



Consequences of overvalued equity: Evidence from earnings manipulation [☆]

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ABSTRACT

Firms that made earnings-decreasing restatements over the period 1990 to 2001 lost \$72 billion around restatement announcements. Forty-seven large-loss firms restating their earnings in the 1998 to 2001 period account for \$66 billion of these losses. Despite very good stock performance and low book-to-market values before earnings misstatements, large-loss firms are associated with mean abnormal returns of −39% during the announcement period, and underperform matched firms by 44% during the first post-restatement year. Collectively, our results support Jensen's [Jensen, M.C. Agency costs of overvalued equity. *Financial Management* 2005;34: 5–19.] argument that substantial overvaluation of equity pressures managers to manipulate earnings and when investors learn about earnings restatements by overvalued firms, they reevaluate firms to correct not only for pre-misstatement overvaluation, but also for the loss of confidence in the firms' managers.

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1. Introduction

What happens when a firm's stock gets substantially overvalued and the managers of this firm are unable to produce the performance required to sustain the excessive stock price? In his explanation of the agency costs of overvalued equity, Jensen (2005) asserts that to avoid disappointing investors, managers of firms with overvalued equity engage in a variety of actions including assuring investor expectations of future growth by using overvalued equity to make acquisitions; excessive internal spending; earnings manipulation; and, under intense strain, even fraud. With these actions, managers are able to trick the market for some time through the delusion of growth. However, when market participants discover that the firm's lofty value is an illusion, there is a sharp decline in the firm's value not only because of a correction of earlier overvaluation but also because of a loss of confidence about the trustworthiness of the firm's managers.

In this paper, we examine whether managers of overvalued firms use earnings manipulation to deceive the market into believing that management is going to generate the value anticipated by market participants.¹ Managers manipulate earnings to avoid revealing the true value of their firm because reporting lower than expected earnings is harshly punished by the market (Skinner and Sloan, 2002). Specifically, we examine the role of the agency costs of overvalued equity in earnings manipulation by

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¹ Earnings management pervasiveness is confirmed in Graham et al. (2005) study. In their study, the vast majority of financial executives admit smoothing earnings through real or accounting manipulation.

investigating a sample of 526 firms that restated their earnings over the period 1990 to 2001.² We restrict our analysis to earnings-decreasing restatements since such restatements suggest earnings manipulation by firms that overstated their earnings.

To examine the role of overvalued equity in earnings manipulation, we separately examine the performance of firms that restated earnings during the enormous overvaluation of equity that took place during the late 1990s and early 2000s (Jensen, 2005) and compare it to the performance of firms that restated earnings during the rest of the 1990s. Our inspiration for the subsamples we examine comes from Moeller et al. (2005). They find that as a result of acquisition announcements, acquiring firms lost a total of \$240 billion from 1998 to 2001, but gained a total of \$20 billion from 1980 to 1997. Furthermore, for the later period, they show that substantial losses (at least \$1 billion) were concentrated among a relatively small number of overvalued acquiring firms and these losses could not be explained by firm or acquisition characteristics. Taken together their findings confirm that after acquisition announcements the market not only evaluates the value of acquisitions, but also reevaluates the stand-alone value of acquiring firms.

If Moeller et al.'s (2005) conclusions about the agency costs of overvalued equity are correct, equity overvaluation should affect not only mergers and acquisitions but also other corporate events, for example, earnings restatements. Our findings about earnings-decreasing restatements indicate that as overvaluation of equity increased in the late 1990s and early 2000s, both the number of restatements per year and the losses in equity value associated with restatements (restatement losses) increased significantly. During the five-day announcement periods restating firms lost a total of \$63 billion in equity value (\$224 million per firm) in the four-year 1998 to 2001 period, as compared to a loss of \$9 billion (\$38 million per firm) in the eight-year 1990 to 1997 period.

To get a better understanding of the huge restatement losses during the 1998 to 2001 period, we examine the distribution of restatement losses per firm for this period. Similar to Moeller et al.'s (2005) findings about acquiring firms during the same period, we find that the large losses are driven by a relatively small number of firms. Our data show that 47 out of 282 firms making restatements from 1998 to 2001 are each associated with losses exceeding \$100 million. For these 47 large-loss restatements, the mean loss per firm is \$1,402 million, substantially higher than the mean loss per firm of \$13 million for the remaining 479 restatements in our sample. Furthermore, the combined restatement loss is \$66 billion for the large-loss restatements while only \$6 billion for all other restatements. Although the large-loss restatements represent only 9% of the full sample, they are associated with 91% of the total restatement losses.

A closer examination of the large-loss firms in our sample indicates that the enormous losses associated with these firms are caused by the strong negative market reaction to restatement announcements and high market values of equity before restatements. During the five-day period surrounding restatement announcements, shareholders of large-loss firms experience a mean abnormal stock price decline of 39%, significantly larger than the decline of 10% for other restating firms. The average market value of equity for large-loss firms (\$5,158 million) is six times larger than the average market value of equity for other restating firms. Our analysis of the impact of firm and restatement characteristics on the market reaction to restatement announcement reveals that these characteristics cannot explain the huge losses experienced by the large-loss firms. Collectively our findings provide striking evidence on the existence and magnitude of overvaluation, which consistent with Jensen's (2005) hypothesis, motivates corporate managers to engage in earnings manipulation and perhaps other destructive actions to avoid revealing to the market that management will be unable to generate the value anticipated by market participants. However, when investors learn about earnings restatements by overvalued firms they reevaluate firms to correct for earlier overvaluation and the loss of confidence in the managers.

The rest of the paper proceeds as follows. In Section 2, we describe our sample and examine the distribution of shareholder wealth losses associated with restatements. In Section 3, we ascertain the economic and statistical significance of large-loss restatements, and in Section 4 we investigate whether firm and restatement characteristics can explain large-loss restatements. We examine stock performance after earnings restatements in Section 5 and describe in more detail the large-loss subsample in Section 6. We conclude in Section 7.

2. Shareholder losses associated with earnings-decreasing restatements

2.1. Sample

To identify the initial sample of firms that announced restatements of their earnings during the years 1997 to 2001, we use the Financial Statement Restatement Database created by The General Accounting Office (GAO).³ To extend this sample to include earnings restatements for the rest of the 1990s, we search *Lexis-Nexis* for earnings restatements using methods similar to those in the GAO study. More detailed information about the restatements is obtained from articles announcing restatements for the whole sample period January, 1990 to December, 2001 and, when available, from the GAO study. From these sources we gather information about the impact of the restatements on earnings, the number of quarters restated, the reasons for restatements, and the initiators of restatements.

Although both restatements that decrease or increase earnings suggest inappropriate accounting, we confine our analysis to earnings-decreasing restatements as such restatements suggest earnings manipulation by firms that overstated their earnings. These earnings-decreasing restatements are the ones that are relevant to investigation of the role of the agency costs of overvalued

² In a contemporaneous study Kothari et al. (2006) find some support for the agency theory of overvalued equity by examining firms with high discretionary accruals. A sample of earnings restatements examined in our study provides a more suitable sample to test whether agency problems of overvalued equity lead to earnings manipulation. An earnings restatement is an admission by management that earnings were improperly reported. On the other hand, discretionary accruals is a somewhat arbitrary measure of earnings manipulation since high discretionary accruals do not necessarily imply earnings manipulation.

³ The Financial Statement Restatement Database was created by searching the *Lexis-Nexis* using variations of the word "restate." The procedure is described in detail in GAO (2002).

