

DOES POST-IPO M&A ACTIVITY AFFECT FIRMS' PROFITABILITY AND SURVIVAL?

MATTEO BONAVENTURA*[§], STEFANO BONINI^{†,¶},
VINCENZO CAPIZZI^{‡,||} and GIANCARLO GIUDICI^{*,**}

**Politecnico di Milano
School of Management, Milan, Italy*

*†Stevens Institute of Technology
School of Business, Hoboken, NJ, USA*

*‡University of Piemonte Orientale
Department of Economics and Business Studies
Novara, Italy*

§matteo.bonaventura@mail.polimi.it

¶sbonini@stevens.edu

||vincenzo.capizzi@uniupo.it

***giancarlo.giudici@polimi.it*

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In this paper, we investigate the post-IPO operating performance of acquiring companies listed in the US in the period 1986–2008. We find that acquiring IPO firms delivers better operating returns when compared to non-acquiring IPO firms in the five years after the listing. This result holds controlling for both IPO and firm-specific characteristics. Furthermore, acquiring targets already listed on the stock exchange and running stock deals are associated with the improved operating performance. Finally, we find that acquisitions also affect the newly listed companies' survival, reducing both the time to failure and the time to being acquired, which suggest a structural acceleration of the “natural” company lifecycle.

Keywords: Mergers and acquisition; initial public offerings; operating performance; strategic investments.

JEL Codes: G32, G34

1. Introduction

Companies going public on stock exchanges can raise money to finance capital expenditures (capex), intensify research and development (R&D), pursue growth strategies

§Corresponding author.

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in the global arena and, furthermore, to acquire other firms through either cash or stock deals (Ritter 1991, Pagano *et al.* 1998, Ritter 2002, Celikyurt *et al.* 2010).

Recently, researchers have shown that newly public firms are very active acquirers in the post-IPO years (Brau & Fawcett 2006, Hovakimian & Hutton 2010, Hsieh *et al.* 2011, Rau & Stouraitis 2011). Bernstein (2015) reports that external growth is important for innovation in IPO companies, as breakthrough patents in the years after the listing are typically obtained through acquisitions.

A number of papers in the literature explore the relationship between the M&A activism of IPO companies and their follow-up operating performance, with mixed results. Brau *et al.* (2012) find that acquiring IPO firms experience poorer long-term performance compared to non-acquiring counterparts. Ben Amor & Kooli (2016) examine the performance of serial acquirers compared to single acquirers and find evidence of underperformance for frequent acquirers. By contrast, Bessler & Zimmermann (2012) find superior returns for European post-IPO acquirers. Bonaventura & Giudici (2018) find that in Europe, acquiring IPO firms delivers poor operating returns, as non-acquiring counterparts do.

On a broad perspective, after the listing, the operating performance of newly listed companies in most cases shows declining trends and a great deal of volatility when compared to the pre-IPO case. This is both predicted by theoretical models, namely the agency theory (Jensen & Meckling 1976) and the information asymmetries theory (Leland & Pyle 1977), and widely documented by empirical research (Jain & Kini 1994, Mikkelsen *et al.* 1997).

Conversely, analyzing operating returns following acquisitions is a far more puzzling issue. Efficient-market models predict improved operating performance of merging firms compared to the operating performance of standalone ones, while models based on agency and behavioral theories introduce the possibility of value destruction for merging firms' shareholders (Roll 1986, Morck *et al.* 1990).

On the empirical ground, the evidence about operating returns following M&A is mixed. Some paper documents improved the operating performance after acquisitions (Linn & Switzer 2001, Heron & Lie 2002), while others find insignificant changes (Ghosh 2001, Sharma & Ho 2003) and others find declining operating profitability (Dickerson *et al.* 1997).

Furthermore, there is even more disagreement whether M&A characteristics can predict changes in operating performance. Martynova *et al.* (2007), in a sample of 858 European M&A deals, find that none of the typical acquisition characteristics (method of payment, business relatedness of the target and geographical location of the target) explains changes in operating performance. Golubov *et al.* (2015) find that firm characteristics predict post-announcement returns. Bonaventura & Giudici (2018) show that acquisitions financed with stock lead to poorer profitability.

In this paper, we contribute to the literature on the relationship between operating performance and M&A strategies of IPO companies. More specifically, we aim at answering the following questions: what is the contribution of M&A to the operating performance of IPO firms? What are the M&A characteristics that most

likely affect the operating returns of newly public firms? What is the impact of M&A on firms' survival after the listing?

