need for restructuring is justified, management determines the amount of restructuring charges. Here, management may potentially accelerate future expenses or create a reserve with the view to bleed back these accruals into future profit (Levitt, 1998; Penman, 2010; Schilit and Perler, 2010). The discretionary component is captured by the excess amount of restructuring charge.

I follow Bens and Johnston (2009) and use a Tobit model to estimate restructuring charges justified by economic fundamentals. For each restructuring observation, I identify a control sample of non-restructuring firm observation within the industry. Then I estimate industry specific Tobit model with both the restructuring and non-restructuring control firms. In this model, the dependent variable is restructuring charges deflated by beginning of year total assets. Since restructuring charges for the control firms is censored at 0, I use the following Tobit regression model to estimate expected restructuring charges:

$$R\_CHRG = \beta_0 + \beta_1 RECT\_TO + \beta_2 INVT\_TO + \beta_3 PPE\_TO + \beta_4 SALE\_EMP + \beta_5 RET + \beta_6 LOSS + \beta_7 PROF\_MRG + \beta_8 \Delta ROE + \beta_9 GDP\_GRWTH + \varepsilon \quad (1)$$

where R_CHRG is restructuring charge deflated by total assets at the beginning of the year. The independent variables include accounting and stock market based fundamentals, which prior research identified as ones associated with special items (including restructuring) and future performance (see Abarbanell and Bushee, 1997; Atiase et al., 2004; Bens and Johnston, 2009; Francis et al., 1996; Lev and Thiagarajan, 1993). Those variables include (Compustat mnemonics are shown in brackets when appropriate): RECT_TO is the ratio of sales (SALE) to trade receivables (RECTR); INVT_TO is the ratio of cost of goods sold (COGS) to total inventory (INVT) and LIFO reserve (LIFR); PPE_TO is the ratio of sales (SALE) to net property, plant and equipment (PPENT); SALE_EMP is the ratio of sales (SALE) to employees (EMP × 1,000); RET is stock return for the year prior to the restructuring year; LOSS is an indicator variable that takes 1 if the firm reported a net loss in any of the three years prior to the restructuring year; PROF_MRG is the ratio of income before extraordinary items (IB) to sales (SALE); ΔROE is year-over-year change in the ratio of income before extraordinary items (IB) to stockholders' equity (SEQ); and GDP_GRWTH is the percentage change in real U.S. GDP. All continuous variables are winsorized at the 99th and 1st percentiles. Following Bens and Johnston (2009), I truncate RECT_TO and INVT_TO at 24.

The expected R_CHRG from equation (1) represents the amount of restructuring charge necessitated by economic fundamentals (NR_CHRG). R_CHRG in excess of the expected amount is the result of management discretion, and represents excess restructuring charges (EXCESS).

I posit that restructuring charges necessitated by fundamentals (NR_CHRG) enhance productivity while excessive amounts (EXCESS) lead to lower productivity. To assess the impact of NR_CHRG and EXCESS on contemporaneous and future productivity, I estimate productivity of firms around restructuring years.

Productivity measure using Data Envelopment Analysis

Determining productivity of a firm requires observation of the input-output process of a firm and comparing that with the ***expected*** performance level. Since expected performance level is not observable, such an assessment can best be achieved by constructing a benchmark from observed practice of other firms operating under similar conditions (Athanassopoulos and Ballantine, 1995). Data Envelopment Analysis (DEA) utilizes this approach. DEA is a linear programming based non-parametric method of estimating productivity of decision making units (DMU). DEA was introduced by Charnes, Cooper, and Rhodes (1978) and extended by Banker et al. (1984; hereafter BCC), and has been received as an effective tool to evaluate relative efficiency of DMUs. A distinct advantage of DEA over parametric methods is that estimation of productivity does not require one to impose specific functional form of the production process. Furthermore, DEA allows development of an ***overall*** performance measure when DMUs use multiple inputs to produce single or multiple outputs.

Following prior research (Banker and Natarajan, 2008; Chang et al., 2011), I use BCC model of DEA to estimate productivity of restructuring and non-restructuring control firms. To estimate productivity, I identify the input and output variables as well as the level at which relative productivity is assessed. The three input variables in the study are: cost of goods sold (COGS), selling, general and administrative expenses (XSGA), and capital expenditure (CAPX) while the output variable is Sales (SALE). Since productivity under DEA is a relative measure, I compute productivity relative to all other firms (restructuring and non-restructuring) for each Fama-French industry every year. To do this, I pool the restructuring and control firms used in equation (1) above and estimate relative efficiency separately for each industry-year. I estimate productivity for each industry-year separately because my analyses include assessment of productivity after restructuring. Based the above inputs and outputs, I use the linear program below to assess the relative efficiency of firm (DMU) j assuming variable returns to scale (BCC model). From this model, I find the productivity measure of a DMU (θ_j), which is computed as the reciprocal of the inefficiency measure (Φ_j):

$$\Phi_j = \max \Phi \tag{2a}$$

$$\textit{subject to :} \quad X_{ji} \geq \sum_{j=1}^{N} \lambda_j X_{ji} \tag{2b}$$

$$\Phi Y_j \leq \sum_{j=1}^{N} \lambda_j Y_j \tag{2c}$$

$$\sum_{j=1}^{N} \lambda_j = 1 \tag{2d}$$

$$\lambda_j \geq 0 \tag{2e}$$

where X_{ji} is the quantity of input consumed by firm j; Y_j is the quantity of output produced by firm j; and λ_j is the weight placed on the inputs or output of firm j. The relative efficiency measure that results from solving the linear program for each DMU falls between 0 and 1. A DMU with a score of 1 (and 0 slack) is efficient; and the lower the score, the less efficient the unit is compared to the rest of the population (Cooper et al., 2006; Vincova, 2005).

Productivity and return regressions

To assess the effect of NR_CHRG and EXCESS on productivity, I use the efficiency scores from the linear program (model 2) as dependent variable in the following regression specification. Banker and Natarajan (2008) show that OLS regression where DEA efficiency scores are the dependent variable yield consistent estimators of coefficients. Hoff (2007), McDonald (2009) validate the claims. Thus, I use the following regression to assess the impact of restructuring charges (R_CHRG, NR_CHRG, and EXCESS) on productivity:

$$\boldsymbol{PROD}_{i,t+k} = \boldsymbol{\beta}_0 + \boldsymbol{\beta}_1\boldsymbol{SIZE}_{i,t} + \boldsymbol{\beta}_2\boldsymbol{ROA}_{i,t} + \boldsymbol{\beta}_3\boldsymbol{COMPET}_{i,t} + \boldsymbol{\beta}_4\boldsymbol{AGE}_{i,t} + \boldsymbol{\beta}_5\boldsymbol{R\ \&\ D}_{i,t} + \boldsymbol{\beta}_6\boldsymbol{R\_CHRG}_{i,t} + \boldsymbol{\varepsilon}_{i,t}$$

(3a)

$$\boldsymbol{PROD}_{i,t+k} = \boldsymbol{\beta}_0 + \boldsymbol{\beta}_1\boldsymbol{SIZE}_{i,t} + \boldsymbol{\beta}_2\boldsymbol{ROA}_{i,t} + \boldsymbol{\beta}_3\boldsymbol{COMPET}_{i,t} + \boldsymbol{\beta}_4\boldsymbol{AGE}_{i,t} + \boldsymbol{\beta}_5\boldsymbol{R\ \&\ D}_{i,t} + \boldsymbol{\beta}_7\boldsymbol{NR\_CHRG}_{i,t} + \boldsymbol{\beta}_8\boldsymbol{EXCESS}_{i,t} + \boldsymbol{\varepsilon}_{i,t} \quad (3b)$$

where $PROD_{i,t+k}$ is the restructuring-year or subsequent year productivity for each firm from the DEA model above. R_CHRG, NR_CHRG and EXCESS total restructuring charges, normal restructuring charges and excess restructuring charges, respectively. The variables of interest in equation 3 are NR_CHRG and EXCESS, and Hypothesis 1 predicts a positive (negative) coefficient for β_7 (β_8). Due to the offsetting effect of R_CHRG and EXCESS on productivity, I include R_CHRG without directional prediction for its coefficient (β_6).

