The effect of post-merger and acquisition layoffs on company performance

Master Thesis in Finance

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Contents

1. Introduction 2
2. Research Question 3
3. Theoretical Background and Literature Review 4
4. Data and methodology 7
   a) Data 7
   b) Methodology 11
5 Findings 14
6 Conclusion 19
7 Study limitations and future research 19
8 Appendix 21
9 References 22

1. Introduction

In October 2004 Royal Dutch Petroleum announced a merger with Shell Transport & Trading[1]. After the announcement in 3-year time around 15 thousand jobs or about 13%[2] of the workforce were cut.
This is one of the cases that happens in real world. According to the press announcements layoffs numbers vary around 10% (Ofek,1993) sometimes going up to 30-40%[3].
Do layoffs really happen after merger and acquisitions and do they contribute to the company efficiency? *These questions are unanswered and need empirical investigations.*

Wealth maximization forces company management continuously to search and exploit new opportunities for investment and secure their position in the market. According to the latest surveys among executives[4] the key driving trends that motivate deal-makers are to secure a competitive position in the current market, expansion beyond the current market, satisfaction of shareholders needs for growth etc.
Any activity from the shareholders' perspective should be done to create a value for shareholders. In mergers and acquisitions (henceforth M&A) value can be created through the synergies presented as 2+2=5.

Synergies are further considered in three types (Trautwein, 1990): financial, managerial and operational. While financial synergies are driven from a low cost of capital, managerial synergies are coming from a better planning and monitoring processes. Operational synergies are assumed to arise as a result of elimination of surplus facilities and savings on labor costs, tax savings etc. Labor is the largest part of costs in most of the companies and the simple logic tells that it would be affected at first after M&A's. It can easily lead to an increase (at least in the near future) of cash flows taking a form of layoffs, early retirements, hiring freezes, wage reductions, reductions in future pension benefits, and other cuts in compensation. According to Rosett (1990) wage reductions can explain up to 9% of takeover premiums.

Many studies show that most of M&A's are underperforming in the long-run. Different explanations are provided, such as strategic fit, wrongly estimated deal/structure prices, cultural differences between companies, insufficient focus on customers and sales[5], information asymmetry and performance extrapolation (Rau and Vermaelen 1998, Louis 2002). So far there has been no extensive research devoted to study the impacts of layoffs on company performance.

[1] http://royaldutchshellplc.com/2004/10/28/royal-dutchshell-to-merge/
[2] 13% is calculated based on Compustat Dutch Shell employee numbers in year 2003 premerger (119k) and 2007(104k)
[3] http://www.fiercepharma.com/financials/updated-pfizer-s-post-megamerger-cost-cutting-record-51-500-jobs-7-years
[4] U.S. executives on M&A: full speed ahead in 2016, KPMG Survey report 2016
[5] U.S. executives on M&A: full speed ahead in 2016, KPMG Survey report 2016

Post-acquisition problems in line with pre-acquisition problems and integration were discussed by Rankine (1998). An importance of post-acquisition and effective integration, and the need to gain cooperation and commitment from employees was discussed as important steps (Devine, 2003).

As a post-acquisition issue, the human capital is a key element and needs to be tackled successfully. Furthermore, it could lead to a post-acquisition underperformance and is somehow neglected in the studies. Leaving valuable employees "out of the boat" or leaving remaining staff dissatisfied may wipe out the synergy effect and even decrease the value of the company.

Post-acquisition layoffs can have two implications on the firm value. First, human capital is part of the total firm value and cutting it off from the firm can decrease firm value. The size will be higher for the firms with a higher employee tenure, who had accumulated lots of experience and whose experience, knowledge is substantial for the firm.

Second, mass layoffs will have a negative implication on remaining employees due to the unproductive atmosphere. Especially when rumors are going about layoffs and no clear plan or announcements are released (Pritchett, 2006). Pikula (1999) observes, that even the best-orchestrated mergers can be threatening and stressful for employees.

2. Research Question

The primary purpose of merger and acquisition is to improve the overall performance by eliminating redundant activities. Often it's said that the savings could be achieved by cutting double positions in the merging companies. But the problem is that every employee carries a certain amount of expertise and knowledge. And transferring or keeping that knowledge to the new entity is not an easy-going process. It fails greatly due to improper planning and handling. And technically speaking, it is not possible to fire an employee keeping his knowledge and expertise within the company. Hence, layoff will contribute positively to the performance if the marginal saving from layoff will be higher than marginal loss of the value carried by the employee.

The purpose of the thesis is to testify if savings from the layoffs are offset by the costs associated with layoffs and employee turnover.

Research questions:

a) is the post-acquisition long-term performance negative?
b) does the number of employees in post-M&A period decline?
c) are post-acquisition layoffs negatively correlated with post-acquisition performance?

3. Theoretical Background and Literature Review

Numerous studies have identified that merger and acquisitions are value destructive in the long run for acquirers[6]. They developed long-horizon event studies for the evaluation of this issue.

Ikeberry, Lakonishek and Vermaelen (1995) have provided valuable inputs in the long-horizon event studies examining 1980-1990 buy-and-hold abnormal returns (henceforth BHAR) of share repurchases. They have measured 12.1% BHAR for 4 years after initial announcement. They made a valuable input in long-term event study with an introduction of bootstrapping procedures to address the skewness problems in BHAR's.

Barber and Lyon (1996) directed their study to the statistical tests designed to detect abnormal performance based on accounting measures. According to them the problem of misspecification of the tests significance comes from the matched/control firms or pre-event performance. They recommend to specify tests well enough to have empirical rejection rates close to the theoretical ones and use tests that have higher significance.

Fama and French (1996) claim that their three factor model (besides market risk, size and book-to-market factors) better captures cross-sectional variation of stock returns and could be a better benchmark model for expected returns. In his later studies Fama (1998) discredits BHAR methodology based on model's systematic errors, which arise due to imperfect expected return proxies.