Table 1

Calendar distribution of restatement losses

Year	Number of obs.	Mean five-day CAR, %	Total restatement loss, \$000	Mean restatement loss per firm, \$000
1990	24	-6.37	-1,396,441	-58,185
1991	20	-3.97	-115,976	-5,799
1992	22	-2.86	-1,223,757	-55,625
1993	25	-10.69	-241,530	-9,661
1994	38	-12.84	-1,908,672	-50,228
1995	31	-3.73	-245,208	-7,910
1996	38	-12.97	-2,928,161	-77,057
1997	46	-14.28	-1,109,943	-24,129
1998	64	-15.49	-24,447,242	-381,988
1999	72	-15.08	-14,014,923	-194,652
2000	90	-18.03	-18,371,912	-204,132
2001	56	-9.66	-6,288,038	-112,286
1990–1997	244	-9.49*** (-7.45)	-9,169,686	-37,581*** (-4.41)
1998–2001	282	-15.04*** (-10.86)	-63,122,115	-223,837*** (-2.62)
Difference in subperiods		-5.55*** [0.004]	-53,952,429	-186,256** [0.044]
1990–2001	526	-12.46*** (-13.04)	-72,291,801	-137,437*** (-2.98)

The sample includes earnings-decreasing restatements announced during 1990 to 2001. We start with the sample compiled by the General Accounting Office and extend it to incorporate earlier years. We exclude restatements associated with earnings understatements or misstatements that had no impact on earnings. When there is more than one restatement for the same firm in any five-year period, we include only the earliest one. Furthermore, we limit the sample to firms with the data necessary to estimate the restatement loss. The five-day cumulative abnormal returns (CARs) are estimated using the market model during days -3 to 1 relative to the restatement announcement day (AD). The model parameters are estimated during AD-180 to AD-31. The restatement loss per firm is the market value of firm on AD-4 multiplied by the five-day CARs. We adjust the market value of equity using the U.S. gross domestic product deflator. The U.S. gross domestic product deflator is set up as 1 for year 2000. T-statistics are provided in parentheses. We use the analysis of variance to test the difference in means and report the corresponding *p*-values in brackets.

***, **, and * Significance at the 1%, 5%, and 10% levels, respectively (two-tail tests).

equity in earnings manipulation.⁴ We also exclude restatements caused by technical reasons such as changes in accounting rules or accounting methods because such restatements do not imply that a firm misstated its earnings. Due to data availability, we limit the sample to firms included in the Center for Research in Security Prices (CRSP) database and having the data necessary to calculate the loss in equity value associated with the restatement. Finally, since we investigate stock returns for a five-year post-restatement period, when a firm has more than one earnings restatement in any five-year period, we include only the earliest one. The above exclusions restrict our final sample to 526 earnings restatements.

2.2. Evolution of losses associated with earnings restatements

For each year in the sample period, we compute the mean announcement period cumulative abnormal returns (CARs), the total restatement loss, and the mean restatement loss per firm. To estimate CARs, we use a market model and estimate the model parameters during the 150-day period ending 30 days before the restatement announcement day (AD). Returns on the CRSP value-weighted index are used to proxy for market returns. The announcement period includes AD-3 to AD+1.⁵

To measure the restatement loss, we obtain the market value of equity for the restating firm before the announcement period (AD-4) and adjust it using the U.S. gross domestic product deflator to report the market value of equity in year 2000 dollars.⁶ The restatement loss is the adjusted market value of equity multiplied with the CAR during the announcement period. Throughout the paper, the restatement loss, the market value of equity, and total assets are reported in year 2000 dollars.

If agency problems caused by overvalued equity increased in the later years of our sample period, we should observe an increase in the number of earnings restatements and an increase in restatement losses. Table 1 presents the distribution of earnings restatements by year for the 1990 to 2001 period. As expected, the number of restatements per year increases with time. As earlier studies suggest a considerable increase in the overvaluation of equity in the late 1990s and early 2000s (e.g., Jensen, 2005; Moeller et al., 2005), we examine the eight-year 1990 to 1997 period and the four-year 1998 to 2001 period separately. Our results indicate that the highest concentration of restatements is in the last four years of the sample period. In the first eight years we have 244 restatements (30.5 restatements per year); while in the last four years we have 282 restatements (70.5 restatements per year).

⁴ Some restatements consist of a negative restatement in one period and a positive restatement of equal amount in the next period. As these restatements are caused by initial overstatements of earnings, we include them in our sample. Otherwise, we exclude restatements that have no effect on earnings.

⁵ Announcement periods vary significantly in earlier studies on restatements. For example, Palmrose et al. (2004) use the two-day event window, Agrawal and Chadha (2005) use the three-day event window, and Anderson and Yohn (2002) use the seven-day event window. Hence we examine abnormal returns around restatement announcements to determine the appropriate announcement period. In an unreported analysis, we find that daily average abnormal returns are negative and significant at the 1% level for AD-3 to AD+1. Furthermore, we find that these returns are not significantly different from zero on AD-4 and AD+2, at the 10% level. Thus, we concentrate on the five-day event window AD-3 to AD+1.

⁶ We obtain the U.S. gross domestic product deflator from the Federal Reserve Bank of Saint Louis website. Deflating slightly reduces the differences in losses across the examined subperiods, however, it does not have a significant impact on our results.

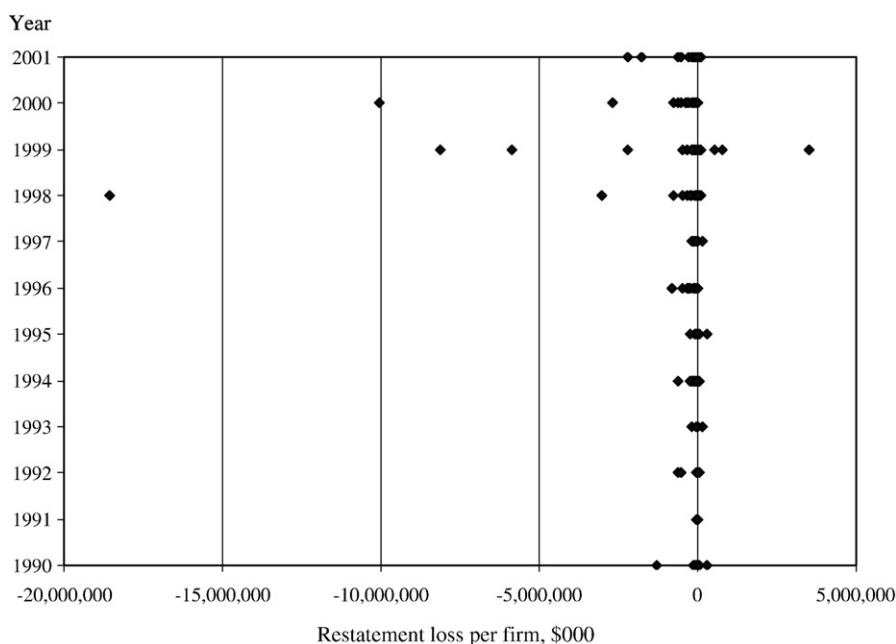


Fig. 1. Calendar and size distribution of restatement losses. The sample includes earnings-decreasing restatements announced during 1990 to 2001. We estimate the restatement loss during the five-day (AD-3 to AD+1) announcement period by multiplying the market value of equity at the end of AD-4 by the five-day CARs. We adjust the market value of equity using the U.S. gross domestic product deflator. The U.S. gross domestic product deflator is set up as 1 for year 2000. The five-day CARs are estimated using a market model during AD-3 to AD+1. The model parameters are estimated during AD-180 to AD-31.