Following Bulan et al. (2010) and Chang et al. (2011), I include size (SIZE), profitability (ROA), competition (COMPET), firm age (AGE), and research and development (R&D) as control variables in the above regressions. Prior research suggests that the extent of industry competition and R&D have significant effect on productivity of firms (Tang and Wang, 2005; Griliches, 1986; Bulan et al., 2010). Firms in competitive industries need to find ways to continuously improve their productivity which is greatly affected by industry structure and competition (Chang et al., 2011; Tang and Wang, 2005). Therefore, I expect COMPET ($SALE_{it}$/INDUSTRY $SALES_t$) to be positively associated with productivity. R&D is aimed at creating long-term value to the firm. However, the return from such expenditures, if it materializes, will occur many years into the future. Hence, I expect R&D ($R\&D_{it}$/TOTAL $ASSETS_{i,t-1}$) to be negatively related to current and near-term productivity of the firm. Larger, older, and more profitable firms have greater economies of scale and more resources that allow them to be more productive (Haltwinger et al., 1999; Lee and Tang, 2001; Bulan et al., 2010). Hence, SIZE (natural log of assets at the beginning of the year), AGE (the number of years since the firm first appeared on Compustat), and ROA (core earnings deflated by total assets at the beginning of the year) are expected to be positively related to productivity.[3]

In the following section, I examine whether stock market participants use the information contained in NR_CHRG and EXCESS. Analysts generally revise earnings and growth expectations downwards after restructurings (see Chaney et al., 1999; Lopez, 2002). In addition, prominent players in the capital markets express concern over opportunistic accrual of excess restructuring charges. For example investors might be forgiving of excess restructuring charges if subsequent earnings per share (EPS) improves by a few cents (Buffet, 1998). Similarly, former SEC chairman Arthur Levitt noted that investors look beyond one-time loss and focus on future earnings even if firms recognize extra restructuring charges under the guise of conservatism.[4] Given that NR_CHRG is dictated by economic fundamentals, investors are likely to discern its performance implications. If investors efficiently use information in analysts' forecasts, NR_CHRG is likely to be priced correctly. In contrast, EXCESS is ignored (overlooked) at the time of accrual (in later years), which suggests that investors are less likely to use the information in EXCESS correctly. To formally test these conjectures, I use the following regression:

$$\boldsymbol{R}_{i,t} = \boldsymbol{\beta}_0 + \boldsymbol{\beta}_1\boldsymbol{PROD}_{i,t} + \boldsymbol{\beta}_2\boldsymbol{ROA}_{i,t} + \boldsymbol{\beta}_3\boldsymbol{NR\_CHRG}_{i,t} + \boldsymbol{\beta}_4\boldsymbol{EXCESS}_{i,t} + \boldsymbol{\beta}_5\Delta\boldsymbol{ROA}_{i,t} + \boldsymbol{\varepsilon}_{i,t} \quad (4a)$$

$$R_{i,t+1} = \beta_0 + \beta_1 PROD_{i,t} + \beta_2 ROA_{i,t} + \beta_3 NR\_CHRG_{i,t} + \beta_4 EXCESS_{i,t} + \beta_5 \Delta ROA + \beta_6 \Delta ROA_{i,t+1} + \varepsilon_{i,t+1} \quad (4b)$$

where $R_{i,t}$ and $R_{i,t+1}$ are contemporaneous and one-year ahead buy-and-hold abnormal returns, respectively. I measure $R_{i,t}$ compounded buy-and-hold market adjusted returns over a 13 month period beginning 11 months before the end of the fiscal year. To avoid an overlap, I determine R_{t+1} using compounded by-and-hold market adjusted returns over one year period beginning two months after the fiscal year end.[5] I include the following variables to control for performance: $\Delta ROA_{i,t}$ is change in core earnings from period t-1 to t deflated by total assets at end of t-1; $\Delta ROA_{i,t+1}$ is change in core earnings between period t and t+1 deflated by total assets at the end of t; the other variables are as defined above.[6] If investors do not efficiently utilize the information in EXCESS, it will be positively associated with $R_{i,t+1}$ when the accrual is released to boost earnings. Inefficiency in processing EXCESS also implies that the information is not used when the restructuring charge is disclosed. Therefore, I expect β_6 in equation 4b to be positive; however, I do not expect β_6 in equation 4a to be different from 0.

SAMPLE SELECTION

I obtain an initial sample of restructuring observations from *Firstcall* for 1992-2007. Firstcall provides amounts of restructuring charges and other items that are deemed unusual by a majority of analysts. These amounts, provided in the footnotes, are aggregate dollar amounts or expressed on per share for a quarter or a year. When per share amounts are given, I multiply the amount by weighted average shares outstanding from Compustat to calculate total restructuring charges. I also aggregate quarterly restructuring amounts into an annual figure.[7]

I begin with 5,881 restructuring observations by 3,074 firms. I require a minimum of 5 restructuring observations in a given year for each Fama-French 12 industry classification to estimate normal restructuring charges. Sixty-one observations fail to survive this requirement. Following prior research (Lee, 2008), I eliminate 480 restructuring observations by 312 financial firms. Next, I match the remaining observations with financial and stock returns data from Compustat and CRSP. The restructuring observations should have the necessary data in Firstcall, Compustat and CRSP. In addition, I require the *firms* to have sufficient time series data covering the periods before and after the *restructuring charge*. These requirements reduce the total number of restructuring observations to 1,182 by 398 firms.[8] Overall, the number of observations in this study is similar to those of prior studies; Atiase et al. (2004), Bens and Johnston (2009) and Lee (2008) use 267, 420 and 2,595 observations, respectively.

Following Bens and Johnston (2009), I estimate expected restructuring charges using a Tobit model, which requires identification of restructuring (treatment) and non-restructuring (control) firms. I include an observation as a control firm if the firm is not included in Firstcall as reporting restructuring charges for any of the years prior to 2011. In addition, I require a minimum of fifteen industry-year observations with the necessary variables for each Fama-French 12 industry classification. After this screening, 14,671 observations (2,748 firms) remained in the control sample. Thus, the first stage Tobit model is estimated using 15,853 observations.