As an alternative to Fama-French, Barber and Lyon (1997) developed non-parametric approach using matched control firm as benchmark. They gave a preference to BHAR due to the findings that CARs are biased predictors of BHARs.

Kothari and Warner (1997) contributed to long-horizon return measurement in event studies. They argue that long-horizon tests should be used with caution and the test significance can be biased due to a bad model. Like Barber and Lyon (1996, 1997) they also recommend non-parametric procedures, such as bootstrapping procedures and Wilcoxon signed rank tests to improve study results.

Rau and Vermaelen (1998) showed with their study that acquiring firms underperform in long-horizon (3 year) with 4.04% (bias adjusted CAR for all mergers). They compared their results with tender offers and saw that tender offers earn a small but statistically significant abnormal return. They also found that low book-to-market acquirers underperform worse and it was independent from the way of payment. According to them it is due to poor acquisition decisions and overextrapolation of past performance.

Empirical investigations discuss strategic fit as a principal effect variable. These studies typically hypothesize that the tighter the fit and the more core technologies related in the merging businesses, the more value would be created for the acquiring

[6] Sudi Sudarsanam "Creating value from mergers and acquisitions the challenges" 2010, p.96.

firms' shareholders (Lubatkin, 1983 and 1987, Elgers and Clark (1981) and Chatterjee (1986). From the practical side a survey held by Bain & Company in 2012 among 352 executives in North America, Europe and Asia revealed that in 46% cases the origins of the deal failure were problems integrating management teams and retaining key talent.

Moeller et al. (2004) have studied 12 thousand M&A's from 1980 to 2001. They have found that abnormal announcement returns are robust to a size effect and are irrespective to a form of financing and do not change over time.

Empirical investigations in the area of labor and M&A are not wide and consistent.

Brown and Medoff (1988) found no evidence of employment reductions examining post-acquisition changes in small Michigan companies during 1978-1984.

Lichtenberg and Siegel (1988) found significant employment drops (about 16%) 2 to 3 years before the ownership change. After that event employment recovered a bit, but not enough to offset the previous decline. Most layoffs were detected within central-office employees and it embodied a substantial productivity gain.

Shleifer and Summers (1988) investigating hostile takeovers case studies found, that after acquisition acquirers can capture rents through a renegotiation of contracts. It leads to a transfer of wealth from different parties to the shareholders. Through tax savings a transfer of premium could come from government and suppliers. Employees can take a form of renegotiation of contracts. Following an acquisition usually the buyer cuts wages, lays off many employees. According to them acquisition provides an opportunity to renegotiate existing contracts and to find an efficient mix of labor force. They also stress the importance of long-term implicit contracts in employment relationships and do not deny that ex post layoffs might be efficient. They suggest that in case continued employment is part of the implicit contract, layoffs represent a breach of trust that transfers future wages in excess of marginal product from employees to shareholders.

P. Healy et al. (1992) investigating 50 US largest mergers through 1979-1984 found, that the median number of employees declines each post-merger year. They controlled for the industry average, adjusting the growth rates. It gave the same negative result. Their possible explanations are as followed: improvements in post-merger performance are achieved by the reduction of labor costs. And mergers lead to wealth redistribution from employees to stockholders through renegotiation of explicit/implicit contracts. They found also that post-merger operating cash flow returns (adjusted for pre-merger return) show a significant improvement (also statistically) and the results are particularly strong for firms with overlapping businesses. The source of increased return, according to the study, is the increased asset productivity. And the improvements are not at the expense of long term performance as the merging firms maintain their capital expenditure in line with the industry averages.

Ofek (1993) found that employee layoff (at least 10% of its workforce) is a significant action after asset restructuring in high levered and financially distressed firms.

O'Shaughnessy and Flanagan (1998) have performed a thorough analysis of this issue by constructing a sample of 50 of the largest mergers in U.S. in the period of 1989-1993. They found no evidence that debt financing followed by mergers and acquisitions increases the probability of layoffs.

Glebbeek and Bax (2002) looked into the labor turnover and its effect on company performance. Based on empirical data, they found that the relationship between labor turnover and company performance is bell-shaped: low and high turnover levels cause a negative effect on economic performance.

Gugler and Yurtoglu (2004) evidenced that M&A's don't obviously affect labor force demand and it varies from country to country due to employment protection laws. In the United States they found no significant evidence of changes in labor demand caused by merger and acquisitions. In Europe labor demand is affected by -10% compared to premerger levels.

Ton and Huckman (2008) using 48 months of turnover data from U.S. stores of a major retail chain, found that high turnover has a negative effect on performance and the effect is greater for companies which require high levels of expertise for their work (low-process-conformance). According to their findings an increase of one standard deviation in total turnover at a low-process-conformance store leads to a 3.8% decrease in profit margin.

Allen (2008) looked into the costs associated with the employee turnover. When employees are leaving, they are forcing companies to spend time, money and other resources to refill the position. Costs vary from direct expenditures to indirect costs. Direct expenditures, such as advertising and selection process costs, training costs, socialization and supervisory costs, are required to acquire a new employee. Indirect costs are the financial value of the lost production (Tziner en Birati, 1996). Researchers suggest that turnover costs are ranging from 50% to 200% of the position's annual costs.

M&A's most of the time create trauma for employees and an unproductive atmosphere among them. Especially if the M&A lasts long, employees are spending most of their time on finding a new job, rather than doing their duty (Fulmer and Gilkey, 1988). Buono and Bowditch (1989) found that negative reactions may lead to significantly lower levels of job satisfaction, job security and originate less favorable attitudes toward management. The bad sides of M&A's are not vanishing with time, but they are becoming more and more over time.

M&A's are stressful events due to the uncertainty that they bring to the employees' lives and this has negative implications on their attitudes, intentions and behaviors (Davy et al. 1988, Schweiger and Denisi 1991).

Moran and Panasian (2005) surveyed on the role of human resources in the process of merger and acquisition. They specified post-acquisition psychological and behavioral reactions of employees and their possible impact on performance.