For the entire sample, we find that earnings-decreasing restatements are associated with -12.5% five-day CARs, significant at the 1% level (Table 1).⁷ An examination of abnormal returns indicates that the years 1998 to 2001 are considerably dissimilar from the years 1990 to 1997. The mean five-day CARs change from -9.5% during the 1990 to 1997 period to -15.0% during the 1998 to 2001 period. The difference in the market reaction across the subperiods is significant at the 1% level. Table 1 also shows that the total restatement loss increases dramatically in the later subperiod. The total loss is about \$9 billion during the first eight years and about \$63 billion during the last four years.

As the total number of restatements is only slightly larger in the later period than in the earlier one, the substantial increase in the total restatement loss is driven by higher restatement losses per firm. Our results indicate that the mean loss per firm reaches \$224 million in the last four years and increases about six times from \$38 million per firm in the first eight sample years with the difference significant at the 5% level (Table 1). Collectively, these results suggest that negative earnings restatements have become considerably more damaging to firms during the 1998 to 2001 period. Our findings are similar to Moeller et al.'s (2005) findings of a drastic increase in the losses associated with acquisitions during the same period.

2.3. Size distribution of losses associated with restatements

Moeller et al. (2005) find that the substantial increase in total loss associated with acquisitions in the late 1990s and early 2000s is driven by a small number of firms. To see whether there is a similar pattern for restatement losses, we examine the size distribution of the restatement loss per firm each year. Fig. 1 shows that the distribution of losses per firm changes during our sample period, with later years being characterized by the presence of firms with extremely large restatement losses. Furthermore, the skewness coefficient changes from -5.3 for the period 1990 to 1997 to -9.4 for the period 1998 to 2001, indicating that the left-skewness of the distribution of losses becomes stronger with time.

To gain a better understanding of the reasons for the increase in restatement losses, we examine separately restatements made during 1998 to 2001 and associated with larger than \$100 million loss in equity value, other restatements made during 1998 to 2001, and restatements made during 1990 to 1997. Table 2 reports our results for the three subsamples. While the large-loss subsample has only 47 firms (9% of the full sample), the total value loss associated with these 47 firms is \$66 billion (91% of the total value loss for the full sample). Thus, similar to Moeller et al.'s (2005) findings about acquiring firms, we find that restatement losses are concentrated among a relatively small number of firms. The mean (median) loss per firm for the large-loss restatements is \$1.4 billion (\$317 million), versus the gain of \$12 million (the loss of \$3 million) for the other 1998–2001 restatements and the loss of \$38 million (\$4 million) for the 1990–1997 restatements. The difference between the mean loss for the large-loss subsample and

⁷ Palmrose et al. (2004) report the average two-day CARs of -9.5% for a sample of 403 restatements announced during 1995 to 1999. Agrawal and Chadha (2005) find -5.6% three-day CARs for a sample of 159 restatements during 2000 to 2001. Anderson and Yohn (2002) find -3.5% seven-day CARs for a sample of 161 restatements during 1997 to 1999. As our sample includes only earnings-decreasing restatements, the more unfavorable market reaction than the one found in earlier studies is not surprising.

Table 2

Distribution of restatement losses by subsample

		1998–2001	1998–2001	1990–1997	Difference between large-loss and all others, p-value
		Large loss	Other	All	
Number of obs.		47	235	244	
Restatement loss, \$000	Sum	–65,906,875	2,784,760	–9,169,686	
	Mean	–1,402,274***	11,850	–37,581***	0.000***
	(t-statistic)	(–2.95)	(0.76)	(–4.41)	
	Median	–316,786***	–2,697***	–3,899***	0.000***
	p-value	0.000	0.000	0.000	
Five-day CAR, %	Mean	–39.09***	–10.23***	–9.49***	0.000***
	(t-statistic)	(–9.78)	(–8.23)	(–7.45)	
	Median	–31.49***	–5.84***	–5.17***	0.000***
	p-value	0.000	0.000	0.000	
Market value of equity, \$000	Mean	5,158,158	915,852	781,365	0.000***
	Median	981,325	69,483	81,518	0.000***

The sample includes earnings-decreasing restatements announced during 1990 to 2001. Large-loss restatements are those associated with the loss in equity value exceeding \$100 million (in year 2000 dollars). We use the analysis of variance to test the difference in means and the Kruskal–Wallis test to test the difference in medians. ***, **, and * Significance at the 1%, 5%, and 10% levels, respectively (two-tail tests).

the other two subsamples is significant at the 1% level. The large total loss for the large-loss subsample is a result of the strong negative market reaction to the restatement announcements and high market values of equity before the restatements. On average, large-loss firms experience –39% five-day CARs, while other firms experience only about –10% CARs. The mean size of large-loss firms is \$5,158 million, about six times larger than the mean size of other restating firms.

3. Sensitivity tests for the statistical significance of large-loss restatements

In this section, we examine alternative measures of losses associated with large-loss restatements. We find that our results are robust to alternative definition of the change in equity value, controlling for industry effects, and controlling for unrelated news.

3.1. Change in the market value of equity during the restatement announcement period

In earlier sections, we estimate the restatement loss by multiplying the market value of equity of restating firms before restatement announcements (in year 2000 dollars) by the five-day CARs. CARs are estimated using a market model and may be understated if an earnings restatement by one firm affects negatively the market perception about other firms. To investigate this possibility, we estimate the loss related to restatements using five-day raw returns instead of CARs. Our results show that restatement announcements do not have a significant effect on the returns of other firms. The mean loss for the large-loss firms estimated using raw returns is \$1,419 million, only slightly larger than the \$1,402 million mean loss estimated using CARs.

3.2. Industry effects

If earnings restatements are more frequent immediately after negative news about industry prospects, our measure of restatement losses may be overstated. To explore this proposition, we estimate CARs during the restatement announcement period for industry-matched firms. We identify an industry-matched portfolio using the four-digit SIC code for each large-loss firm. If the four-digit SIC portfolio includes fewer than ten firms, we use the three-digit SIC portfolio. If the three-digit SIC portfolio includes fewer than ten firms, we use the two-digit SIC portfolio. Matched portfolios exclude the large-loss restating firms. We calculate equally weighted daily returns for each matched portfolio and use these returns to estimate five-day CARs, employing the same procedure that we used for restating firms. We find that the mean five-day CAR for matched portfolios is only –0.64%, not significant at the 10% level ($t = -1.23$). Thus, industry related news does not have a significant effect on the restatement CARs and restatement losses.

3.3. News unrelated to restatement announcements

The large-loss firms experience much larger restatement losses than other restating firms. It is possible that these large losses are driven by news unrelated to restatements. To exclude this possibility, we read all *Dow Jones Newswire* and the *Wall Street Journal* articles related to the large-loss firms during the five-day restatement announcement period and one day before and after this period. In many articles we find negative news related to restatements: responding to earnings restatements, analysts downgrade firm securities; senior executives potentially responsible for earnings misstatements are suspended or fired; and following sharp declines in stock values, shareholders sue managers for misleading them about firm earnings. However, negative news unrelated to restatements is uncommon: we find such news only for eight large-loss firms. Comparisons of mean losses and announcement period CARs of these eight firms and of other large-loss firms show no statistically significant differences. The mean (median) loss for firms with unrelated negative news is \$1,131 million (\$575 million), while the mean (median) loss for other large-loss firms is \$1,458 million (\$310 million).