The second stage analyses require use of my key variable of interest, productivity. Productivity is essentially a measure of relative performance of a firm in a given year relative to the best observed practice. This best observed practice is determined using the observed input-output relationships of all firms in an industry. I use restructuring firm-years and the control firm-years and estimate the productivity measure. To estimate expected restructuring charges, I need restructuring charges for the restructuring firm and non-restructuring firms with non-missing independent variables in the corresponding year. Therefore, the Tobit model includes observations only for years in which restructuring charges are reported. In the second stage analyses, I examine productivity for up to four years before and after a restructuring year. As a result, the number of observations I use to estimate productivity (26,642) is greater than 15,853.

EMPIRICAL RESULTS

First-stage results

Table 1 presents the descriptive statistics of in the variables used in the first stage regression (equation 1). The restructuring sample has approximately a mean (median) of 5% (1%) of total assets. Comparison of the independent variables for the restructuring and control firms shows that restructuring firms generally performed poorly prior to or during the restructuring year. For example, restructuring firms' mean cumulative returns prior to the restructuring year (0.10) is significantly lower than that of control firms' (0.20). Similarly, the restructuring firms accounting performance is generally lower than that of control firms'. The mean RECT_TO, INVT_TO, PPE_TO, and RET of restructuring firms are significantly lower than those of control firms' with t-stats of 8.52, 3.90, 6.99, and 3.40, respectively. However, restructuring firms have SALE_EMP that is significantly higher than that of control firms. In addition, while PROF_MG and ΔROE of restructuring firms are negative, the means are not statistically lower than those of the control firms. Overall, the results are consistent with the notion that restructuring firms performed poorly relative to control firms.

TABLE 1
DESCRIPTIVE STATISTICS OF VARIABLES USED IN THE FIRST STAGE TOBIT-REGRESSION.

	Restructuring Sample			Control Sample		
	Mean	Median	St.Dev.	Mean	Median	St.Dev.
R_CHRG	0.0476	0.0075	0.9274	N/A	N/A	N/A
RECT_TO	7.1046	6.3628	3.5794	8.7015	6.3517	6.3658
INVT_TO	5.3769	4.3511	4.0764	6.1011	3.7812	6.2723
PPE_TO	6.7075	4.3319	10.3685	11.5984	5.9936	23.8707
SALE_EMP	0.2513	0.2022	0.2088	0.2225	0.1653	0.2282
PROF_MRG	-0.0291	0.0236	0.3328	-0.3217	0.0248	9.6026
ΔROE	-0.0208	-0.0296	1.2064	-0.0036	-0.0032	2.5588
LOSS	0.4137	0.0000	0.4927	0.5207	1.0000	0.4996
RET	0.1043	0.0201	0.6398	0.2003	0.0298	0.9532
GDP_GRWTH	0.0309	0.0285	0.0120	0.0310	0.0307	0.0120

Notes: Variable definitions
R_CHRG= restructuring charges deflated by total assets at the beginning of the year.
RECT_TO= the ratio of sales (SALE) to trade receivables (RECTR).
INVT_TO= the ratio of cost of goods sold (COGS) to total inventory (INVT) and LIFO reserve (LIFR).
PPE_TO= the ratio of sales (SALE) to net property, plant and equipment (PPENT).
SALE_EMP= SALE_EMP is the ratio of sales (SALE) to employees (EMP × 1,000).
PROF_MGR= the ratio of income before extraordinary items (IB) to sales (SALE)
ΔROE= year-over-year change in the ratio of income before extraordinary items (IB) to stockholders' equity (SEQ).
LOSS= an indicator variable that takes 1 if the firm reported a net loss in any of the three years prior to the restructuring year.
RET= stock return for the year prior to the restructuring year.
GDP_GRWTH= percentage change in real U.S. GDP.

In Table 2, I present the results of the first-stage regression, which I use to estimate NR_CHRG and EXCESS. Column 1 shows the number times the coefficient of a variable is in the expected direction (and the frequency of significant coefficients) out of the 9 industry specific regressions. Column 2 shows the coefficients of the variables from pooled regression of all observations.[9]

The results in this table generally show that the fundamental variables are significantly associated with R_CHRG. Table 2 also shows that the model has a modest explanatory power (Dhrymes R^2 of 20%). In column 1, we see that PPE_TO and RET have the most frequency of significant coefficients. The pooled regression coefficients in column 2 show that fundamental variables are significantly associated with R_CHRG. With the exception of SALE_EMP the sign of coefficients is in the expected direction.

TABLE 2
SUMMARY OF INDUSTRY SPECIFIC REGRESSIONS OF RESTRUCTURING CHARGES ON PROXIES FOR ECONOMIC FACTORS.

$$R\_CHRG = \beta_0 + \beta_1 RECT\_TO + \beta_2 INVT\_TO + \beta_3 PPE\_TO + \beta_4 SALE\_EMP + \beta_5 RET + \beta_6 LOSS + \beta_7 PROF\_MRG + \beta_8 \Delta ROE + \beta_9 GDP\_GRWTH + \varepsilon$$

	No. of coefficients with predicted sign (number significant)	R_CHRG
RECT_TO	7(3)	-0.0017***
		(-5.79)
INVT_TO	7(1)	-0.0001
		(-0.33)
PPE_TO	8(5)	-0.0018***
		(-7.98)
SALE_EMP	4(4)	0.0468***
		(6.82)
PRO_MRG	3(3)	0.0086**
		(2.33)
ΔROE	6(0)	-0.0002
		(-0.22)
LOSS	4(3)	-0.0088***
		(-3.38)
RET	8(4)	-0.0081***
		(-3.74)
GDP_GRWTH	3(3)	-0.0681
		(-0.67)
INTERCEPT		-0.0710***
		(-13.13)
Dhrymes R^2		0.2017
N		15,853

Notes:
*, **, and *** denote significance at 0.10, 0.05, and 0.01 levels respectively; t-statistics are provided in parentheses.
Variables are defined as follows:
R_CHRG= restructuring charges deflated by total assets at the beginning of the year.
RECT_TO= the ratio of sales (SALE) to trade receivables (RECTR).
INVT_TO= the ratio of cost of goods sold (COGS) to total inventory (INVT) and LIFO reserve (LIFR).
PPE_TO= the ratio of sales (SALE) to net property, plant and equipment (PPENT).
SALE_EMP= SALE_EMP is the ratio of sales (SALE) to employees (EMP × 1,000).
PROF_MGR= the ratio of income before extraordinary items (IB) to sales (SALE)
ΔROE= year-over-year change in the ratio of income before extraordinary items (IB) to stockholders' equity (SEQ).
LOSS= an indicator variable that takes 1 if the firm reported a net loss in any of the three years prior to the restructuring year.
RET= stock return for the year prior to the restructuring year.
GDP_GRWTH= percentage change in real U.S. GDP.

Regressions are performed for each of the nine industries in the sample. Each model yields the expected amount of restructuring charges. Excess restructuring charges is the difference between the actual amount of restructuring charges and expected restructuring charges.

Descriptive statistics for the second stage

The descriptive statistics of variables in the second-stage regressions is shown in Panel A of Table 3. The mean (median) NR_CHRG and EXCESS is 0.7% (0.3%) and 4% (0.4%), respectively. The mean (median) productivity (PROD) of the average restructuring firm is 0.84(0.87). DEA measures productivity as a scaled score relative to the most efficient firm based on the observed input-output relationship in the sample. Therefore, a mean productivity score of 0.84 suggests that the average firm is 84% efficient compared to the virtual efficient firm.