4. Data and methodology

a) Data

The sample consists of 450 US merger and acquisitions registered in the Security Data Corporation (SDC) database covering a period of January 1, 2000 to December 31, 2015.

From the SDC database 164,362 deal-observations were downloaded. Only M&A's are taken which acquire 100% of shares and which have non-missing data on the number of share purchases. Filtering for duplicates and companies which have multiple mergers during the period, leaving out financial and governmental firms (which have sic codes beginning with 6 and 9) 27,606 observations are left.

The second dataset is from the Center for Research on Security Prices (CRSP) and consists of monthly returns of the stocks and value-weighted returns of the market portfolio (consisting of Amex, Nasdaq and NYSE firms) covering January 1997 to December 2015.

The third dataset: The Compustat a database of U.S. and Canadian fundamental and market information (accessed through Wharton Data Research Service) provides annual records on the number of employees and market values for companies in the period of January 1997 to December 2015.

All three datasets are merged based on acquirer's 6-digit CUSIP (Universally recognized identifier for financial instruments' issuer) as a unique identifier.

Since SDC rarely provides a completion date, the announcement date is treated instead. It is not a big assumption, since it is more important when the market receives the news, rather than when the event occurs (Henderson, 1990).

For the notation of the time τ (in months) is used. $\tau = 0$ is the event month of M&A. The Estimation window is 24 months: starting one month before the announcement: T_0,T_1=[-25,-1]. Post-event window is 36 months after the announcement, starting one month after the announcement: T_2,T_3=[+1,+37]. Figure 1 provides the time line of long-term event study.

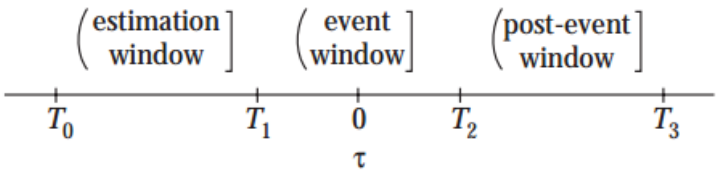


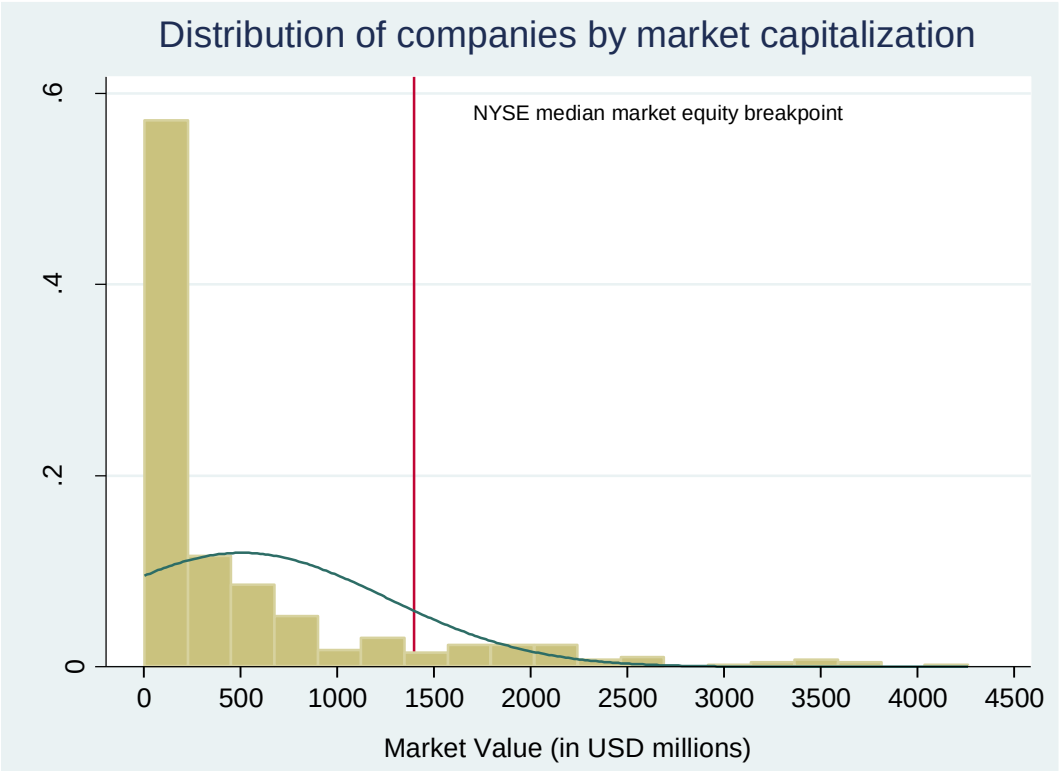
Figure 1. Time line for an event study.

Observations falling beyond these windows are dropped.

The dataset is further filtered: the observations that have missing values for the variables of interest (return, number of employees, market values) are dropped. The final dataset consists of 27,846 company-month observations from 450 companies. Within them 105 companies are large and 345 are small. The division between small

and large is based on the NYSE median market equity breakpoint in a year preceding the event, following the Kenneth R. French methodology[7]. Graph 1 shows the distribution of companies based on their market capitalization. As we can see from the graph most of the companies in our sample have a market value less than 500 million USD. In the graph NYSE median market equity breakpoint is an average breakpoint (USD 1,395.8 mln). The breakpoint value varies based on the date according which the company is evaluated for the size (one year before the announcement).

Graph 1. Distribution of companies by market capitalization



Descriptive statistics are provided in the Table 1. Here are presented monthly average returns for the companies in the dataset, monthly market returns, market average value of companies and median market equity averaged at the year before the announcement. The returns are presented covering all dataset-period, pre-M&A and post-M&A periods. From Table 1 we can see that post-M&A returns are greater than market returns. The average results are skewed positively due to outliers.