Three major motivations explain our interest in investigating the impact of M&A activity on post-IPO operating returns. First, managers and controlling shareholders have the option to manage the timing of corporate events like IPOs and M&As, taking advantage of optimistic momentum on the markets (Loughran & Ritter 1995, Rau & Vermaelen 1998, Malmendier & Tate 2008); therefore, outside investors need to be clearly aware about corporate strategies and their impact on follow-up performance and survival. Second, the separation between ownership and control after an IPO increases the incentives to extract private benefits reducing the firms value (Jensen & Meckling 1976). Managers may be tempted to focus on short-term results rather than on long-term value creation and to "build an empire" in order to maximize their personal reputations (Jensen 1986). Thus, it is important to predict the impact of alternative acquisition targets on IPO companies' future performance.

Third, the risk of default is more relevant in the early years following an IPO (Jain & Kini 2008): newly listed firms have to meet analysts' expectations, they are monitored by professional investors and authorities and must disclose more information to the market, this creating an opportunity for competitors. As such, it is interesting to investigate if and how M&A activity does truly affect the IPO companies' survival.

We study the operating performance and the survival rate of a treatment sample of 715 US IPO firms conducting at least one acquisition in the first year following the listing in the period 1986–2008. More specifically, we compare the operating profitability of acquiring IPO firms to the performance of a control sample of both matching non-acquiring companies and already listed acquiring companies.

We then investigate through a multivariate analysis whether changes in operating performance are due to IPO and/or firm characteristics or are due to the acquisition strategies. Finally, we study the impact of M&A on post-IPO survival of our treatment sample of newly listed companies.

Our results can be summarized as follows. Contrary to empirical evidence based on stock returns, we find that post-IPO acquirers experience better operating performance compared to their non-acquiring peers. More specifically, we find that non-acquiring IPO firms tend to underperform the median firm in their industry. On the other hand, acquiring IPO firms experiences an insignificant change in operating performance after the IPO compared to industry medians. Their change in performance is indeed similar to already listed firms' one in the five years after the listing. In other words, it seems that post-IPO acquisitions have a moderating effect on the profitability drop characterizing most IPO firms. Our results hold even after controlling for both IPO and firm-specific characteristics. Improvements in the operating performance are positively correlated with the presence of a venture capitalist and with the presence of a top-tier investment bank hired as underwriter, while they are negatively correlated with the firm's age and with the initial IPO underpricing. Acquisitions financed with stock issuances and aimed at taking over companies already listed on the exchange lead to better performance.

Finally, we report that acquiring IPO companies is characterized by lower survival rates compared to their non-acquiring peers, but showing clear and opposite outcomes: the best performing acquiring IPO companies become the target of other bidders, while the worst performing ones go bankrupt more quickly.

The remainder of the paper is organized as follows. Section 2 illustrates the research methodology and describes the sample selection process. Section 3 shows the empirical results. Finally, Sec. 4 draws the conclusions.

2. Sample and Methodology

2.1. The sample

We start identifying all IPOs that took place in the US in the period 1986–2008 from Thomson One New Issues database. As common in the IPO literature (Ritter 1991, Rau 2000, Welch & Ritter 2002), we exclude American depositary receipts (ADRs), unit offerings and IPOs with an offer price lower than 5 \$. We also exclude financial firms (two-digit Standard Industry Classification (SIC) code 60) and IPOs for which pre-IPO data on assets and operating income are not available. In order to obtain prices and accounting data, we rely on Center for Research in Security Prices (CRSP) and Compustat, respectively. After applying these criteria, we retain a sample of 3823 IPOs.

Table 1 presents the descriptive statistics for the sample and the distribution of IPOs by year and industry.

In order to identify the IPO firms that completed at least one acquisition in the first year after their listing, we match IPO data with M&A data from Thomson One Mergers and Acquisitions database.

Following Bonaventura & Giudici (2018), we exclude acquisitions where the deal value is lower than 1% of the market value of equity at the IPO and acquisitions where change of control does not occur (we identify a change of control as an acquisition where the acquirer holds less than 50% of target's shares before the deal and more than 50% after the deal).

We obtain our treatment sample of 715 IPO acquirers (18.7% of the total sample) completing 1005 acquisitions from 1986 to 2008 (see again Table 1).