TABLE 3
DESCRIPTIVE STATISTICS AND CORRELATION MATRIX FOR VARIABLES USED IN THE SECOND STAGE REGRESSIONS.

Panel A. Descriptive Statistics

	Mean	Median	StDev.
NR_CHRG_t	0.0072	0.0030	0.0562
$EXCESS_t$	0.0404	0.0047	0.8800
$PROD_t$	0.8380	0.8699	0.1485
ROA_t	0.1204	0.1238	0.1064
$SIZE_t$	7.0911	7.0820	1.7711
$COMPET_t$	0.0048	0.0013	0.0115
AGE_t	3.3049	3.4499	0.5961
$R\&D_t$	0.0565	0.0338	0.0612
R_t	0.0151	-0.0722	0.5849
R_{t+1}	0.1388	-0.0179	0.9114
ΔROA_t	-0.0272	-0.0096	0.1030
ΔROA_{t+1}	0.0059	0.0034	0.0802

Panel B. Spearman correlation matrix for variables used in the second stage regressions

	$PROD_{t+1}$	$PROD_t$	$SIZE_t$	ROA_t	$COMPET_t$	AGE_t	$R\&D_t$	R_CHRG_t	NR_CHRG_t
$PROD_{t+1}$	1.0000								
$PROD_t$	**0.7583**	1.0000							
$SIZE_t$	**0.4464**	**0.4757**	1.0000						
ROA_t	**0.3550**	**0.4281**	**0.2266**	1.0000					
$COMPET_t$	**0.5469**	**0.5844**	**0.9288**	**0.3806**	1.0000				
AGE_t	**0.3213**	**0.3469**	**.6139**	**0.2085**	**0.6083**	1.0000			
$R\&D_t$	**-0.4413**	**-0.4780**	**-0.2662**	**-0.1585**	**-0.2910**	**-0.2671**	1.0000		
R_CHRG_t	**-0.1454**	**-0.1576**	**-0.2562**	**-0.0767**	**-0.2026**	**-0.1829**	**0.2760**	1.0000	
NR_CHRG	**0.1141**	**0.1181**	**0.3284**	0.0348	**0.2897**	**0.1300**	0.0242	**-0.1056**	1.0000
$EXCESS_t$	-0.1767	**-0.1906**	**-0.2903**	**-0.0796**	**-0.2393**	**-0.1893**	**0.2837**	**0.9578**	**-0.2929**

Notes for Panels A and B:

Bolded figures in Panel B are statistically significant at 0.01 level.

Variables are defined as follows:

R_CHRG= restructuring charges deflated by total assets at the beginning of the year; NR_CHRG_t= Expected restructuring charges from the Tobit-model; $EXCESS_t$=Actual amount of restructuring charges (deflated by assets) in excess of NR_CHRG; $PROD_t$= Productivity of the firm calculated using DEA; ROA_t= core earnings deflated by total assets at the beginning of the year; $SIZE_{t-1}$= Natural log of total assets (in millions) at the beginning of the year; $COMPET_t$=Sales divided by total sales of all firms in the industry; AGE_t=Natural log of the number of years since the firm first appeared on Compustat; $R\&D_t$=Research and development expenses deflated by beginning of year total assets; R_t= compounded buy-and-hold market adjusted returns over a 13 month period beginning 11 months

before the end of the fiscal year; R_{t+1}= compounded by-and-hold market adjusted returns over one year period beginning two months after the fiscal year end; ΔROA_t= change in ROA between period t-1 to t; ΔROA_{t+1}= change in ROA between period t to t+1

The average restructuring firm reported return on asset of 12% while the mean (median) abnormal returns were 1.51% (-7.22%). These results suggest that the amount of restructuring charges may be different from the normal restructuring charges but that restructuring decision may not be made merely for reporting reasons. However, the restructuring firms' stock performance seems to suggest that investors foresaw the difficulties firms faced prior to restructuring.

Univariate results

Panel A of Table 3 shows the correlation coefficients among variables used in equation 3. Equation 3 examines the impact of R_CHRG, NR_CHRG and EXCESS on contemporaneous or future productivity (PROD) and expects positive (negative) relationship between $PROD_{t+1}$ and NR_CHRG (EXCESS). The correlation coefficients show this relationship; NR_CHRG is positively correlated with both $PROD_t$ (coefficient=0.12) and $PROD_{t+1}$ (coefficient=0.11)while EXCESS is negatively correlated with those variable (coefficient=-0.19 and coefficient= -0.18, respectively). These relationships provide preliminary evidence that restructuring charges necessitated by economic fundamentals (NR_CHRG) improve productivity, but that excess restructuring charges may lead to diminished productivity. The correlation coefficients also suggest that larger, older, and more profitable firms recognize excess amount of restructuring charges to a lesser extent.

TABLE 4
MEDIAN OF PRODUCTIVITY FOR DECILES SORTED BY NR_CHRG AND EXCESS.
Panel A. Median value of productivity for each decile sorted by NR_CHRG (normal restructuring charges).

Rank (NR_CHG)	$PROD_t$	$PROD_{t+1}$	$PROD_{t+2}$	$PROD_{t+3}$
Low	0.8605	0.8979	0.8909	0.8694
2	0.8731	0.8701	0.8746	0.8766
3	0.8491	0.8494	0.8292	0.8503
4	0.8393	0.8424	0.8557	0.8491
5	0.8437	0.8514	0.8370	0.8246
6	0.8454	0.8482	0.8247	0.8496
7	0.8372	0.8538	0.8498	0.8306
8	0.9056	0.8980	0.8960	0.8852
9	0.8748	0.8895	0.8580	0.8599
High	0.9636	0.9627	0.9530	0.9581

Notes:
NR_CHRG_t = Expected restructuring charges from the Tobit-model.
PROD = Productivity of the firm calculated using DEA. t, t+1, t+2, and t+3 denote the year of restructuring charge and subsequent years.
Observations are ranked based on NR_CHRG into 10 portfolios each year. Then, median of productivity score for the restructuring year and subsequent years (t+1 through t+3) is calculated for each portfolio.

TABLE 4 (cont.)

Panel B. Median value of productivity for each decile sorted by EXCESS (excess restructuring charges).

RANK (EXCESS)	$PROD_t$	$PROD_{t+1}$	$PROD_{t+2}$	$PROD_{t+3}$
Low	0.9498	0.9574	0.9545	0.9631
2	0.8974	0.9076	0.9070	0.8806
3	0.8731	0.8749	0.8698	0.8547
4	0.8943	0.8859	0.8929	0.8902
5	0.8762	0.8743	0.8835	0.8815
6	0.8756	0.9015	0.8896	0.8631
7	0.8682	0.8923	0.8386	0.8533
8	0.8432	0.8573	0.8536	0.8720
9	0.8201	0.8104	0.8325	0.8263
High	0.7510	0.7718	0.7794	0.7605

Notes:

EXCESS= Actual amount of restructuring charges (deflated by assets) in excess of NR_CHRG

PROD= Productivity of the firm calculated using DEA. t, t+1, t+2, and t+3 denote the year of restructuring charge and subsequent years.