Employee growth is the relative difference between the number of employees in year τ and year τ_{-1}. Based on the fact that compustat provides only annual data, the previous year is taken as a previous period. Employee growth is presented as an average for the whole 1997-2015 period, pre-M&A, post-M&A and post-M&A in year 1,2 and 3. From the table we can see that employee growth is positive in all periods except the 3rd year following M&A. The sample is divided into small and large companies based on their size to the median NYSE market equity. See panel 2 and 3 of the Table 1.

[7] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_me_breakpoints.html

Table 1. Descriptive Statistics covering a period of January 1997 to December 2015

	-Observations-					---------- Quantiles ----------			
Variables	N	n	Mean	S.D.	Min	0.25	Median	0.75	Max
				Panel 1					
Monthly return	27700	450	0.013	0.20	-0.82	-0.08	0.000	0.08	3.33
Monthly return $_{\text{pre-M\&A}}$	11029	450	0.022	0.21	-0.82	-0.08	0.002	0.10	3.09
Monthly return $_{\text{post-M\&A}}$	16221	450	0.007	0.19	-0.80	-0.08	-0.002	0.08	3.33
Market value	421	421	1506.89	9147.27	1.66	65.31	192.57	809.46	179971.5
Median market equity	450	450	1395.82	513.98	722.85	956.88	1248.42	1825.41	2661.75
Monthly market return	27846	n/a	0.0048	0.05	-0.18	-0.02	0.01	0.04	0.11
Monthly market return $_{\text{pre-M\&A}}$	11174	n/a	0.0048	0.05	-0.18	-0.02	0.01	0.04	0.11
Monthly market return $_{\text{post-M\&A}}$	16222	n/a	0.0048	0.04	-0.18	-0.02	0.01	0.04	0.11
Employee growth	27601	450	0.08	0.58	-1.00	-0.06	0.01	0.12	15.77
Employee growth $_{\text{pre-M\&A}}$	10929	450	0.11	0.62	-1.00	-0.04	0.02	0.14	12.00
Employee growth $_{\text{post-M\&A}}$	16222	450	0.06	0.54	-0.95	-0.07	0.01	0.10	15.77
Employee growth $_{\text{post-M\&A in year 1}}$	5399	450	0,14	0,44	-0,85	-0,02	0,06	0,19	3,84
Employee growth $_{\text{post-M\&A in year 2}}$	5358	450	0,04	0,6	-0,82	-0,06	0	0,09	11,77
Employee growth $_{\text{post-M\&A in year 3}}$	5465	405	-0,01	0,20	-0,78	-0,08	-0,01	0,05	1,28

Table 1 provides descriptive statistics. Monthly return represents average monthly returns for all companies in the dataset in Panel 1, for small companies in Panel 2 and large companies in Panel 3. Employee growth is the relative difference between the number of employees in year t and t_{-1}. The previous year is taken as a previous period and employee growth presents an annual change. The sample is divided into small (panel 2) and large (panel 3) companies based on their size to the median NYSE market equity.

Table 1 (continuation) Descriptive Statistics covering a period of January 1997 to December 2015

	- Observations-				---------- Quantiles ----------				
Variables	N	n	Mean	S.D.	Min	0.25	Median	0.75	Max
by small companies			*Panel 2*						
Monthly return	21157	345	0.01	0.21	-0.80	-0.09	-0.00	0.09	3.33
Monthly return $_{pre\text{-}M\&A}$	8407	345	0.02	0.22	-0.79	-0.09	0.00	0.10	3.09
Monthly return $_{post\text{-}M\&A}$	12405	345	0.01	0.20	-0.80	-0.09	-0.01	0.08	3.33
Employee growth	21130	345	0.08	0.62	-1.00	-0.07	0.01	0.13	15.77
Employee growth $_{pre\text{-}M\&A}$	8380	345	0.11	0.69	-1.00	-0.05	0.02	0.14	12.00
Employee growth $_{post\text{-}M\&A}$	12405	345	0.06	0.59	-0.95	-0.08	0.01	0.11	15.77
by large companies			*Panel 3*						
Monthly return	6543	105	0.01	0.16	-0.82	-0.06	0.01	0.07	1.90
Monthly return $_{pre\text{-}M\&A}$	2622	105	0.02	0.18	-0.82	-0.06	0.01	0.09	1.90
Monthly return $_{post\text{-}M\&A}$	3816	105	0.01	0.15	-0.63	-0.06	0.01	0.07	1.68
Employee growth	6471	105	0.08	0.37	-0.88	-0.04	0.01	0.10	3.09
Employee growth $_{pre\text{-}M\&A}$	2549	105	0.12	0.35	-0.64	-0.02	0.02	0.14	2.80
Employee growth $_{post\text{-}M\&A}$	3817	105	0.05	0.38	-0.88	-0.05	0.01	0.07	3.09

Table 1 provides descriptive statistics. Monthly return represents average monthly returns for all companies in the dataset in Panel 1, for small companies in Panel 2 and large companies in Panel 3. Employee growth is the relative difference between the number of employees in year t and t_{-1}. The previous year is taken as a previous period and employee growth presents an annual change. The sample is divided into small (panel 2) and large (panel 3) companies based on their size to the median NYSE market equity.

b) Methodology

Long-horizon event study methodology is used in this study to measure the performance. It is based on the fact that the impact of layoffs on company's performance is not realized immediately.
The announcement day is considered as an event date following Henderson (1990).
The length of the event window is taken 36 months beginning at the month following the event to avoid picking up share price reactions from announcements. It is denoted as [+1,+37]. The window is considered to be long enough and it can sufficiently evaluate the effects of employment change on post M&A performance.

For assessment of long-term performance, a characteristic-based matching approach or otherwise called buy-and-hold abnormal returns approach is used (BHAR) following numerous studies e.g. Ikenberry, Lakonishok, Vermaelen (1995), Bareber and Lyon (1197), Kothari & Warner (1997), Lyon, Barber and Tsai (1999). BHAR measures average multiyear return from a strategy investing and selling at the end of a pre-specified holding period[8]. Another advantage of this approach is that it better resembles investors' investment experience than periodic rebalancing approaches.