In order to build a control sample, for each IPO firm that completed at least one acquisition in the first year after the listing, we find a non-acquiring IPO-matched counterpart. The matching algorithm is similar to Barber & Lyon (1996) and Loughran & Ritter (1997): matching candidates are firms that went public in the same year of the sample firm; we then require that the matching candidate: (i) has the same 2 digit SIC code of the sample firm; (ii) exhibits book value of assets between 20% and 200% of the sample firm's; (iii) is closest in performance with the sample firm (performance is defined by return on assets (RoA) in the pre-IPO year, that is the ratio between operating income before depreciation and amortization and the book value of assets). If no matched firms are found, we remove the size

Table 1. Descriptive statistics of the sample IPO companies.

Panel A: Frequency distribution by IPO year					
IPO year	Number of IPOs	% of total sample	Number of acquiring IPO firms	% of acquirers on total IPOs	
1986	221	5.78	9	4.07	
1987	164	4.29	10	6.10	
1988	62	1.62	1	1.61	
1989	62	1.62	2	3.23	
1990	58	1.52	3	5.17	
1991	160	4.19	20	12.50	
1992	238	6.23	29	12.18	
1993	322	8.42	47	14.60	
1994	273	7.14	39	14.29	
1995	309	8.08	47	15.21	
1996	394	10.31	88	22.34	
1997	268	7.01	71	26.49	
1998	184	4.81	51	27.72	
1999	288	7.53	104	36.11	
2000	225	5.89	50	22.22	
2001	56	1.46	12	21.43	
2002	54	1.41	13	24.07	
2003	43	1.12	12	27.91	
2004	112	2.93	18	16.07	
2005	86	2.25	32	37.21	
2006	116	3.03	27	23.28	
2007	114	2.98	28	24.56	
2008	14	0.37	2	14.29	
Total	3823	100.00	715	18.70	

Panel B: Frequency distribution by industry						
Industry	2-digit SIC code	Number of IPOs	% of IPOs	Number of acquiring IPO firms	% of acquirers on total IPOs	
Agriculture	01–09	7	3.09	—	—	
Natural resource	10–14	119	1.07	26	21.85	
Construction	15–17	41	41.87	2	4.88	
Manufacturing	20–39	1611	9.04	204	12.66	
Transportation, communication and sanitary services	40–49	348	12.58	83	23.85	
Wholesale and retail trade	50–59	484	32.17	70	14.46	
Services	70–89	1238	0.18	330	26.66	
Total		3823	100.00	715	18.70	

constraint. If once again no matched firms are found, we allow the matching firm to belong to the same 1 digit SIC code. For the remaining firms that have no matching, we find the IPO company closest in performance that also respects the size constraint.

Table 2 compares the samples of acquiring IPOs and non-acquiring counterparts.

Because of our matching algorithm, we find that the asset size of acquiring IPO companies and non-acquiring counterparts are similar. We also find that the two

Table 2. Acquiring and non-acquiring IPO firms.

Variable	Acquiring IPO firms	Non-acquiring IPO firms	<i>t</i> -test (Wilcoxon <i>z</i> -test)
Assets	320 (97.18)	296 (73.708)	0.441 (1.593)
Market-to-book	21.91 (9.27)	18.74 (8.55)	-0.424 (-0.935)
Age	16.734 (8)	15.750 (8)	1.527 (-2.054**)
Underpricing	0.321 (0.120)	0.235 (0.068)	2.118** (4.009***)
Underwriter reputation	4.961 (7.010)	4.838 (6.500)	0.598 (0.418)
Retention	0.672 (0.706)	0.521 (0.676)	10.722*** (6.088***)
Capex	0.210 (0.114)	0.185 (0.116)	1.510 (0.096)

Notes: This table presents the descriptive characteristics of both the treatment sample of acquiring IPO companies and the control sample of non-acquiring companies selected with our matching procedure. Assets is the book value of assets in the pre-IPO year. MB is the ratio between the market value of equity at the IPO and the book value of assets immediately prior to the IPO. Age is the age of company at the IPO since inception date. Underpricing is the ratio between the first day closing price and the IPO offer price minus 1. Underwriter reputation is the reputation of the investment bank chosen as underwriter, according to Ritter's rankings. Retention is the percentage ownership held by insiders after the IPO. Capex is the total amount of capital expenditures displayed by IPO firms in the first year after the issue scaled by book value of assets. Means and medians (in brackets) are reported. The third column shows the *t*-statistics (Wilcoxon signed rank *z*-statistic) testing the equality of mean (medians) between the two samples. Sample: 715 acquiring US IPO firms + 715 matching non-acquiring IPOs listed in the period 1986–2008. **, *** The difference between the two samples is significant at the 5%, 1% levels, respectively.

subsamples do not differ in growth opportunities (proxied by market-to-book (MB) ratios), underwriter prestige and capex investment in the first year after the IPO.