Table 3

Overvaluation of restating firms before earnings misstatements

		1998–2001 Large loss	1998–2001 Other	1990–1997 All	Difference between 1998–2001 and 1990–1997, <i>p</i> -value	Difference between large-loss and all others, <i>p</i> -value
Book-to-market of equity	Mean	0.386	0.743	0.531	0.063*	0.032**
	Median	0.307	0.535	0.425	0.329	0.003***
	No. of obs.	45	205	214		
Adjusted book-to-market	Mean	−0.176***	0.183**	−0.011	0.092*	0.022**
	(<i>t</i> -statistic)	(−2.87)	(2.55)	(−0.25)		
	Median	−0.132***	−0.035	−0.052**	0.486	0.002***
	<i>p</i> -value	0.000	0.546	0.030		
	No. of obs.	45	205	214		
Tobin's <i>q</i>	Mean	3.200	1.919	2.397	0.388	0.018**
	Median	2.007	1.338	1.449	0.449	0.000***
	No. of obs.	45	210	214		
Adjusted Tobin's <i>q</i>	Mean	1.444***	0.227**	0.750***	0.280	0.024**
	(<i>t</i> -statistic)	(4.00)	(2.57)	(2.613)		
	Median	0.440***	−0.005	0.011**	0.943	0.000***
	<i>p</i> -value	0.000	0.368	0.021		
	No. of obs.	45	210	214		
Two-year raw holding-period returns, %	Mean	141.33**	50.80***	49.56***	0.349	0.002***
	(<i>t</i> -statistic)	(2.34)	(3.98)	(5.23)		
	Median	53.15***	16.66***	8.12***	0.722	0.009***
	<i>p</i> -value	0.000	0.000	0.000		
	No. of obs.	38	169	167		
Two-year holding-period size- and BM-adjusted returns, %	Mean	120.61*	−2.65	−0.19	0.504	0.010***
	(<i>t</i> -statistic)	(1.59)	(−0.10)	(−0.01)		
	Median	36.57*	−4.27	−13.01	0.180	0.067*
	<i>p</i> -value	0.088	0.352	0.623		
	B. <i>p</i> -value	0.005	0.640	0.920		
	No. of obs.	31	125	130		

Book-to-market ratios and Tobin's *q*'s for the subsamples are estimated before the earnings misstatement (at the end of the fiscal year at least one year before the earnings restatement). Adjusted book-to-market (Tobin's *q*) is the difference between a firm's book-to-market ratio (Tobin's *q*) and the median for the firm's industry. We define the industry group by the four-digit SIC code if it includes at least ten firms, otherwise we use the three- or two-digit SIC code. Stock performance is estimated during the two years before earnings misstatement (years 2 and 3 before earnings restatement). We use the analysis of variance to test the difference in means and the Kruskal–Wallis test to test the difference in medians. For each subsample, we report cross-sectional *t*-statistics and Wilcoxon sign-rank test *p*-values, while for abnormal returns we also report bootstrapped *p*-values.

***, **, and * Significance at the 1%, 5%, and 10% levels, respectively (one-tail tests for the large-loss subsample and differences between the large-loss subsample and others; two-tail tests for other tests).

The mean (median) five-day CARs are −42% (−28%) for firms with unrelated negative news and −38% (−32%) for other large-loss firms. These findings suggest that large losses associated with restatements are not driven by unrelated news.

4. Can firm and restatement characteristics explain large-loss restatements?

4.1. Overvaluation of restating firms

To examine the role of overvaluation in the substantial losses associated with large-loss firms, we use book-to-market values, Tobin's *q*'s, and pre-misstatement period holding-period returns (HPRs) as proxies for overvaluation. We examine the differences in these variables between 1998–2001 restatements and 1990–1997 restatements as well as between the large-loss restatements and other restatements. If all restating firms were more overvalued during 1998–2001 than during 1990–1997, the 1998–2001 restatements can be expected to have lower pre-misstatement book-to-market values, higher Tobin's *q* values, and higher HPRs than earlier restatements. However, a relatively small number of large-loss firms suggests that the number of substantially overvalued restating firms during 1998–2001 is rather small, thus, there may be no statistically significant differences in overvaluation between the subperiods.⁸ If the large losses associated with restatements are primarily caused by equity overvaluation of restating firms, the large-loss subsample can be expected to have the lowest pre-misstatement book-to-market values, the highest Tobin's *q* values, and the highest HPRs as compared to the other subsamples we examine. To investigate these possibilities we first estimate the book-to-market ratio using Fama and French's (1993) methodology. Since most earnings restatement periods are one year or shorter, we estimate book-to-market values and Tobin's *q*'s at the end of the last fiscal year ending at least one year before the restatement announcement. As in Moeller et al. (2005), we also estimate industry-adjusted book-to-market ratios.⁹ We calculate Tobin's *q* as total assets minus the book value of common equity plus the market value of

⁸ Furthermore, firms may have had better growth opportunities during 1990–1997 than during 1998–2001. That would bias our overvaluation measures and make our comparison of overvaluation across the subperiods not meaningful.

⁹ To adjust the book-to-market values, each year we estimate the median book-to-market ratio for each four-digit SIC group. If the four-digit SIC group includes fewer than ten firms, we examine the three-digit SIC group. If the three-digit SIC group includes fewer than ten firms, we examine the two-digit SIC group. We calculate the adjusted book-to-market ratio as a difference between a firm's book-to-market ratio and the median book-to-market ratio for the corresponding industry group.

common equity divided by total assets. The procedure we use to estimate adjusted Tobin's q 's is the same as the one we use to estimate adjusted book-to-market ratios. As shown in Table 3, we find no evidence that overall restating firms were more overvalued during the 1998–2001 than during the earlier years. The mean book-to market and adjusted book-to-market are slightly higher for 1998–2001 restatements while the differences in the median book-to market and adjusted book-to-market as well as Tobin's q 's are not statistically significant. Instead, overvaluation seems to be concentrated among large-loss firms. We find that the mean (median) book-to-market ratio is 0.39 (0.31) for the large-loss subsample, while the mean (median) ratios are 0.74 (0.54) and 0.53 (0.43) for the other two subsamples. The difference in means (medians) between the large-loss restatements and other restatements is significant at the 5% (1%) level. Table 3 also shows that the mean (median) adjusted book-to-market ratio is -0.18 (-0.13) for the large-loss subsample, significant at the 1% (1%) level. Furthermore, the adjusted mean (median) book-to-market ratio for the large-loss firms is lower than the ratios for other restating firms, significant at the 5% (1%) level. These findings are consistent with the hypothesis that large-loss firms are substantially overvalued at the time of restatements. We confirm the overvaluation hypothesis for the large-loss subsample using Tobin's q 's and adjusted Tobin's q 's before the misstatements.