Monthly returns are compounded over 12, 24 and 36 months for 1, 2 and 3 year BHARs' starting from the 1st month following the event minus compounded monthly value-weighted market returns (contains monthly returns, including all distributions, on a value-weighted market portfolio of Amex, Nasdaq and NYSE firms)[9] applying the following formula:

$$BHAR_i = \prod_{t=1}^{H}[1 + R_{it}] - \prod_{t=1}^{H}[1 + \mathrm{BR_t}]$$

Where, R_{it} *is the return of company* i *at time* t
BR_t *is benchmark return at time* t.

In the long-horizon event studies the crucial point remains the performance benchmark. Many studies e.g. Barber and Lyon (1996), Kothari and Warner (1997), Fama (1998) discussed this issue and turned their attention to the risk adjustment in the calculation of the long term benchmark performance. If in the short-term event studies this issue is not so important and does not have too much impact on the outcome, in the long term event studies risk-adjustment is the "Achilles heel". There are many models developed (market model, asset pricing model, reference portfolio benchmarks, single firm benchmarks) and the question which model more appropriate is, remains still unresolved. Even more, the outcome is highly sensitive to the choice of the model, see Zhang et al (2004).[10]

During the research market return model or market-adjusted return model as a benchmark (Ritter and Welch, 2002) is applied. It can be viewed as the same market model with the parameters of α=0 and β=1, MacKinlay (1997).

[8] Mitchell and Stafford (2000, p. 296)
[9] Source: CRSP US Stock Databases
[10] Handbook of Corporate Finance: Empirical Corporate Finance, B. E. Eckbo 2007

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \;\Rightarrow\; R_{it} = R_{mt} + \varepsilon_{it}$$

Where: *R_{it} – is the return of company i at time t*
R_{mt} – is market return at time t

And assuming that the expectation of error term is equal to zero

$$E(\varepsilon_{it}) = 0, \Rightarrow E(R_{it}) = R_{mt}$$

As a market return is taken New York Stock Exchange value-weighted monthly portfolio return. It is downloaded from the CRSP database and consists of Amex, Nasdaq and NYSE firms.

Appling the market return as a benchmark return, the equation for buy-and-hold abnormal returns will be:

$$BHAR_i = \prod_{t=1}^{H}[1 + R_{it}] - \prod_{t=1}^{H}[1 + R_{mt}]$$

Where, *R_{it} is the return of company i at time t*
R_{mt} is market return at time t.

In the Table 2 are provided the results of BHAR calculations. Table provides BHAR's for 1,2 and 3 years. BHAR's are presented for whole dataset (Panel 1) and small (Panel 2) and large company (Panel 2) subsets. As we can see from Panel 1 and 2 both the mean and the median BHAR's in all three year periods for whole dataset and small companies' dataset are negative. Large companies in average generate positive abnormal buy-and-hold returns in all time periods.

Table 2. Buy-and-hold abnormal returns

	-Observations-				---------- Quantiles ----------				
Variables	N	n	Mean	S.D.	Min	0.25	Median	0.75	Max
			Panel 1						
1 year BHAR	5399	450	-0.01	0.63	-1.08	-0.37	-0.10	0.20	5.14
2 year BHAR	10757	450	-0.05	0.86	-1.30	-0.53	-0.19	0.22	8.17
3 year BHAR	15828	450	-0.05	0.99	-1.55	-0.66	-0.27	0.27	7.08
by small companies			*Panel 2*						
1 year BHAR	4139	345	-0.04	0.60	-1.08	-0.40	-0.16	0.18	4.00
2 year BHAR	8241	345	-0.09	0.87	-1.30	-0.56	-0.25	0.17	8.17
3 year BHAR	12106	345	-0.08	1.07	-1.55	-0.70	-0.35	0.21	7.08
by large companies			*Panel 3*						
1 year BHAR	1260	105	0.09	0.70	-0.78	-0.26	0.03	0.22	5.14
2 year BHAR	2516	105	0.05	0.83	-1.07	-0.36	0.02	0.22	6.93
3 year BHAR	3722	105	0.02	0.65	-1.28	-0.52	0.00	0.42	2.00

Further, BHAR's are tested if they are significantly different from zero with the following test statistics.

$$S = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(BHAR_i - \overline{BHAR})^2}$$

$$TS = \sqrt{N}\frac{\overline{BHAR}}{S} \sim N(0,1)$$

Where: $BHAR_i$ – is buy-and-hold abnormal return
$\overline{BHAR}$- average BHAR
S - sample standard deviation
N - sample size

Employee growth is assumed to be a proxy for layoffs[11] as there was no reliable data on layoffs. It's equal to the percent change of the number of employees relative to the previous period and it is calculated as

$$employee\ growth = \frac{number\ of\ employees_t}{number\ of\ employees_{t-1}} - 1$$

Employee growth is also tested to see if it is significantly different from zero.

$$TS = \frac{\overline{employee\ growth}}{\frac{S}{\sqrt{N}}}$$

Where: $\overline{employee\ growth}$- sample mean (average employee growth)
S - sample standard deviation
N - sample size

To test the impact of layoffs on post-M&A performance, abnormal returns are regressed on employee growth, including control variables.

$$BHAR_i = \alpha + \beta_1 \times employee\ growth_i + \beta_2 Size + \beta_2 Year + \varepsilon_i$$

Where: *$BHAR_i$ – is buy-and-hold abnormal return for company i*
α - intercept
β_1 - employee growth coefficient
β_2 – size coefficient
Size –natural log of company's market capitalization[12]
β_3 – year coefficient
Year- is the year then the M&A is announced
ε - error terms

[11] Ideally a data on layoffs would be used to measure the impact on performance. During the research all efforts to find a data on layoff ended without results. Only M&A announcements and media releases were available, which were considered not reliable for the research.
[12] For the calculation of the size effect a methodology of Moeller et al (2004) is used

5 Findings

a) is the post-acquisition long-term performance negative?