On the other hand, acquiring IPO firms is older and more underpriced compared to non-acquiring counterparts. Their shareholders also retain on average a higher fraction of equity after the IPO.

Table 3 reports the basic statistics about the acquisition strategies performed by both the treatment and the control sample companies.

In Panel A, we split the sample of acquiring of IPO firms by the frequency of their acquisitions.

We find that most firms (460) perform only one acquisition in the first year after going public, while 255 firms (36% of the total sample) close more than one acquisition, actively pursuing external.

In Panel B, we investigate more in detail the characteristics of the acquisitions. We find that most of them involve mixed methods of payment. Pure stock offerings (202) are slightly more common than pure cash offerings (189), although the numbers are very similar.

Furthermore, we find that most firms acquire US targets, as only 110 acquisitions involve cross-border deals. Interestingly, we note that 705 acquisitions aim at

Table 3. Characteristics of the acquisitions.

Panel A: One-time and serial acquirers (sample: 715 IPO companies)		
Variable	Number	Percentage over the total sample (%)
Single acquirers	460	64.34
Serial acquirers	255	35.66
Panel B: Acquisition characteristics (sample: 1005 acquisitions)		
Method of payment		
Cash	189	18,81
Stock	202	20,10
Mixed	614	61,09
Target's geographical location		
Local	895	89.05
Cross-border	110	10.95
Target's industry relatedness		
Industry related	300	29.85
Diversification	705	70.15
Public versus private target		
Public	33	3.28
of which:		
Hostile	(9)	(27.27)
Friendly	(24)	(72.73)
Private	972	96.72

Notes: This table presents the descriptive statistics of the M&A deals for both the acquiring IPO firms and their acquisitions. Panel A splits the sample in single and serial acquirers. Panel B breaks down the deals by acquisition-specific characteristics, namely the method of payment, the geographical location of the target, the industry relatedness of the target with the bidder, the public or private status of the target and whether the merger is friendly or hostile. The percentage of hostile and friendly takeovers is computed over acquisition of public target sample: 715 acquiring US IPO firms in the period 1986–2008.

business diversification, while only 300 involve targets operating in the same industry (according to the 2-digit SIC code).

Finally, we report that only 33 acquisitions involve already listed firms. Of these, 9 acquisitions were declared to be hostile by the management, while 23 of them were declared to be friendly deals. Not reported in the table, we find that 15 public targets were acquired with pure stock offerings, while 10 involved pure cash deals.

2.2. The methodology

The academic literature has developed various techniques to study operating performance changes after corporate events such as an IPO. More specifically, we need the selection of: (i) a measure of operating performance; (ii) the definition of an appropriate benchmark; (iii) a model testing the statistical significance of operating performance changes.

The most correct measures of company’s performance and value creation involve the identification of the operating cash flows of the company. We use two alternative proxies of operating cash flows: the first measure is the operating income of the company before depreciation and amortization (EBITDA); the other proxy we employ is the EBITDA of the company net of investments in working capital (i.e. increase in inventories, receivables and other current assets net of the increase in payables and other current liabilities). The two variables are scaled by the book value of total assets^a at the beginning of the year and are computed annually in a time window $[-1; +5]$ with respect to the IPO date (year 0). We define our profitability measures as

$$\text{RoA} = \text{EBITDA} / \text{Total assets}, \quad (2.1)$$

$$\text{CFRoA (cash flow RoA)} = (\text{EBITDA} - \text{Working capital inv.}) / \text{Total assets}. \quad (2.2)$$

In order to identify an appropriate profitability benchmark and check for any “abnormal” performance, we employ two alternatives. First, we rely on the matching sample introduced in Sec. 2.1 (every acquiring IPO company is compared with the non-acquiring peer). Alternatively, we compute the median performance ratio (either RoA or CFRoA) for already listed companies operating in the same 2-digit SIC industry. Therefore, we are able to compare: (i) acquiring IPO firms to non-acquiring IPO firms; (ii) acquiring IPO firms to the industry; (iii) non-acquiring IPO firms to the industry.