We also expect that overvalued restating firms experience exceptionally good stock performance before earnings misstatements. Since most earnings restatement periods are one year or shorter, we define our pre-misstatement period as the two-year period starting 36 months before the restatement announcement and ending 12 months before the restatement announcement. Table 3 presents raw HPRs and size- and book-to-market-adjusted holding-period returns (HPARs) for the pre-misstatement period. We find no significant difference in pre-misstatement performance between the subperiods. Though, we find that the large-loss subsample performs exceptionally well before earnings misstatements. Large-loss firms earn on average 141% during this two-year period, significantly more than other restating firms at the 1% level. Furthermore, large-loss firms outperform size- and book-to-market-matched firms by 121%, significant at the 10% level. As the results using median values instead of mean values are qualitatively similar, the exceptional pre-misstatement stock performance is typical for large-loss firms.¹⁰ Collectively, the findings in this section support the hypothesis that before their earnings misstatements, large-loss firms were substantially overvalued as compared to other restating firms.¹¹

4.2. Other characteristics of restatements and restating firms

Palmrose et al. (2004) show that the market reaction to announcements of earnings restatements is negatively related to the initiation of restatement by auditors or managers and the number of accounts restated. Furthermore, they show that the market reaction is positively related to the impact of restatements on net income. In this section we examine whether the huge losses experienced by the large-loss firms could be driven by these and other firm and restatement characteristics.

Table 4 presents the characteristics of restatements and restating firms by subsample and tests the differences between 1998–2001 restatements and 1990–1997 restatements as well as large-loss restatements and other restatements. We examine the initiators of earnings restatements in Panel A of Table 4. Following Agrawal and Chadha (2005), in this table we assume that restatements with unidentified initiators are initiated by the firm.¹² The company itself is more likely to initiate earnings restatements during the 1998 to 2001 period than during earlier years. However, there is no significant difference between large-loss firms and other restating firms. We also find that the proportion of restatements initiated by auditors is similar across all three subsamples. An external initiator (usually the SEC) is more likely during 1990 to 1997 than during later years. Overall, while we find some differences about the initiators of restatements in the subperiods of 1990–1997 and 1998–2001, we do not find significant differences between the large-loss firms and other firms in our sample.

The stronger negative market reaction associated with large-loss firms could be a result of the larger size of restatement or the reevaluation of a firm's value to correct the pre-misstatement overvaluation of the restating firm. We estimate the size of restatement as the change in net income caused by the restatement relative to total assets at the end of the fiscal year before the restatement and relative to the originally reported net income.¹³ Panel B of Table 4 shows that there is no significant difference in the size of restatement between the subperiods and that large-loss firms are not associated with restatements of larger amounts than other restatements. The mean (median) change in net income relative to total assets for large-loss firms is -3.76% (-0.53%), while it is -4.31% (-1.53%) for other 1998–2001 firms and -3.55% (-1.17%) for 1990–1997 firms. The results are qualitatively similar for the changes in net income relative to the originally reported net income.¹⁴ The larger size of restatements cannot explain the more unfavorable market reaction to restatements made by the large-loss firms. Instead, when reevaluating the large-loss firms, the market seems to take into consideration both earnings restatements and pre-misstatement overvaluation. Thus, substantially overvalued firms experience larger losses in their market value at the time of restatements than other firms even when restatement sizes are the same.

¹⁰ The Fama and French (1993) three-factor model also cannot explain abnormal pre-misstatement stock performance of large-loss firms. The α is 1.54 and the adjusted α is 1.46, both significant at the 5% level.

¹¹ In an unreported analysis, we also examine mean and median restatement losses for the subsamples of overvalued and other firms. Overvalued firms are defined as restating firms in the lowest book-to-market or adjusted book-to-market quartiles and highest Tobin's q , adjusted Tobin's q , pre-misstatement HPRs, or pre-misstatement HPARs quartiles. The results lead to the same conclusions as the results in Table 3; there is a positive relation between the size of restatement losses and pre-misstatement overvaluation. For example, firms in the lowest book-to-market quartile have the mean restatement losses of \$410 million, while other firms have the mean losses of \$78 million, significantly different at the 1% level.

¹² This assumption does not have a significant impact on our results.

¹³ We obtain the information about the size of restatements from Lexis-Nexis articles. When only pre-tax data are available from the articles, we assume 35% tax rate and estimate the effect on net income. When only the impact on earnings per share is available, we use the number of outstanding shares at the end of the fiscal year before the restatement to estimate the effect on net income.

¹⁴ When reporting the change in net income relative to originally reported net income, we exclude observations with negative originally reported net income (65 obs.).

Table 4

Characteristics of earnings restatements and restating firms

		1998–2001	1998–2001	1990–1997	Difference between 1998–2001 and 1990–1997, <i>p</i> -value	Difference between large-loss and all others, <i>p</i> -value
		Large loss	Other	All		
<i>Panel A: Initiator of earnings restatement</i>						
Company	Proportion	0.787	0.809	0.697	0.004***	0.588
	No. of obs.	47	235	244		
Auditor	Proportion	0.132	0.115	0.146	0.420	0.977
	No. of obs.	38	174	157		
External	Proportion	0.132	0.144	0.325	0.000***	0.168
	No. of obs.	38	174	157		
<i>Panel B: Size of restatements</i>						
Change in NI / total assets, %	Mean	–3.76	–4.31	–3.55	0.555	0.940
	Median	–0.53	–1.53	–1.17	0.553	0.002***
	No. of obs.	24	114	132		
Change in NI / reported NI, %	Mean	–0.30	–1.38	–2.51	0.351	0.467
	Median	–0.23	–0.46	–0.52	0.176	0.046**
	No. of obs.	11	37	72		
<i>Panel C: Other restatement characteristics</i>						
Number of quarters restated	Mean	5.07	4.35	3.64	0.011**	0.062*
	Median	4	4	2.5	0.002***	0.084*
	No. of obs.	45	220	236		
Multiple reasons for restatement	Proportion	0.233	0.219	0.271	0.204	0.865
	No. of obs.	43	228	210		
Revenue or cost related	Proportion	0.605	0.645	0.548	0.044**	0.934
	No. of obs.	43	228	210		
<i>Panel D: Firm characteristics</i>						
Total assets, \$000	Mean	4,615,701	954,127	2,456,888	0.230	0.021**
	Median	1,108,616	105,017	100,087	0.134	0.000***
	No. of obs.	40	196	198		
Debt-to-assets ratio	Mean	0.259	0.246	0.263	0.466	0.909
	Median	0.251	0.219	0.230	0.348	0.727
	No. of obs.	40	195	196		
Abnormal discretionary total accruals, %	Mean	–0.91	–0.16	–3.45	0.388	0.889
	Median	2.58	1.04	–1.72	0.310	0.615
	No. of obs.	29	143	139		

We estimate the size of restatement as a change in net income (NI) caused by the restatement. We obtain total assets and total debt at the end of the fiscal year before the restatement and the market value of equity on AD-4. Discretionary abnormal total accruals are estimated in Year-1 relative to those of industry- and net-income-matched firms.

***, **, and * Significance at the 1%, 5%, and 10% levels, respectively (two-tail tests).

Panel C of Table 4 presents our findings on the number of quarters restated. Similar to Agrawal and Chadha's (2005) sample, the majority of our sample firms restate earnings for a period not exceeding one year. The number of quarters restated is larger for 1998–2001 restatements than for earlier restatements. Furthermore, the mean number of quarters restated for the large-loss firms is 5.1, larger than for the other 1998–2001 firms (4.4) and the 1990–1997 firms (3.6), significant at the 10% level. It is likely that, managers try to cover up intentional overstatements and keep misstating earnings as long as possible, while they are more willing to admit unintentional mistakes as soon as those mistakes are discovered. If large-loss restatements are more often associated with intentional overstatements than other restatements, it can be expected that a number of quarters restated will be larger for the large-loss restatements.