Study results confirmed that indeed long-term abnormal returns (BHAR) are negative in line with many studies. In all three years following an event companies generated in average negative buy-and-hold abnormal returns. If the 1st year buy-and-hold abnormal returns are equal -0.80% and are not statistically significant, two and three year buy-and-hold abnormal returns are -5.34% and -5.45% and highly significant. The results of the prior studies, for instance, were -4% for 3 year buy-and-hold abnormal returns relative to value-weighted portfolios (Mitchell and Stafford, 2000), up to -5.43% depending on a benchmark for 3 year buy-and-hold abnormal returns (Barber and Lyon, 1997), -4.04% for 3-year bias-adjusted cumulative abnormal returns (Rau and Vermaelen,1998), -0.2% monthly abnormal returns on the benchmark of equally weighted index (Franks, Harris and Titman,1991).

Table 3 provides details of buy-and-hold abnormal returns and *t*-test statistics based on cross-sectional and time-series variations.

Table 3. Average BHAR and t-statistics by all, small and large companies

	All		*Small companies*		*Large companies*	
Time period	$\overline{BHAR}$	*Test statistics*	$\overline{BHAR}$	*Test statistics*	$\overline{BHAR}$	*Test statistics*
1-year	-0.0080	-0.93	-0.0378***	-4.03	0.0899***	4.58
2-year	-0.0534***	-6.43	-0.0850***	-8.89	0.0501***	3.02
3-year	-0.0545***	-6.96	-0.0779***	-8.04	0.0216**	2.02

* p<0.10, ** p<0.05, *** p<0.01

From above presented table we can see that there is a huge difference between 1 and 2-,3-year BHAR's. The difference is not only the compounding effect, but also the result of possible savings caused by M&A (tax, administrative etc.). Another possible explanation could also be the case that markets in their share price valuations still care an information that companies generated higher returns in the past (in pre-M&A periods, see Table 1) and the 1st year is a transitional year.

We can see that both large and small companies BHAR's are declining throughout the post-M&A years. Large companies despite sharp decline, still generate positive abnormal returns.

Table 3 statistically confirms the results that in average long-term performance is negative. And if small companies underperform the market, large companies, in contrast, outperform the market in all 3 years. Testing the results revealed highly significance in all cases, except 1-year BHAR for all companies.

b) does the number of employees in post-M&A period decline?

Study results revealed that the number of employees in a post-M&A 3-year period is growing and is highly significant. Namely +5.5% with a *t* statistic of 12.94 (see Table 4). The growth is persistent in the 1st and 2nd years, but is gradually declining. Already in the 3rd year employee growth becomes negative -1.3% and is statistically significant (*t*= -4.27). Within the large companies the reduction of the number of employees begins already from the 2nd year (-0.08% but are not significant: *t*=-0.13) and the decline is more than twice compared to the small companies.

The results confirm that the number of employees in post-M&A period indeed declines, but only starting from the 3rd year. It could be resulted with delayed layoffs due to labor protections laws and legal issues. Other explanation could be imperfect data coming from Compustat.

Table 4. Employee growth and t-statistics by all, small and large companies

	All		*Small companies*		*Large companies*	
Time period	*Employee growth*	*Test statistics*	*Employee growth*	*Test statistics*	*Employee growth*	*Test statistics*
[+1,+36]	0.0553***	12.94	0.0576***	10.95	0.0478***	7.82
[+1,+12]	0.1433***	18.11	0.1348***	14.72	0.1715***	10.97
[+13,+24]	0.0365***	3.83	0.0480***	3.91	-0.0008	-0.13
[+25,+36]	-0.0134***	-4.27	-0.0097**	-2.59	-0.0251***	-4.67

* p<0.10, ** p<0.05, *** p<0.01

During the research was looked also on the growth rates of the companies, which didn't experience M&A. The comparison of employee growth rates between these two company subgroups in Compustat dataset (comprises 930,234 company-year observations) showed that companies experiencing M&A have in average lower employee growth rates for 2000-2015 years. After analyzing and filtering the dataset from outliers the difference is -1.29% and statistically significant (*t*-statistic=-4.30). Breaking down the dataset into shorter periods, I saw that the growth differences are not consistent in all periods. I.e. during 2000-2005 companies experiencing M&A have 3.9% (*t*-statistic=7.97) higher employee growth rates than non-M&A companies, but from 2005 onwards the trend reverses and the difference becomes negative -4.5% (*t*-statistic=-7.97). It could be explained with slowdown in M&A's in the beginning of 2000's compared to previous years and with the change of merger waves and their characteristics. I.e. if before 2000's cross border M&A's were dominating, staring from 2003-05 takeover activities started their upward swing[13].

Based on the findings, if we adjust post-M&A employee growth rates with market trends, post-M&A companies will evidence decline in the number of employees.

[13] Sudi Sudarsanam "Creating value from mergers and acquisitions the challenges" 2010, pp.16-22

c) are post-acquisition layoffs negatively correlated with post-acquisition performance?

OLS regression results are provided in the Tables 5a and 5b. In the Table 5a 3-year BHAR is regressed on employee growth and control variables one by one (size and year). As a size variable in the regressions is taken the natural logarithm of companies' market values following the Moeller et al (2004). For the year is taken the year, when the event occurred.

By the initial hypothesis β should have a negative loading to emphasize the adverse effect of layoffs on performance, but with a condition that employee growth is negative. From Table 5a regression results we see that β_1 coefficient is positive and significant with a negative employee growth, which contradicts our hypothesis.

In the Table 5b are presented regressions run for small, large and all companies separately for one, two and three years BHAR's on employee growth as a single independent variable. Observed betas for year one (-0.066) and year two (-0.030) are negative. In year one β is highly significant at 1% and at year two at 5%. In year three the effect reverses and β becomes positive (0.036) with a 5% significance level. It could be explained with the reversal of employee growth in the 3rd year from positive to a negative. That effect pushes β coefficient to be positive. Again our hypothesis is rejected.