To identify the abnormal performance, we adopt three different widely accepted methodologies: the level model (Loughran & Ritter 1997), the intercept model (Healy et al. 1992), and the change model (Ghosh 2001).

The level model is based on a comparison of the performance of both the control and the treatment sample year-by-year. For each year in the interval $[-1; +5]$ relative to the IPO date, we compute the difference between the return of the acquiring IPO company and the return of the benchmark in the year “ t ” th year after the IPO. While this method provides insights on the yearly evolution of operating returns and is often used by researchers, it is not suitable to understand whether a firm has underperformed or not (Powell & Stark 2005).

To solve the issues related to the level model, the intercept model takes into account any possible persistence effect of the operating performance and consists in an ordinary least squares regression between the median operating return displayed by the company after the event (dependent variable) and the median operating return before the event (independent variable). The latter variables are adjusted considering the median values of the performance computed for the matching companies belonging to the control sample.

Finally, Ghosh (2001) suggests using non-parametric tests based on the difference of medians rather than parametric tests on the difference of means. Following this

^aIn unreported robustness tests, we scale by revenues, obtaining qualitatively similar results.

approach, we also perform the change model, computing the difference between the benchmark-adjusted operating performance after and before the IPO date.

3. Empirical Results

3.1. Univariate analysis

Table 4 describes the results of the comparative analysis on the abnormal operating performance of acquiring IPOs, adopting the three different methodologies described in Sec. 2.2.

Table 4. Univariate analysis.

Panel A: Level model							
RoA: Raw performance							
Year	-1 (%)	0 (%)	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
Acquiring IPO firms	11.04	9.86	9.95	9.17	8.36	9.74	9.90
Industry (acquiring)	9.27	8.98	8.70	8.04	7.72	7.35	7.20
Non-acquiring IPO firms	10.90	10.99	10.27	9.81	8.12	8.16	9.32
Industry (non-acquiring)	9.27	9.02	8.22	7.42	7.43	7.44	7.20
Wilcoxon z -test testing the equality of distributions							
Acquiring versus industry	-0.791	1.476	0.577	0.119	1.078	1.552	2.113**
Non-acquiring versus industry	-1.098	-0.211	-0.465	-0.612	-1.002	0.352	2.659***
Acquiring versus non-acquiring	0.466	1.377	1.149	0.988	1.614	1.606	0.356
CFRoA: Raw performance							
Year	-1 (%)	0 (%)	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
Acquiring IPO firms	12.73	11.20	11.45	10.30	9.51	10.12	10.18
Industry (acquiring)	10.40	9.80	9.73	9.04	8.56	8.23	7.97
Non-acquiring IPO firms	12.45	12.28	11.14	10.53	9.60	8.70	11.07
Industry (non-acquiring)	10.47	10.19	9.56	8.08	8.24	8.23	8.09
Wilcoxon z -test testing the equality of distributions							
Acquiring versus industry	0.247	3.362***	2.276***	0.897	1.642	1.398	1.139
Non-acquiring versus industry	0.526	2.009**	1.009	0.113	-0.978	0.086	2.254**
Acquiring versus non-acquiring	-0.281	0.905	0.949	1.357	1.798*	1.856*	-0.691
Panel B: Intercept model							
	Intercept		Slope (pre-issue adjusted performance)				
RoA							
Acquiring IPOs post-issue performance (industry adjusted)	-0.012* (0.007)		0.145*** (0.035)				
Non-acquiring IPOs post-issue performance (industry adjusted)	-0.038*** (0.010)		0.224*** (0.084)				
Acquiring IPOs post-issue performance (non-acquiring firms adjusted)	0.031*** (0.013)		0.200*** (0.058)				

Table 4. (Continued)

Panel B: Intercept model		
	Intercept	Slope (pre-issue adjusted performance)
CFRoA		
Acquiring IPOs post-issue performance (industry adjusted)	-0.007 (0.007)	0.126*** (0.029)
Non-acquiring IPOs post-issue performance (industry adjusted)	-0.048*** (0.011)	0.143* (0.077)
Acquiring IPOs post-issue performance (non-acquiring firms adjusted)	0.373*** (0.014)	0.139** (0.057)
Panel C: Change model		
	Median change in operating performance with respect to year -1	Wilcoxon signed rank z-statistic
RoA		
Acquiring IPOs versus industry	-0.007	0.626
Non-acquiring IPOs versus industry	-0.012	-1.965**
Acquiring IPOs versus non-acquiring IPOs	0.009	1.772*
CRFoA		
Acquiring IPOs versus industry	-0.002	0.916
Non-acquiring IPOs versus industry	-0.023	-3.172***
Acquiring IPOs versus non-acquiring IPOs	0.013	2.321**