We study the pervasiveness of restatements for each subsample by examining the proportion of restatements with more than one identified reason. As shown in Panel C of Table 4, we find no significant difference in the subsamples. The two most common reasons for restatements in our sample are related to revenue and costs. The proportion of restatements related to these two reasons is higher during 1998–2001 than during 1990–1997 but similar for large-loss and other restatements. Finally, in Panel D of Table 4, we present restating firm characteristics. Total assets of restating firms are similar across the subperiods. The large-loss firms have larger total assets than other firms, however, the difference in size across the subsamples is smaller than when size is measured as the market value of equity (Table 2). We find no significant differences in debt-to-assets ratios across the subperiods and the subsamples. We also find no significant differences in abnormal discretionary total accruals before restatements (Year-1) across the subperiods and the subsamples.¹⁵ This is consistent with our finding of no significant difference in the restatement size across these groups.

¹⁵ To obtain abnormal discretionary total accrual, we estimate differences between discretionary accruals of sample firms and those of industry- and net-income-matched firms (Kothari et al. 2005). We estimate discretionary total accruals following Hribar and Collins (2002). Non-discretionary accruals are obtained from the modified Jones (1991) model (e.g., Chung et al., 2002; Park and Shin, 2004). Total accruals are differences between earnings before extraordinary items and discontinued operations (Compustat item 123) and operating cash flow from continuing operations (item 308 minus item 124).

Table 5

Predicting the market reaction to the large-loss restatements using firm and restatement characteristics

	Model 1	Model 2	Model 3	Model 4
Dependent variable: five-day CARs				
Intercept	0.0325 (0.28)	0.0036 (0.03)	-0.0183 (-0.18)	-0.0445 (-0.45)
Log of market value of equity	-0.0126 (-1.40)	-0.0105 (-1.14)	-0.0081 (-1.05)	-0.0059 (-0.76)
Adjusted book-to-market	-0.0642 (-1.60)		-0.0667* (-1.84)	
Adjusted Tobin's <i>q</i>		-0.0031 (-0.84)		-0.0021 (-0.57)
Initiated by company	-0.0197 (-0.46)	-0.0255 (-0.59)	0.0127 (0.35)	0.0094 (0.26)
Initiated by auditor	0.0374 (0.56)	0.0503 (0.72)	0.0525 (0.96)	0.0675 (1.19)
Initiated by external body	0.1119** (2.30)	0.1050** (2.09)	0.0989** (2.33)	0.0879** (2.04)
Change in net income/total assets	0.2742 (1.19)	0.1848 (0.80)		
Number of quarters restated	0.0120* (1.72)	0.0108 (1.51)	0.0030 (0.57)	0.0020 (0.39)
More than one reason for restatement	0.0030 (0.08)	0.0147 (0.37)	0.0070 (0.20)	0.0148 (0.42)
Revenue or cost related restatements	-0.0297 (-0.81)	-0.0189 (-0.52)	-0.0362 (-1.16)	-0.0288 (-0.92)
Debt-to-assets ratio	-0.0171 (-0.21)	0.0032 (0.04)	0.0016 (0.02)	0.0187 (0.26)
Number of observations	123	122	182	181
Adjusted R^2	0.0219	0.0052	0.0089	-0.0091
Estimated CARs for large-loss firms, %	-10.05*** (-5.98)	-11.30*** (-6.97)	-9.88*** (-12.54)	-11.04*** (-16.85)
Unexplained part of CARs for large-loss firms, %	-18.83*** (-4.87)	-17.58*** (-4.42)	-25.75*** (-6.60)	-24.60*** (-6.15)
Number of observations for large-loss firms	23	23	38	38

This table reports the estimated coefficients from OLS regression analysis for 1990–1997 restatements and the estimated values of CARs for the large-loss restatements obtained using the earlier estimated coefficients. We estimate accounting variables at the end of year before the restatement announcement. *T*-statistics are reported in parentheses.

***, **, and * Significance at the 1%, 5%, and 10% levels, respectively (two-tail tests).

4.3. Regression analyses

In Table 5, we examine whether firm and restatement characteristics can explain the market reaction to the large-loss restatements. Using data from 1990 to 1997, we estimate the models predicting five-day CARs with firm and restatement characteristics. Then, using the estimated coefficients from these regressions, we calculate estimated (explained) CARs for the large-loss restatements. The difference between actual and estimated CARs is the unexplained part of CARs.

The variables we use to predict the market reaction to restatements are those we examine in Tables 2 through 4. In Table 3, we examine six proxies for the market overvaluation of a firm's equity: the book-to-market of equity, adjusted book-to-market, Tobin's *q*, adjusted Tobin's *q*, as well as two-year pre-misstatement HPRs and HPARs. In Table 5, we report results with only two proxies for the overvaluation of equity: the adjusted book-to-market (Model 1 and Model 3) and adjusted Tobin's *q* (Model 2 and Model 4). Analyses with the other four proxies lead to very similar results. We estimate accounting ratios used in this analysis at the end of the fiscal year before the restatement announcement. Because including in the models the change in net income caused by restatements substantially reduces the number of observations available for our analysis, we estimate Model 3 and Model 4 without this variable.

Table 5 shows that most of the examined variables are not significant in predicting the market reaction to restatement announcements during 1990–1997. Similar to Moeller et al. (2005), we find that even the adjusted book-to-market and adjusted Tobin's *q*, which are highly significant in predicting large-loss restatements made during 1998–2001, are not consistently significant in predicting the market reaction before 1998. Only the initiation of restatement by an external party is positively related to the market reaction in all four models, significant at the 5% level. This finding is consistent with Palmrose et al.'s (2004) finding that initiation of restatement by managers and auditors is associated with a stronger negative market reaction than initiation by external parties.

Applying the estimated coefficients from the four models, we find that firm and restatement characteristics predict -10% to -11% five-day CARs for the large-loss restatements. The predicted CARs for the large-loss firms are very similar to -9% CARs experienced by the 1990–1997 firms and -10% CARs experienced by the other 1998–2001 firms (Table 2). The unexplained part of the market reaction to the large-loss restatements varies from -18% to -26% depending on the model used, significant at the 1%

Table 6

Stock performance after earnings restatements

Panel A: Raw and size- and book-to-market-adjusted holding-period returns						
		1998–2001	1998–2001	1990–1997	Difference between	Difference between
		Large loss	Other	All	1998–2001 and	large-loss and all
					1990–1997, <i>p</i> -value	others, <i>p</i> -value
One-year HPRs, %	Mean	–27.46***	–3.14	5.84	0.078*	0.026**
	(<i>t</i> -statistic)	(–3.24)	(–0.45)	(1.113)		
	Median	–28.56***	–14.44***	–2.93	0.012**	0.008***
	<i>p</i> -value	0.003	0.006	0.598		
One-year HPARs, %	No. of obs.	36	143	188		
	Mean	–44.28***	–10.62*	–13.28**	0.680	0.025**
	(<i>t</i> -statistic)	(–3.22)	(–1.69)	(–2.18)		
	Median	–38.48***	–10.47**	–10.31***	0.775	0.016**
Five-year HPRs, %	<i>p</i> -value	0.001	0.024	0.002		
	B. <i>p</i> -value	0.006	0.128	0.040		
	No. of obs.	45	203	237		
	Mean	3.65	27.34	157.76**	0.200	0.483
Five-year HPARs, %	(<i>t</i> -statistic)	(0.128)	(1.56)	(2.34)		
	Median	–30.71	5.82	34.61***	0.117	0.137
	<i>p</i> -value	0.966	0.519	0.000		
	No. of obs.	11	28	96		
Five-year HPARs, %	Mean	–45.04***	14.08	30.38	0.484	0.307
	(<i>t</i> -statistic)	(–2.60)	(0.61)	(0.90)		
	Median	–59.45***	–13.97*	–21.43**	0.845	0.070*
	<i>p</i> -value	0.009	0.054	0.036		
	B. <i>p</i> -value	0.024	0.406	0.174		
	No. of obs.	45	203	237		
Panel B: α 's from the Fama and French three-factor model for one-year post-restatement returns						
		1998–2001 other restatements		1990–1997 restatements		
		Large-loss restatements				
		α	Adjusted α	α	Adjusted α	α
						Adjusted α
Coefficient		–3.1621*	–3.0966*	–0.3376	–0.6839	–2.0044***
(<i>t</i> -statistic)		(–1.90)	(–1.86)	(–0.25)	(–0.50)	(–3.31)
						(–3.35)