Observations are ranked based on EXCESS into 10 portfolios each year. Then, median of productivity score for the restructuring year and subsequent years (t+1 through t+3) is calculated for each portfolio.

Table 4 summarizes the relationship between NR_CHRG/EXCESS and productivity. In panel A of Table 4, observations are first ranked into deciles each year based on NR_CHRG. Next the median of contemporaneous and future productivity is calculated for each rank. The results show that the productivity firms increases with the NR_CHRG ranks. For example, the median PROD at t+1 for firms in the bottom NR_CHRG is 0.89 while those in the top decile have a median productivity score of 0.96. These increasing relationships, which are consistent across period t through t+3, suggest that the impact of restructuring charges on productivity increases with the part that is necessitated by economic fundamentals.

In panel B of Table 4, I follow the same procedure and use EXCESS as a sorting variable. The results show that PROD *decreases* as the ranks based on EXCESS increases. The median productivity at t+1 of a firm in the lowest decile is 0.96 while the productivity of firms in the top decile is 0.77. These relationships are consistent across t through t+3.

In summary, the results in Tables 3 and 4 provide preliminary evidence that NR_CHRG and EXCESS have different implications on productivity. Specifically, the results show that NR_CHRG represent essential restructuring charges that will lead to improvement to productivity. In contrast, EXCESS represents deviations from the optimal amount of restructuring charges that will have adverse effect on productivity.

5.4.1 Regression results for productivity

Table 5 presents the result of my analysis of the relationship between productivity and restructuring charges. I begin my analysis by examining the impact of R_CHRG (total restructuring charges) on productivity, which is shown in Column 1. The results in this column show that the significance and direction of coefficients of all control variables but one are consistent with prior research. AGE has positive but insignificant coefficient perhaps because of lower variation in the age of firms in the sample.

My variable of interest in column 1, R_CHRG, has coefficient that is insignificantly different from 0. This insignificance has two potential explanations. First, NR_CHRG and EXCESS have opposing

effect on productivity and offset each other. This is perhaps the main reason for which prior studies do not find improvement in performance after restructuring. For example Atiase et al. (2004) find some improvement in accounting performance while Holder-Webb et al. (2005) and Brickley and Van Drunen (1990) find no change or decline in accounting performance following restructuring. Second, restructuring charges may take time to take effect on performance.

TABLE 5
REGRESSION OF PRODUCTIVITY ON RESTRUCTURING CHARGES

$$PROD_{i,t+k} = \beta_0 + \beta_1 SIZE_{i,t} + \beta_2 ROA_{i,t} + \beta_3 COMPET_{i,t} + \beta_4 AGE_{i,t} + \beta_5 R\&D_{i,t} + \beta_6 R\_CHRG_{i,t} + \beta_7 NR\_CHRG_{i,t} + \beta_8 EXCESS_{i,t} + \varepsilon_{i,t}$$

	$PROD_t$	$PROD_t$	$PROD_{t+1}$	$PROD_{t+2}$	$PROD_{t+3}$
SIZE	0.0154***	0.0155***	0.0143***	0.0141***	0.0125***
	(6.25)	(6.24)	(5.20)	(4.95)	(4.18)
ROA	0.5338***	0.5334***	0.3963***	0.2872***	0.3216***
	(17.28)	(17.18)	(11.51)	(8.04)	(8.62)
COMPET	1.3311***	1.3306***	1.3597***	1.3537***	1.0441***
	(4.09)	(4.08)	(3.79)	(3.62)	(2.70)
AGE	0.0035	0.0034	0.0028	0.0039	0.0094
	(0.55)	(0.55)	(0.40)	(0.55)	(1.25)
R&D	-0.7926***	-0.7931***	-0.7544***	-0.8333***	-0.7790***
	(-14.21)	(-14.17)	(-12.15)	(-12.78)	(-11.34)
R_CHRG	0.0044				
	(1.32)				
NR_CHRG		-0.0064	0.2669**	0.3362***	0.3570***
		(-0.06)	(2.40)	(2.94)	(3.04)
EXCESS		0.0050	-0.0172**	-0.0204***	-0.0321***
		(0.77)	(-2.42)	(-2.79)	(-4.28)
INTERCEPT	0.6911***	0.6912***	0.7182***	0.7302***	0.7146***
	(31.80)	(31.76)	(29.79)	(29.29)	(27.48)
N	1182	1182	1149	1107	1062
Adj. R^2	0.492	0.491	0.379	0.349	0.329

Notes:
*, **, and *** denote significance at 0.10, 0.05, and 0.01 levels respectively; t-statistics are provided in parentheses.
The above regression is for 398 restructuring firms over 1992 to 2007. In the sample selection process, I require at least 4 years data before and after restructuring for each firm. Note that I do not require the time series for each restructuring. As a result, the number of observations in columns 3 to 5 declines even though the number of firms remains 398.

Variable definitions:
PROD= Productivity of the firm calculated using DEA. t, t+1, t+2, and t+3 denote the year of restructuring charge and subsequent years.
SIZE= Natural log of total assets (in millions) at the beginning of the year.
ROA_t= core earnings deflated by total assets at the beginning of the year.
$COMPET_t$=Sales divided by total sales of all firms in the industry.
AGE_t=Natural log of the number of years since the firm first appeared on Compustat.
$R\&D_t$=Research and development expenses deflated by beginning of year total assets.
R_CHRG= restructuring charges deflated by total assets at the beginning of the year.
NR_CHRG_t= Expected restructuring charges from the Tobit-model.
$EXCESS_t$=Actual amount of restructuring charges (deflated by assets) in excess of NR_CHRG.

Restructuring involves closing, consolidating, and other streamlining activities that significantly change the scope and the manner of business conducted by the firms (Bragg, 2012). In most cases, restructuring is necessitated by divergence between strategy and structure and the outcome is change in organizational structure (Bowen et al., 1999). This suggests that the effect of restructuring charges (both NR_CHRG and EXCESS) may not be immediate. Column 2 of table 5 appears to support this; the coefficients of both NR_CHRG and EXCESS are insignificant-suggesting that the result of restructuring charges is not realized in the year of restructuring

Columns 3 shows that the impact of NR_CHRG is positive and significant (coefficient=0.27; t-stat 2.40), suggesting that restructuring charges necessitated by economic fundamentals lead to improvement in productivity. One of the key questions in restructuring is what would have been the result had the firm did not restructure (Bowen et al., 1999; Smart and Waldfogel, 1994; Dechow, 2004). The result in column 3 provides indirect evidence that failure to restructure when fundamentals necessitate may lead to lost productivity.

Columns 4 and 5 show similar results to that of column 3; NR_CHRG (EXCESS) are followed by improvement (decrease) in productivity two and three years after restructuring. In addition, the coefficient of NR_CHRG increases from 0.27 in column 3 to 0.36 (t-stat=3.04) in column 5 indicating that the impact of restructuring charges on productivity spans several years and its effect increases as restructuring programs are fully implemented. In contrast, the adverse effect of EXCESS on future productivity increases from column 3 to 5. As is the case with NR_CHRG, the effect (absolute value) of EXCESS on productivity gradually increases beginning the year after the restructuring. Specifically, the coefficient of excess in Column 3 is -0.02 (t-stat=-2.42) while it is -0.03 (t-stat=-4.28) in column 5 where $PROD_{t+3}$ is the dependent variable.