Notes: This table presents the univariate analysis on the operating performance. Panel A reports median raw RoA and CFRoA for acquiring IPO firms, matched counterparts and industry medians and the Wilcoxon signed rank z-statistic testing the equality of distributions. Panel B reports the intercept and the coefficient of the intercept model (standard errors in brackets). Panel C reports the median change in performance and the Wilcoxon signed rank z-statistics testing its equality to 0.

Sample: 715 acquiring US IPO firms in the period 1986–2008.

* = significant at the 10% level, ** = significant at the 5% level, *** = significant at the 1% level.

Panel A shows the differences dealing with the raw operating performance.

The median RoA (CFRoA) in the pre-IPO year for acquiring IPO companies is equal to 11.04% (12.73%). As a result of our matching procedure, acquiring firms' pre-IPO performance is not statistically different from matched firms' (RoA and CFRoA are, respectively, equal to 10.90% and 12.45%). We also note that both acquiring IPO firms and non-acquiring IPO firms show a similar performance compared to industry medians in the pre-IPO year.

After the IPO, we do not find significantly persistent differences in performance between newly listed companies (both acquiring and non-acquiring) and industry medians. We only note that the CFRoA for IPO companies is larger in the short run after the IPO, while the RoA is significantly larger only in the fifth year after the listing. When we compare acquiring and non-acquiring IPO firms' performance, we note that the RoA is always larger for acquiring firms, but differences are never statistically significant. On the other hand, differences in the CFRoA are positive and

statistically significant for acquiring IPO firms in the third and fourth year after the issue, suggesting a positive impact of acquisition-based strategies on long-run value creation.

To further analyze this issue, we implement the intercept and the change model, which provide more insights on performance changes.

Panel B reports the results relative to the intercept model. We first note that in all the regressions, regardless the measure of operating performance, the coefficient relative to the persistence in cash flows is positive and statistically significant. This means that companies exhibiting larger cash flows before the IPO continue to deliver better operating returns after the access to capital market. We also find that the performance of acquiring IPO firms does not decline relatively to already listed industry peers (the intercept is positive and statistically significant in the model based on the RoA, while it is not statistically significant in the model based on the CFRoA). On the other hand, non-acquiring IPO firms seem to underperform relatively to already listed firms in the same industry, as the intercept of the regression is always negative and statistically significant at the 1% level. This result is consistent with the literature on the decline in the operating performance after equity issues (see, among the others, Jain & Kini (1994), Mikkelsen *et al.* (1997), Pagano *et al.* (1998), Welch & Ritter (2002)).

Finally, the intercept model comparing acquiring IPO firms to their non-acquiring peers reports a significant improvement in performance for acquiring firms (the intercept is positive and statistically significant at the 1% level in both the models).

Despite the bias issues related to the intercept model (Ghosh 2001), the change model confirms our results (see Panel C). We find that the change in the performance for acquiring IPO firms is not different from the change in performance of already listed peers. The change model also confirms the underperformance of non-acquiring IPO firms relatively to already listed industry peers and the overperformance of acquiring IPO firms relatively to non-acquiring counterparts.

We can conclude that, nothing else changed, acquisitions significantly improve the operating performance and the stockholder value of US IPO firms. A consequent policy suggestion to corporate executives is to consider post-IPO M&A as a possible solution to the well-known and documented phenomenon of underperformance experienced in many cases by newly listed companies.

3.2. Multivariate regressions: The determinants of post-IPO performance

The first set of regression tests is aimed at checking whether the operating performance of IPO companies improves in the long run after controlling for firm and issuance-specific characteristics.^b

We introduce the following dependent variables: (i) *Post-IPO RoA* namely the median RoA of the acquiring IPO firm in the years $[t = +2, \dots, +5]$ following the

^bWhen running the econometric analysis, we used a reduced sample made up of 1112 IPOs because of missing data. We were not able to compute pre-IPO RoA and CFRoA as a weighted average of bidder's and target's performance mainly due to lack of data on US private firms.