In Panel A we use the analysis of variance to test the difference in means and the Kruskal–Wallis test to test the difference in medians. For each subsample, we report cross-sectional *t*-statistics, Wilcoxon sign-rank test *p*-values, and bootstrapped *p*-values. Panel B reports results from the Fama and French (1993) three-factor model:

$$R_{pt} - R_{ft} = \alpha + \beta_m(R_{mt} - R_{ft}) + \beta_s SMB_t + \beta_h HML_t + \varepsilon_t,$$

To estimate one-year period monthly abnormal returns, each month we identify all firms that restated their earnings in the last year and calculate average monthly return for these firms (R_{pt}). R_{ft} is the risk-free rate, $(R_{mt} - R_{ft})$ is the excess return on the market, SMB_t is the size factor, and HML_t is the book-to-market factor. The adjusted intercept is estimated relative to the expected intercept obtained from 1000 regressions of random portfolios with the same size and book-to-market characteristics as the sample firms.

***, **, and * Significance at the 1%, 5%, and 10% levels, respectively (two-tail tests).

level. Our results suggest that firm and restatement characteristics cannot explain higher losses for the large-loss firms than for other restating firms.

5. Stock performance after earnings restatements

Our results thus far suggest that losses associated with the large-loss restatements reflect pre-misstatement overvaluation and a loss in confidence about the trustworthiness of the firm's managers. An alternative explanation for the losses associated with the large-loss restatements is that the market overreacts to these announcements.¹⁶ If so, restating firms should outperform matched firms after the announcement period. However, it is also possible that the market underreacts to the news about restatements and does not fully correct the overvaluation of restating firms at the time of restatement. In this case, restating firms should underperform matched firms after the announcement period. To investigate these possibilities, we examine one- and five-year post-restatement stock performance and report the results in Table 6.¹⁷ Panel A of Table 6 shows that in the first post-restatement year the large-loss subsample has –27% HPR. The median HPR for the large-loss subsample is –29%, indicating that most large-loss firms experience very poor stock performance following earnings restatements. For the other two subsamples one-year post-restatement HPRs are insignificantly different from zero. Stock performance is worse for firms restating their earnings during 1998–2001 than during 1990–1997, significant at the 10% level. The difference in post-restatement stock performance between the large-loss firms and other restating firms is significant at the 5% level.

¹⁶ Studies show that the market does not always immediately and correctly incorporate the information available in corporate announcements (e.g., Loughran and Ritter, 1995; Hertz et al., 2002).

¹⁷ As we are unaware of a theory that predicts whether restatement announcements should be associated with market overreaction or underreaction, we use two-tail tests in Table 6.

Table 7

Description of large-loss firms

Panel A: Industry distribution				
Industry	SIC code	Number of events	Percent of events	
Computer and data processing services	7370	4	8.51	
Refuse systems	4953	3	6.38	
Pharmaceutical preparations	2834	2	4.26	
Communications equipment	3660	2	4.26	
Telephone communications	4810	2	4.26	
Prepackaged software	7372	2	4.26	
Business services, nec	7389	2	4.26	
Panel B: Reasons for restatement				
Reason	Number of events		Percent of events	
Revenue recognition	20		42.55	
Cost or expense	10		21.28	
Restructuring, assets, or inventory	5		10.64	
Acquisitions and mergers	4		8.51	
Panel C: Board of directors and audit committee characteristics				
Variable	Restating large-loss firms	Matched firms	Mean difference	t-statistic
Number of directors	9.21	9.34	−0.62	−0.89
Independent directors	59.89%	57.42%	−1.14%	−0.23
Same person chair and CEO	73.81%	75.00%	0	0.00
Number of board meetings	7.80	7.48	0.16	0.19
Number of audit committee meetings	3.02	3.40	−0.32	−0.81
Independent financial expert on audit committee	12.77%	25.53%	−12.77%*	−1.52

The large-loss sample includes 47 restatements made during 1998–2001 and associated with a restatement loss exceeding \$100 million (in year 2000 dollars). Panel A examines the industry distribution of large-loss firms. Panel B reports restatement reasons associated with at least 5% of large-loss restatements. Panel C compares board of directors and audit committee characteristics before earnings restatements for large-loss firms and matched firms. Data on the number of directors, number of independent directors and committee membership are obtained, when available, from IRRC's Director Database, and otherwise from proxy statements. Data on the number of board and audit committee meetings, whether the chair and CEO are the same person, and whether at least one independent financial expert serves on audit committee before restatements are obtained from proxy statements. The matched sample is constructed by using two-digit SIC codes and the market value of equity at the beginning of the restatement month. Matched firms are restricted to those included in the IRRC's Director Database. ***, **, and * Significance at the 1%, 5%, and 10% levels, respectively (one-tail tests).

Furthermore, we find that all three subsamples underperform size- and book-to-market-matched firms in the first post-restatement year. The large-loss firms experience −44% one-year HPARs (significant at the 1% level), the other 1998–2001 firms experience −11% HPARs (significant at the 10% level), and the 1990–1997 firms experience −13% HPARs (significant at the 5% level).^{18,19,20} These findings suggest that the losses associated with earnings restatements are not limited to the restatement announcement period and total losses associated with restatements are much higher than the ones implied by the market reaction to restatement announcements. The large-loss firms experience on average −39% CARs during the announcement period (Table 2). On the remaining 61% of firm value these firms experience −44% abnormal returns during the first post-restatement year, which translates into a total loss of 66% of firm value. The losses associated with other restating firms are relatively moderate. During the announcement period these firms experience about −10% CARs (Table 2). Taking into consideration the abnormal post-restatement performance, these firms experience about 20% loss in their value as a result of earnings restatements.²¹

For robustness, we examine whether the Fama and French (1993) three-factor model can explain the post-restatement one-year stock performance (Panel B of Table 6). Following Mitchell and Stafford's (2000) methodology, we also estimate size- and book-to-market-adjusted intercepts. The estimated intercept from this model for the large-loss subsample is −3.16 and the adjusted intercept is −3.10, both significant at the 10% level. Thus, calendar-time methodologies confirm the presence of abnormal stock performance for the large-loss subsample. The estimated intercept from the Fama and French model is negative but not statistically significant for the other 1998–2001 restatements subsample.²² The estimated intercept for the 1990–1997 subsample

¹⁸ The number of observations is higher for HPARs than for HPRs because HPARs do not exclude firms when returns are not available for the whole holding period (e.g., Hertz et al., 2002).

¹⁹ Our findings of poor post-restatement performance are consistent with Palmrose and Scholz's (2004) findings that firms experience −3% raw six-month returns following restatement announcements.