In summary, the above results suggest that firm productivity improves if restructuring charges are taken when justified by economic fundamentals. However, restructuring charges that are not necessitated by economic fundamentals appear to have adverse effect on productivity. The key message that emerges from these results is that it is important to distinguish between normal and excess restructuring charges when assessing whether restructurings are followed by improvements in performance.

5.4.2. Returns regressions

Table 6 presents the results for regression of contemporaneous and future buy-and-hold abnormal returns on NR_CHRG and EXCESS after controlling for accounting performance variables. Columns 1 and 2 show results where the dependent variable is R_{t+1} using value weighted market return while Column 3 shows R_{t+1} determined based on equal weighted market returns. Column 1 shows that the coefficients of ROA_t is significant at the 0.05 level (coefficient=0.3841; t-stat=1.99) while the coefficient of ΔROA_t is positive and significant at 0.01 level (coefficient=1.3577; t-stat=7.93). This is consistent with the expectation that earnings growth provides information to investors beyond the information provided by the level of earnings. However, the coefficients of NR_CHRG and EXCESS are insignificantly different from 0. This is because NR_CHRG is predicted by fundamentals. It is also consistent with the view that investors may ignore restructuring charges as suggested by some commentators.

Column 2 shows a different picture. The coefficient of ΔROA_{t+1} is positive and significant (coefficient=3.3530; t-stat=10.64) while ΔROA_t is negative and significant (coefficient=-0.6926; t-stat=-2.81). The dependent variable in R_{t+1} is CAR in year t+1; therefore positive association between growth in year t+1 and R_{t+1} is expected. The negative coefficient of ΔROA_t is perhaps due to lack of persistence in earnings growth.

The main variables of interest in column 2 of Table 6 are NR_CHRG and EXCESS. Similar to the results in column 1, the coefficient of NR_CHRG is not significantly different from 0 (coefficient=-0.8725; t-stat=-1.24). The coefficient of EXCESS is positive and significant at the 0.05 level (coefficient=0.4645; t-stat=2.08). This result suggests that the amount of EXCESS is related to one-year-ahead CAR showing that EXCESS is associated with future surprises. Table 5 shows that the coefficient of EXCESS is negative, showing an adverse effect on productivity. The result here shows that EXCESS is related to future investor surprises. This result is consistent with prior research which documents that

restructuring firms use reversals to beat earnings thresholds (Mohrle, 2002). Results in Table 5 and 6 collectively suggest that while EXCESS may have adverse effect on productivity, it appears that investors do not use the information contained in it. On the contrary, it appears that investors naively reward firms when excess amount of restructuring charge is released back to future earnings. Column 3 shows results when abnormal returns are determined using equal weighted market returns, and results are similar results to those shown in column 2.

TABLE 6
REGRESSION OF CONTEMPORANEOUS AND ONE-YEAR AHEAD ABNORMAL STOCK RETURNS ON RESTRUCTURING CHARGES.

$$R_{i,t} = \beta_0 + \beta_1 PROD_{i,t} + \beta_2 ROA_{i,t} + \beta_3 NR\_CHRG_{i,t} \beta_4 EXCESS_{i,t} + \beta_5 \Delta ROA_{i,t} + \varepsilon_{i,t}$$
$$R_{i,t+1} = \beta_0 + \beta_1 PROD_{i,t} + \beta_2 ROA_{i,t} + \beta_3 NR\_CHRG_{i,t} \beta_4 EXCESS_{i,t} + \beta_5 \Delta ROA_{i,t} + \beta_6 \Delta ROA_{i,t+1} + \varepsilon_{i,t+1}$$

	R_t	R_{t+1}	R_{t+1}
$PROD_t$	-0.1789	-0.5679***	-0.5371***
	(-1.27)	(-2.98)	(-3.17)
ROA_t	0.3841**	0.6382**	0.7520***
	(1.99)	(2.22)	(2.95)
NR_CHRG_t	-0.5261	-0.8725	-0.7762
	(-1.07)	(-1.24)	(-1.24)
$EXCESS_t$	-0.0163	0.4645**	0.4298**
	(-0.10)	(2.08)	(2.17)
ΔROA_t	1.3577***	-0.6926***	-0.6291***
	(7.93)	(-2.81)	(-2.87)
ΔROA_{t+1}		3.3530***	3.1547***
		(10.64)	(11.27)
INTERCEPT	0.1501	0.4916***	0.3693***
	(1.46)	(3.31)	(2.80)
N	1,182	1,149	1,149
adj. R^2	0.067	0.112	0.120

Notes:
*, **, and *** denote significance at 0.10, 0.05, and 0.01 levels respectively; t-statistics are provided in parentheses.
R_t= compounded buy-and-hold market adjusted returns over a 13 month period beginning 11 months before the end of the fiscal year.
R_{t+1}= compounded by-and-hold market adjusted returns over one year period beginning two months after the fiscal
PROD= Productivity of the firm calculated using DEA.
ROA_t= core earnings deflated by total assets at the beginning of the year.
NR_CHRG_t= Expected restructuring charges from the Tobit-model.
$EXCESS_t$=Actual amount of restructuring charges (deflated by assets) in excess of NR_CHRG.
ΔROA_t= change in ROA between period t-1 to t
ΔROA_{t+1}= change in ROA between period t to t+1

Additional tests

My sample includes restructurings that occurred before and after 2003. The accounting standard that governs the accounting for restructuring charges (SFAS 146) is relatively stricter than that existed prior to 2003 (EITF 94-3). In this study, I define excess restructuring charges as the amount of restructuring

charges that managers recognize beyond that necessitated by economic fundamentals. Since the normal restructuring charges are determined based on economic determinants, I expect the impact of normal and excess restructuring charges on productivity to be the same under different accounting regimes. However, as a robustness check, I examine the relationships between future productivity and normal and excess restructuring charges in two ways. First, I separate the sample into restructurings before and after implementation of SFAS 146 (2003) and replicate results in Tables 5 and 6. Untabulated results show that the relationships are qualitatively similar in both periods. Second, I include a dummy variable Post for the period after 2002 and include interaction of the dummy variables and other variables in equations 3 and 4. Untabulated results, show that the coefficients of post and interaction terms are not significantly different from 0 showing that the relationships documented above are similar in both the pre and post- SFAS 146 periods.

The number of restructuring firms in the sample is 398 firms while restructuring firm-years ranges from 1,182 for year t to 1,062 for year t+3. This is so because some of the firms had multiple restructurings. In the above analysis, I require three year data after restructuring at firm level. That is, if a firm restructures twice, I retained both restructurings if the first restructuring has 3 years data after restructuring even though the second restructuring has only two years' data after restructuring. To check the robustness of results, I retained only the 955 restructurings that have complete data for all years through t+3 and examined the relationships. Untabulated results show that the relationships documented above are qualitatively similar. I also examined the relationships separately for firms that restructured only once from those that restructured more than once. Results here are similar to those documented above.