IPO date less than the median RoA of the matched IPO firm in the same years (ii) *Change_RoA* namely the difference between *Post-IPO RoA* and the RoA of the acquiring IPO firm at time $t = -1$ net of the RoA of the matched company at the same time. The first variable measures the difference in the raw performance between acquiring IPO companies belonging to the treatment sample and matching non-acquiring IPO companies belonging to the control sample, while the second measures the difference in the incremental performance between the same samples, comparing the values before and after the IPO. The same variables are computed adopting the CFROA variable.

Based on the extant literature, we introduce a set of independent and control variables: the pre-IPO operating performance (*Pre-IPO RoA*); the natural logarithm of IPO proceeds (*Proceeds*) as large firms tend to underperform small firms (Loughran & Ritter 1997); the fraction of equity retained by pre-IPO shareholders (*Retention*), that can be considered a signal of quality (Leland & Pyle 1977) and is typically associated with positive changes in operating performance (Jain & Kini 1994); the presence of a venture capitalist among pre-IPO shareholders (*VC backed*), as professional investors can bring monitoring benefits and support management efforts (Jain & Kini 1994); the underwriter's reputation (*Reputation*), defined as the underwriter ranking available on Jay Ritter's website (<https://site.warrington.ufl.edu/ritter/ipo-data>) as IPOs supported by top-tier investment banks acting as bookrunners and underwriters tend to experience better operating performance after the issue (Chemmanur & Fulghieri 1994, Chan et al. 2008); the IPO initial return (*Underpricing*, the percentage difference between the first-day stock price and the offer price), as the most underpriced firms tend to have a lower long-run performance (Purnanandam & Swaminathan 2004); the natural logarithm of firm's age^c plus 1 (*Age*), as younger firms are also riskier and deliver on average the worst returns (Ritter 1991); *Leverage*, the ratio between total financial debt outstanding at the IPO and the book value of assets, as a proxy of default risk; *Investments*, the amount spent in Capex and R&D in the first year after the IPO scaled by the book value of assets, as Jain & Kini (2008) show that larger investment in internal growth is associated with better long-term performance; the market-to-book (*MB*) ratio, which is typically considered a proxy of growth opportunities Jain & Kini (1994). Finally, we include a dummy variable (*ME&A*), which takes the value 1 if the IPO company is a first year acquirer and 0 otherwise.^d It is just worth mentioning the relevance played by such independent variable within our research design, ultimately aimed at testing a statistically significant causal relationship between acquisition-based strategies and post-IPO corporate growth and survival.

Table 5 reports the regression results.

We first note that some results are dependent upon the model and the measure of operating performance employed, while other correlations are quite robust.

^cFirms' founding dates are taken from Jay Ritter's website.

^dWe check for multicollinearity among the independent variables. The covariance matrix is available upon request to the authors.

Table 5. Determinants of the post-IPO operating performance.

	Change model <i>Change_RoA</i>	Intercept model <i>Post-IPO RoA</i>	Change model <i>Change_CFRoA</i>	Intercept model <i>Post-IPO CFRoA</i>
<i>Proceeds</i>	0.011 (0.012)	0.026*** (0.006)	0.018 (0.015)	0.025*** (0.007)
<i>Leverage</i>	-0.022 (0.039)	-0.010 (0.016)	-0.014 (0.035)	-0.004 (0.018)
<i>Retention</i>	0.057* (0.031)	0.004 (0.018)	0.088** (0.038)	0.026 (0.020)
<i>VC backed</i>	0.121*** (0.023)	-0.001 (0.012)	0.118*** (0.027)	-0.004 (0.013)
<i>Underpricing</i>	-0.036 (0.030)	-0.031* (0.017)	-0.044 (0.036)	-0.026 (0.018)
<i>Reputation</i>	0.010*** (0.003)	0.002* (0.001)	0.010*** (0.003)	0.003* (0.001)
<i>MB</i>	-0.000** (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000 (0.000)
<i>Investments</i>	-0.041 (0.035)	0.049*** (0.017)	-0.004 (0.041)	0.054*** (0.018)
<i>Age</i>	-0.045*** (0.011)	0.016*** (0.005)	-0.044*** (0.013)	0.019*** (0.005)
<i>M&A</i>	0.037* (0.021)	0.022** (0.011)	0.049* (0.025)	0.027** (0.012)
<i>Pre-IPO RoA</i>	—	0.182*** (0.021)	—	—
<i>Pre-IPO CFRoA</i>	—	—	—	0.162*** (0.020)
<i>Constant</i>	0.067 (0.155)	-0.112* (0.066)	0.130 (0.192)	-0.088 (0.077)
<i>R-square adjusted</i>	0.161	0.311	0.137	0.263
<i>P-value F test</i>	0.000	0.000	0.000	0.000
<i>Number of observations</i>	1112	1112	1112	1112