²⁰ The magnitude and statistical significance of the abnormal performance is very similar when we match by size, pre-restatement six-month HPRs, and book-to-market. Large-loss firms experience −40% one-year HPARs (significant at the 1% level), other 1998–2001 firms experience −12% HPARs (significant at the 10% level), and 1990–1997 firms experience −11% HPARs (significant at the 10% level).

²¹ For the large-loss subsample, we also find some evidence of abnormal performance during the five-year post-restatement period (Panel A of Table 6). However, the size of abnormal returns (−45%) suggests that this underperformance is driven by the poor stock performance in the first post-restatement year.

²² As the sample period is very short (four years) for both 1998–2001 subsamples, it can be expected that calendar-time methodologies will have low power in finding abnormal performance.

is -2.00 and the adjusted intercept is -2.03 (both significant at the 1% level), confirming the presence of abnormal performance for the 1990–1997 subsample.

6. Large-loss firms

6.1. Distributions by industry and restatement reason

Panel A of Table 7 presents four-digit SIC groups with at least two large-loss firms and shows that none of the groups includes more than four firms. Thus, large-loss restatements are not concentrated in a small number of industries. Panel B of Table 7 reveals that, similar to other restatements, the two most common reasons for large-loss restatements are related to revenue recognition and costs or expenses.

6.2. Board of directors and audit committee in large-loss firms

A plausible reason for the considerable losses experienced by large-loss firms can be a collapse of the firms' internal control systems established to find and repair situations detrimental to the interests of the company's shareholders. Jensen (1993) notes that "problems with corporate control systems start with the board of directors" because the board is at the "apex" of the system and has "final responsibility for the functioning of the firm" (p.862). Jensen et al. (2004) assert that "in the end, the only solution to the agency problems of overvalued equity is an effective governance system" (p.48). Recent changes in governance rules adopted by stock exchanges and the Sarbanes–Oxley Bill stress the significance of the independence of corporate boards and the presence of financial experts on audit committees in preventing corporate deception.

Several papers examine the role of board committees in board oversight (e.g., Deli and Gillan, 2000; Klein, 2002). Extant empirical evidence on board independence and the incidence of accounting irregularities is mixed. For example, Klein (2002) reports a negative association between the level of earnings management and the independence of audit committees. Other studies do not find that independent directors are better at insuring the integrity of accounting practices in the firm. For example, Agrawal and Chadha (2005) find no difference in board independence between firms that restate earnings and industry- and size-matched firms, but they find that restating firms are less likely to have financial experts on their audit committees. Similarly, Xie et al. (2003) find that firms with corporate or financial experts on audit committee are less likely to manage discretionary accruals, while Park and Shin (2004) find that firms with directors from financial intermediaries are less likely to manage earnings.

To investigate the oversight role of the board of directors in our sample of large-loss firms, we collect data on the number of directors, the number of independent directors, and data on committee membership before the earnings restatements.²³ Data for each firm in our large-loss sample are obtained from Investor Responsibility Research Center's (IRRC's) Director Database, when available, and otherwise from proxy statements.²⁴ Furthermore, for each firm we identify from proxy statements the number of board and audit committee meetings, whether the chair and CEO are the same person, and whether at least one independent financial expert serves on audit committee before restatements.²⁵ For comparison purposes, we also obtain data on board characteristics for a sample matched by the two-digit SIC codes and the market value of equity at the beginning of the restatement month. To reduce data-collection costs, matched firms are restricted to those included in the IRRC's Director Database. For both the large-loss and matched samples, we obtain the most recent information available before the restatement.

If the characteristics of boards and audit committees are important in preventing large-loss restatements, we expect that the large-loss firms have lower percentage of independent directors, more frequently have CEO serving as board chair, have fewer meetings by the board of directors and audit committee, and less frequently have an independent financial expert serving on the audit committee. In Panel C of Table 7, we compare characteristics of the board of directors and audit committee for the large-loss firms and matched firms. Firms show similarity in most characteristics of the board of directors and audit committee except that the percentage of independent experts on audit committee is significantly lower (albeit only at the 10% level) for large-loss firms (13%) than for matched firms (26%). These findings are similar to Agrawal and Chadha's (2005) findings for their sample of earnings restatements made during 2000 to 2001. Thus, firms experiencing large-loss restatements have fewer independent financial experts on audit committee than matched firms, but they do not have significantly different composition of boards and audit committees than other restating firms.

7. Conclusions

We examine a sample of 526 earnings-decreasing restatements made during 1990 to 2001 and find that the losses in equity value associated with earnings restatements increase substantially in the last four years. This increase in the losses during 1998 to 2001 is driven by a small number of large-loss firms. Forty-seven large-loss restatements made during 1998 to 2001 account for 91% of the losses associated with restatements. Before earnings misstatements the large-loss firms experience very good stock performance and have low book-to-market values as well as high Tobin's q 's. However, the large-loss firms lose 39% of their value at the time of restatement announcements and continue to perform poorly after the announcements. Firm and restatement

²³ See Gillan (2006) for a review of evidence on various director attributes in board oversight.

²⁴ For one firm for which we are unable to obtain data from either of these sources, we get board data from the SEC filings before the restatement.

²⁵ Similar to Agrawal and Chadha (2005), we classify directors as having financial expertise if they have a CFA, CPA, or have work experience as a Chief Financial Officer, Chief Accounting Officer, Controller, Treasurer, or VP-Finance.

characteristics cannot explain the magnitude of the losses associated with the large-loss restatements. Our results suggest that the market was not able to recognize the problems large-loss firms were facing before earnings restatements. Collectively, our findings are consistent with Jensen's (2005) agency costs of overvalued equity hypothesis.

Our research adds to a growing literature on the severe costs of a firm's overvalued equity for managerial decisions. Jensen (2005) asserts that when investors learn about the true situation with overvalued firms, they reevaluate the firm to correct not only for the overvaluation, but also for a loss of confidence about the trustworthiness of the firm's managers. Moeller et al. (2005) provide compelling evidence on how overvalued equity leads to the destruction of firm value by examining acquisition decisions. Our work empirically confirms how similar destructions in firm value can emerge from earnings manipulation. In related research, Efendi et al. (2007) examine whether overvalued equity leads to the likelihood of earnings misstatements. Further research is necessary to examine whether the results of this study can be extended to a broader class of managerial investment and financing decisions.

Appendix A. Long-term stock performance

We create the size- and book-to-market-matched sample using the following procedure. Each month, we form ten size (market value of equity) portfolios from CRSP database firms with an equal number of firms in each. From the corresponding size portfolio we select to the matched sample the firm with the book-to-market ratio closest to that of the restating firm. We estimate market values of equity and book-to-market ratios at the end of the month before restatement announcements.

We estimate the HPAR as the difference between the restating firm and matched firm HPRs (Barber and Lyon, 1997). When a firm is delisted before the end of the holding period, we use HPARs for the longest period available (e.g., Hertz et al. (2002)). To estimate bootstrapped *p*-values, we follow the procedure in Lyon et al. (1999), except, since matching with one firm eliminates skewness bias (Barber and Lyon, 1997; Lyon et al., 1999), we do not adjust for skewness.

To avoid the delisting bias, when estimating long-term stock performance we adjust returns following suggestions in Shumway (1997) and Shumway and Warther (1999). When a firm is delisted, we use CRSP delisting return as the last return. When delisting returns are not available and a firm is delisted for performance reasons, we use -30% as the last return for NYSE and AMEX firms and -55% for Nasdaq firms.

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