The results of large companies in year two (Table 5b) are skewed to the right due to outliers. To test large companies' skewness, the same regression is conducted robust to outliers and with a bootstrapped procedure. It revealed a highly significant (at 1%) β coefficient (t-stats are equal -2.67 and -2.77 respectively).

Regression results show that large companies are more affected by the changes in the number of employees (-0.096 vs -0.061 in year 1 and -0.062 vs -0.025 in year 2) and in the 3rd year they have an adverse effect of employee reduction.

β coefficient represent the mean change in the buy-and-hold abnormal returns for one unit of change in the employee growth (size, year) while holding other explanatory variables in the model constant.

Both Table 5a and 5b indicate that size effect is an important predictor of the performance. In the regression 2 of the Table 5a size coefficient is significant at 1% level and it tells us that keeping other variables constant, an increase in the size of the company increases abnormal return. Controlling for the year of M&A, the size effect becomes even more substantial and significant (regression 4). Regressions 3 and 4 in the Table 5a show that abnormal returns decline through years (starting from 2000).

R-squared is very low in all regressions. Even adding more explanatory variables into the regression (size, year) R-squared remains low. The highest level is detected in the regression 4: R^2=0.05. Though it is close to the similar study results, it points out that error terms are very high and large portion of abnormal return depends on the variables not stated in the model.

Graph 2 in the appendix shows the distribution of 3-year BHAR and employee growth. Observations are mainly distributed evenly. The major outlier in the Graph 2 is Cash Technologies INC, which had a huge employee change around his event

date. Leaving it out in the Graph 3 we can see that observations are mainly distributed below 0 for the y-axis and slightly above zero for x-axis.

Table 5a. Regression analyses

	3-year BHAR			
variables	(1)	(2)	(3)	(4)
intercept	-0.057***	-0.526***	50.303***	76.583***
	(-7.19)	(-22.28)	(12.71)	(18.39)
employee growth	0.036**	0.033**	0.033**	0.026*
	(2.55)	(2.29)	(2.32)	(1.83)
size		0.086***		0.103***
		(20.62)		(24.48)
year			-0.025***	-0.038***
			(-12.73)	(-18.52)
R-squared	0.000	0.028	0.011	0.050
Number of observations	15828	14878	15828	14878

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 5a provides details of $BHAR_i = \alpha + \beta_1 \times employee\ growth_i + \beta_2 Size + \beta_2 Year + \varepsilon_i$ OLS regressions. Dependent variables three year buy-and-hold abnormal returns, independent variables are employee growth in (1), employee growth and size in (2), employee growth and year in (3) and employee growth, size and year in (4) regressions. The research interest in the regressions is β_1 coefficient.

Table 5b. Regression analyses

	1 year BHAR			2 year BHAR			3 year BHAR		
variables	small	large	all	small	large	all	small	large	all
employee growth	-0.061***	-0.096***	-0.066***	-0.025*	-0.062	-0.030**	0.043***	-0.008	0.036**
	(-3.86)	(-2.71)	(-4.50)	(-1.84)	(-1.62)	(-2.30)	(2.6)	(-0.27)	(2.55)
intercept	-0.030***	0.106***	0.001	-0.083***	0.055***	-0.051***	-0.080***	0.022**	-0.057***
	(-3.07)	(5.19)	(0.17)	(-8.58)	(3.27)	(-6.05)	(-8.26)	(2.04)	(-7.19)
R-squared	0.004	0.006	0.004	0	0.001	0	0.001	0	0
Number of observations	4139	1260	5399	8241	2516	10757	12106	3722	15828
Number of companies	345	105	450	345	105	450	345	105	450

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table provides details of $BHAR_i = \alpha + \beta \times employee\ growth_i + \varepsilon_i$ OLS regressions. Dependent variables are one, two and three year buy-and-hold abnormal returns, independent variable is employee growth. The research interest in the regressions is β coefficient. It is conducted for small, large and all companies separately.

6 Conclusion

This research restates that acquirers in general underperform market in the long-term. The results are consistent with previous studies (Mitchell and Stafford 2000, Barber and Lyon, 1997, Rau and Vermaelen, 1998). But market adjusted abnormal returns are conditional on size. I.e. If small companies underperform the market, large companies are generating returns above the market.
According to the study results the average employee growth is positive in the 1st, 2nd and 3-year periods and also in pre-M&A period (Table1). It was initially hypothesized, that post-M&A change of employees will be negative, but only in the 3rd year decrease in the number of employees is detected (for large companies also in the 2nd year but not significant). It could be resulted by delayed layoffs and affected by labor protection laws in line with results of Guglerand and Yurtoglu (2004).

By the initial hypothesis employee growth coefficient should have a negative loading to emphasize the adverse effect of layoffs on the performance, with a condition of negative employee growth. The research confirmed that employee growth coefficient in the 1st and 2nd years following the event are negative and significant, but the negative sign is a result of *employee growth*. In the 3rd year the coefficient becomes positive (but with *employee decrease*) and significant. The results show that employment growth has an adverse effect on performance and the reduction in the number of employees could lead to an increase of the performance in line with Jansen (1988). It indicates again that employee reduction is efficient for the company and affects the performance positively. It could be explained that the savings from the layoffs outweigh the costs associated with them and the lost value of the human capital.

The hypotheses, that employee reduction affects performance adversely is only confirmed within a group of large companies in 3 year buy-and-hold-returns, but the results are not significant.

Study showed also that large companies are affected more than small companies by the change of the number of employees.

The study could not find any significant evidence where post-M&A layoffs are affecting performance adversely.

7 Study limitations and future research

Like with most of the empirical studies, this study's weakness lies first of all on data part. For the study it would be ideal to have data on layoffs. But as mentioned above the study is limited only with its proxy: a relative change in the number of employees. Besides, the data is available only in an annual basis.