SUMMARY

Organizations undertake restructuring activities with the objective of creating a more focused, efficient, and profitable company. To achieve these objectives, managers carry out a series of activities which have both accounting and economic implications. While the stated intent of managers in engaging in restructuring is to improve efficiency and performance, whether restructuring efforts are necessary or effective is not settled. Proponents claim that restructuring enables firms to match their strategy and structure and that these initiatives allow managers to respond to external shocks or poor organizational processes. Critics, on the other hand, suggest that restructuring may adversely affect performance because it potentially disrupts organizational learning and informal networks.

Additionally, the measurement and reporting of restructuring costs has been a subject of debate. Among other things, restructurings involve termination of employees, consolidation and relocation of facilities, and product line elimination which give rise to costs. Some of these costs create obligations while others involve write-off of existing productive assets. The discretion over the recognition of these costs under the current Generally Accepted Accounting Principles (GAAP) allows managers communicate bad news quickly. However, critics claim that managers could opportunistically utilize the discretion to accelerate expenses or create hidden reserves that will boost future earnings.

In this study I analyze the impact of restructurings on future productivity after isolating restructuring charges into normal restructuring charges necessitated by economic fundamentals and excess restructuring charges caused by managerial discretion. In addition, I examine investors' perception of normal and excess restructuring charges. I perform my analyses in two steps. In the first step, I estimate expected restructuring charges after controlling for economic determinants of restructuring charges. In the second step, I examine how the normal restructuring charges and excess restructuring charges are related to future productivity and abnormal returns.

My results indicate that normal restructuring charges lead to improvement in future productivity while excess restructuring charges are associated with decrease in productivity. As normal restructuring charges increase, the one-year to three-year ahead productivity increases monotonically. In contrast, increases in excess restructuring charges are associated with monotonic decrease in future productivity. These results suggest that restructurings lead to improvement in future productivity of restructuring firms.

However, such initiatives will be effective when the restructuring activities are justified by economic determinants. When restructurings deviate from the level justified by economic determinants, future productivity declines.

I also examine how normal and excess restructuring charges are related to contemporaneous and future abnormal returns. My results show that excess restructuring charges are positively associated with future abnormal returns, but that normal restructuring charges are not related to current or future restructuring charges. These results suggest that while excess restructuring charges have adverse effect on productivity, investors seem not to understand the implication. The above results are also consistent with the observation that investors may ignore restructuring charges and that they reward managers when the excess restructuring charges is released to future earnings (Levitt, 1998; Schilit and Perler, 2010; Penman, 2010; Mohrle, 2002).

This study highlights the importance of distinguishing between normal and excess restructuring charges when assessing the impact of restructurings on future performance. Since the two components have a counterbalancing effect, failure to isolate the two may lead to a conclusion that restructurings do not affect performance.

ENDNOTES

1. Jansen et al., (2011) show the counterbalancing effect of manipulations on the income statement and the balance sheet. Specifically, they show that manipulations that inflate income statement amounts (e.g. operating income) have the opposite effect on balance sheet metrics (e.g. Asset turnover). Thus performance measures that use both balance sheet and income statement amounts are ***less susceptible*** to manipulations.

2. Lichtenberg (1992) argues that diversification influences performance (e.g. profitability, Tobin's Q, stock price) through its impact on efficiency.

3. I calculate core earnings as Sales (SALE)-cost of goods sold (COGS)-selling, general, and administrative expenses (XSGA). Barber and Lyon (1996) suggest that income measures that exclude special items when examining improvements in production efficiency.

4. Speech by SEC Chairman Arthur Levitt at NYU Center for Law and Business on September 28, 1998.

5. Abarbanel and Bushee (1997) and Lee (2008) use a similar approach to determine contemporaneous and one-year ahead cumulative abnormal returns. My approach is slightly different from theirs in that I use the fiscal year end as a reference point instead earnings announcement dates.

6. Kothari (2001) suggests that the debate over the regression specification of returns on accounting performance measures is not yet settled. One strand of the literature suggests that using earnings level in the regression reduces bias in the coefficients (e.g. Kothari, 1992). However, another line of research suggests that change in earnings is also a relevant variable (e.g. Easton and Harris, 1991). Perhaps due to these claims, prior studies include both the level and change specifications (e.g. Amir and Lev, 1996; Francis and Schipper, 1999; Soliman, 2008). Following these studies, I include both the level and change specifications of performance variables.

7. Prior studies that use restructuring data from FirstCall include Bhojraj et al. (2009) and Chen and Gu (2004).

8. I require at least four year data after restricting at the firm level. However, I do not impose the same restriction for each restructuring observation. Thus while each firm has the required number of observations after the first restructuring, for year post-restructuring data may not exist for each restructuring. For example, if a firm had two restructurings, I require four year data at the firm level. In other words, it is possible for one the restructuring events to have 4 years data after restructuring while there are 3 for the other. To check the robustness of results, I retain only restructurings with complete data (955 observations satisfy this criteria) and repeat the analyses. The total number of companies remains 398.

9. I provide these coefficients to enhance comparability with the existing literature and the general directions of coefficients.

REFERENCES

Abarbanell, J. & Bushee, B. J. (1997). Fundamental analysis, future earnings and stock prices. *Journal of Accounting Research,* 35(1), 1-24.

Amir, E. & Lev, B. (1996). Value relevance of non-financial information: The wireless communication industry. *Journal of Accounting and Economics,* 22, 3-30.

Athanassopoulos, A.D. & Ballantine, J.A. (1995). Ratio and frontier analysis for assessing corporate performance: Evidence from the grocery industry in the UK. *Journal of Operational Research Society,* 46, 427-440.

Atiase, R. K., Platt, D.E. & Tse, S.Y. (2004). Operational restructuring charges and post-restructuring performance. *Contemporary Accounting Research,* 21 (3), 493-522.

Banker, R. D., Charnes, A., & Cooper, W. W. (1984). Some models for the estimating technical and scale inefficiencies in data envelopment analysis. *Management Science*, *30(9)*, 1078-1092.

Banker, R. D. & Natarajan, R. (2008). Evaluating contextual variables affecting productivity using DEA. *Operations Research*, 56(1), 48-58.

Barber, B.M. & Lyon, J.D. (1996). Detecting abnormal operating performance: The empirical power and specification of test statistics. *Journal of Financial Economics,* 41, 359-399.

Bens, D.A. & Johnston, R. (2009). Accounting discretion: Use or abuse? An analysis of restructuring charges surrounding regulator action. *Contemporary Accounting Research,* 26(3), 673-699.

Bhojraj, S., Sengupta, P. & Zhang, S. (2009). Pricing of restructuring charges. Working Paper, Indian School of Business, India.

Bowman, E.H, Singh, H., Useem, M. & Bhadury, R. (1999). When does restructuring improve economic performance? *California Management Review,* 41(2), 33-54.

Bragg, S. (2012). *GAAP 2012: Interpretation and application of Generally Accepted Accounting Principles,* Wiley, Somerset, NJ

Brickley, J.A., & Van Drunen, L. D. (1990). Internal corporate restructuring. *Journal of Accounting and Economics,* 12, 251-280.

Budros, A. (1999). A conceptual framework for analyzing why organizations downsize. *organization Science,* 10, 69-82.