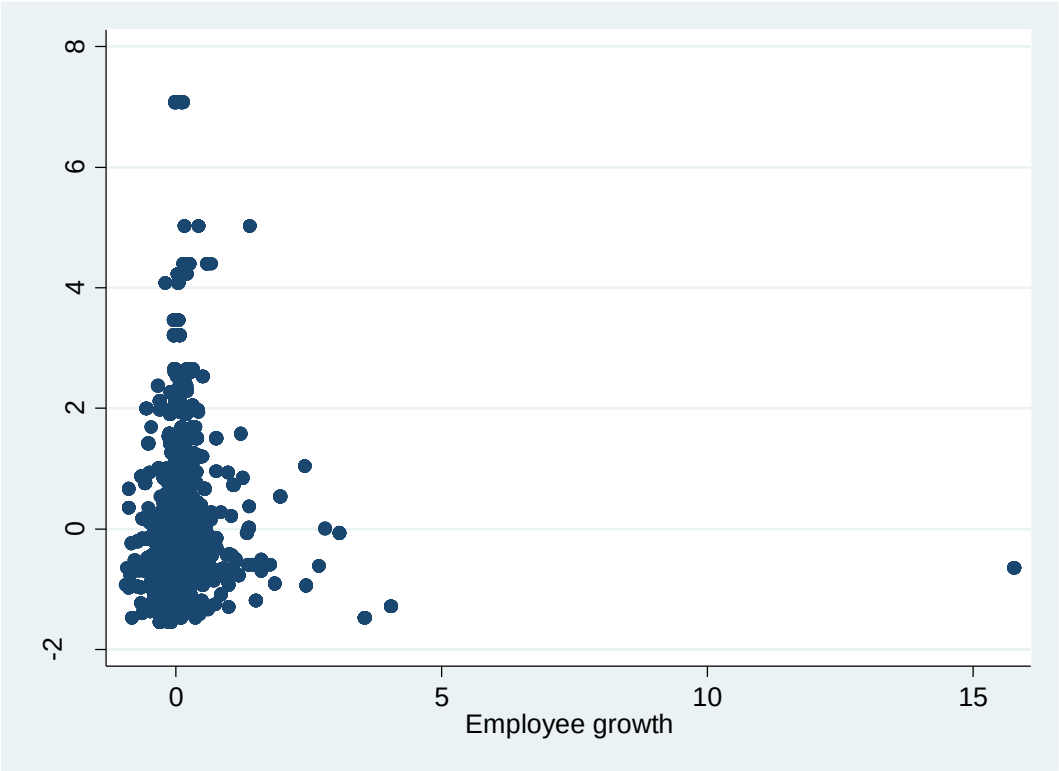
Other possible limitation/future-work is an idea to adjust the employee growth with a corresponsive growth trends of the market or reference companies to have a better view on the change in the number of employees.

Based on the fact that long-horizon abnormal performance measurement is highly sensitive to the chosen benchmark, the use of multiple benchmarks for an impartial view would contribute to the research.

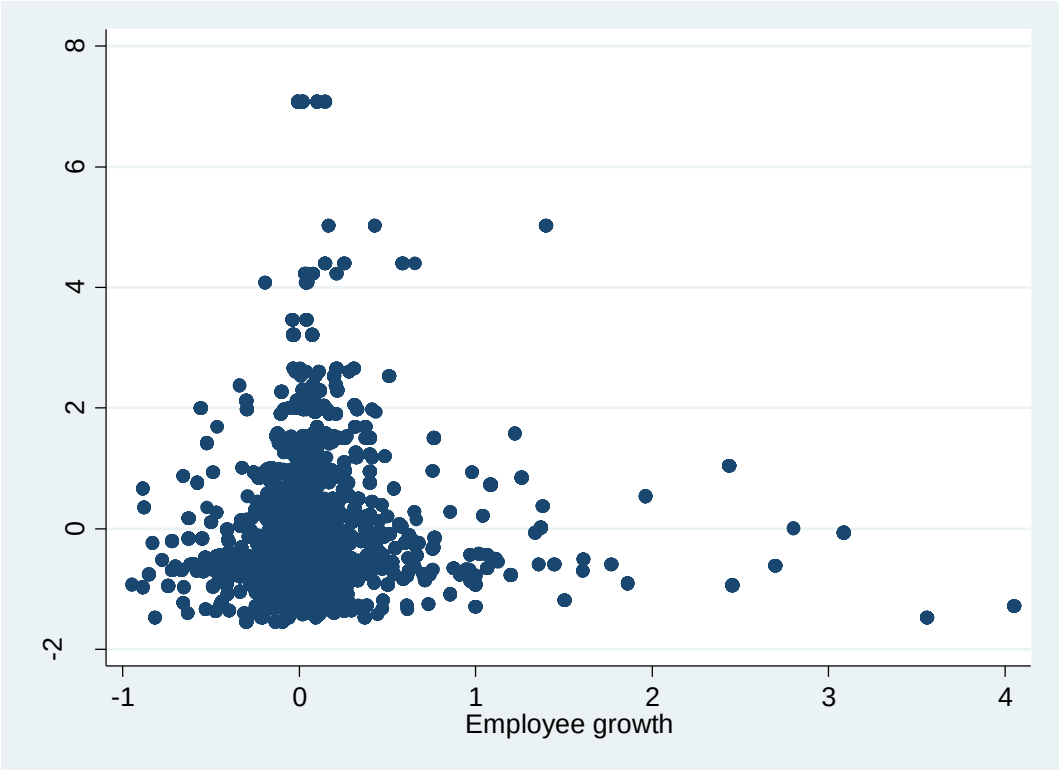
With an existence of proper data, it would be interesting to analyze the layoffs' effect on the performance on a longer time window.

8 Appendix

Graph 2. Distribution of 3-year buy-and–hold abnormal returns and employee growth



Graph 3. Distribution of 3-year buy-and–hold abnormal returns and employee growth (without a major outlier)



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