Bulan, L., Sanyal, P. & Yan, Z. (2010). A Few bad apples: An analysis of CEO performance pay and firm productivity. *Journal of Economics and Business*, 62(4), 273-306

Cascio, W.F. (2002). Strategies for responsible restructuring. *Academy of Management Executive,* 16, 80-91.

Chandler, A.D. (1962). *Strategy and Structure,* MIT Press, Cambridge, MA

Chaney, C.K., Hogan, C.E. & Jeter, D.C. (1999). The effect of reporting restructuring charges on analysts' forecast revisions and errors. *Journal of Accounting and Economics, 27*, 261-284.

Chang, H., Fernando, G.D., Srinivasa, D. & Tripathy, A. (2011). A re-examination of diversification and firm productivity. *Journal of Management Accounting Research,* 25(1), 99-118.

Charnes, A., Cooper, W.W. & Rhodes, E. (1978). Measuring efficiency of decision-making Units, *European Journal of Operational Research*, 2(6), 429–444.

Chen, T. & Gu, Z. (2004). Analysts' treatment of non-recurring items in street earnings. *Journal of Accounting and Economics,* 38, 129-170.

Cooper, W.W., Seiford, L.M., & Tone, K. (2006). *Introduction to data envelopment analysis and its uses,* Springer, New York, NY.

Dechow, P. (2004). Discussion of 'operational restructuring charges and post-restructuring performance'", *Contemporary Accounting Research,* 21(3), 523-527.

Dechow, P. & Ge, W. (2006). The persistence of earnings and cash flows and the role of special items: Implications for the accruals anomaly. *Review of Accounting Studies,* 11, 253-296.

DeRue, D.S., Hollenbeck, J.R., Johnson, M.D., Ilgen, D.R. & Jundt, D.K. (2008). How different

team downsizing approaches influence team-level adaptation and performance. *Academy of Management Journal*, 51(1), 182-96.
Easton, P. & Harris, T. (1991). Earnings as an explanatory variable for returns", *Journal of Accounting Research,* 29(1), 19-36.
Elliot, J. & Hanna, J. (1996). Repeated accounting write-offs and the information content of earnings", *Journal of Accounting Research.* 34 (supplement), 135-155.
Financial Accounting Standards Board, (2002). Accounting for costs associated with exit or disposal activities, Statement of Financial Accounting Standards No. 146, Norwalk, CT.
Fisher, S.R. & White, M.A. (2000). Downsizing in a learning organization: are there hidden costs? *Academy of Management Review*, 25, 244-51.
Francis, J & Schipper, K. (1999). Have financial statements lost their relevance? *Journal of Accounting Research.* 37(2), 319-352.
Francis, J., Hanna, D. & Vincent, L. (1996). Causes and effects of discretionary asset write-offs. *Journal of Accounting Research,* 34, 117-134.
Frankel, R.M. & Roychowdhury, S. (2008). Are all special items equally special? The predictive role of conservatism. Available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1001434
Freeman, S.J. & Cameron, K.S. (1993). Organizational downsizing: convergence and reorientation framework. *Organization Science*, 4, 10-29.
Griliches, Z. (1986). Productivity, R&D, and basic research at the firm level in the 1970's. *American Economic Review*, 76(1), 141-154.
Haltiwanger, J C., Lane L. I., & Speltzer J.R. (1999). Firm size and wages - productivity differences across employers: The roles of employer size, age, and human capital. *American Economic Review*, 89(2), 94 – 99.
Hoff, A. (2007). Second stage DEA: Comparison of approaches for modelling the DEA score. *European Journal of Operational Research, 181(1)*, 425–435.
Holder-Webb, L., Lopez, T.J. & Regier, P.R. (2005). The performance consequences of operational restructurings. *Review of Quantitative Finance and Accounting,* 25, 319-339.
Jansen, I. Ph., Ramnath, S. & Yohn, T.L. (2011). A diagnostic for earnings management using changes in asset turnover and profit margin. *Contemporary Accounting Research,* 20(1), 221- 251.
Jennings, R., Martin, L. & Thompson II, R. (1998). The effect of corporate restructurings on the usefulness of the balance sheet. *Journal of Financial Statement Analysis,* 3(2), 44-56.
Kothari, S.P. (1992). Price-earnings regressions in the presence of prices leading earnings. *Journal of Accounting and Economics,* 15, 173-202.
Kothari, S.P. (2001). Capital markets research in accounting. *Journal of Accounting and Economics,* 31, 105-231.
Lee, Y.G. (2008). An examination of SFAS 146 restructuring charges. Working Paper, Columbia Business School, Columbia University, New York.
Lee, F., & Tang, J. (2001). Multifactor productivity disparity between Canadian and U.S. manufacturing firms", *Journal of Productivity Analysis*, 15, 115-128.
Lei, D. & Hitt, M.A. (1995). Strategic restructuring and outsourcing: the effects of mergers and acquisitions and LBOs on building firms' skills and capabilities. *Journal of Management*, 21,835-59.
Lev, B. & Thiagarajan, S.R. (1993). Fundamental information analysis. *Journal of Accounting Research,* 31(2), 190-215.
Levitt, A. (1998). The numbers game", *The CPA Journal,* 68(12), 14-19. Lichtenberg, F.R. (1992). Industrial de-diversification and its consequences of productivity. *Journal of Economic Behavior and Organization,* 18(3), 427-438.
Lin, B., Lee, Z. & Gibbs, L.G. (2008). Operational restructuring: reviving an ailing business. *Management Decision,* 46(4), 539-552.
Lopez, T. (2002). Evidence on the incremental information contained in the components of restructuring charges. *Journal of Business, Finance and Accounting,* 29(5&6), 613-660.

McDonald, J. (2009). Using least squares and Tobit in second stage DEA efficiency analyses. *European Journal of Operational Research,* 197(2), 792-798.
McNichols, M.F. & Stubben S.R. (2008). Does earnings management affect firms' investment decisions? *The Accounting Review,* 83(6), 1571-1603.
Mohrle, S. (2002). Do firms use restructuring charge reversals to meet earnings targets? *The Accounting Review,* 77(2), 397-413.
Penman, S. (2010). *Financial statement analysis and security valuation*, McGraw-Hill Irwin, New York, NY.
Riedl, E.J. (2004). An examination of long-lived asset impairments. *The Accounting Review,* 79(3), 823-852.
Schilit, H.M. & Perler, J. (2010). *Financial shenanigans*. McGraw-Hill, New York, NY.
Soliman, M.T. (2008). The use of DuPont analysis by market participants. *The Accounting Review, 83(3)*, 823-853.
Stickney, C., & Brown, P. (1999). *Financial reporting and statement analysis: A strategic Perspective*, Third edition, Thomson.
Tang, J. & Wang W. (2005).Product market competition, skill shortages and productivity: Evidence from Canadian manufacturing firms. *Journal of Productivity Analysis,* 23(3), 317-33.
Vincova, K. (2005). Using DEA models to measure efficiency. *BIATEC, xii*, 24-28.

MAILING INFORMATION

Menghistu Sallehu
600 Lincoln Avenue
4016 Lumpkin Hall
Charleston, IL 61920