Notes: This table presents the multivariate regression between change in operating performance with respect to the industry and the post-event industry adjusted operating performance. Dependent and independent variables are described in the text. Coefficients are reported (standard errors robust to heteroscedasticity in brackets).

* = significant at the 10% level, ** = significant at the 5% level, *** = significant at the 1% level.

Remarkably, our major finding from the empirical analysis is that the coefficient of the dummy variable *M&A* is positive and significant (although weakly for the change model) in all the models. This result gives further support to our previous findings and corroborates the hypothesis that acquisitions after an IPO are not a driver of underperformance, at least when operating returns are considered.

As for the control variables, we find that the operating performance significantly improves when the IPO is assisted by a reputable underwriter, consistent with the wide stream of contributions investigating the role of investment banks in capital markets (Beatty & Ritter 1986, Michaely & Shaw 1994, Brav & Gompers 1997, Carter *et al.* 1998, Wang *et al.* 2003, Dong & Michel 2011). The change models also reveal that the operating performance significantly increases if the IPO is backed by

a venture capitalist, while the intercept models find a significant improvement in performance when the IPO size is larger and when issuing firms invest more in the first year following the IPO.

Interestingly, the coefficient of *Age* is statistically significant in all the models, but the sign changes depending on the model employed. The change model shows that the drop in the operating performance is comparatively lower for younger firms. Yet, the intercept model highlights that there is a negative gap in absolute terms with respect to older firms.

3.3. The impact of M&A strategies on post-IPO performance

The second set of regressions is aimed at investigating the impact of acquisition characteristics on the abnormal performance of acquiring IPO firms relative to non-acquiring ones.

In these models, the units of analysis are the single M&A deals that take place within one year after the issue. The sample is composed by the 1005 acquisitions performed in our period of analysis.

Again, the dependent variables are the change in the operating performance of acquiring IPO firms adjusted by matched non-acquiring IPO firms (*Change_RoA* and *Change_CFRoA*) and the post-IPO performance of acquiring IPO firms adjusted by non-acquiring IPO firms (*Post-IPO RoA* and *Post-IPO CFRoA*).

Independent and control variables include the following: the difference in logarithm of the IPO proceeds between the acquiring IPO company and the non-acquiring matching counterpart (*Diff_proceeds*); the difference in the underpricing (*Diff_underpricing*); the difference in the underwriter ranking (*Diff_reputation*); a dummy variable (*Diff_VC*) which takes value 0 if both the acquiring company and the non-acquiring counterpart are either backed or not by venture capitalists, 1 if the acquiring IPO firm is backed by a VC and the non-acquiring is not, -1 if the non-acquiring IPO firm is backed by a venture capitalist and the acquiring IPO firm is not; the difference in the fraction of equity retained by insiders (*Diff_retention*); and the difference in MB ratios (*Diff_MB*).

The control variables related to the characteristics of the M&A transaction are *Crossborder*, a dummy variable taking value 1 if the target company operates outside the US (Moller & Schlingemann 2004); *Diversification*, a dummy variable taking value 1 if the target company operates in a different industry (defined by 2-digit SIC code as in Jain & Kini (2008)); *Cash* and *Stock*, dummy variables taking value 1 if the acquisition is paid 100% by cash and stock, respectively, as the method of payment can affect operating performance (Linn & Switzer 2001, Ghosh 2001); *Listed* if the target company is already listed in the market (Officer 2007); *Hostile*, a dummy variable equal to 1 if the acquisition is labeled as hostile by the managers of the target company, 0 otherwise.

The regression results are reported in Table 6.

As in the previous analysis, we find that some of the results are dependent upon the regression model employed. Three out of four models find that differences in

Table 6. M&A characteristics and operating performance.

	Change model <i>Change_RoA</i>	Intercept model <i>Post-IPO RoA</i>	Change model <i>Change_CFRoA</i>	Intercept model <i>Post-IPO CFRoA</i>
<i>Diff_proceeds</i>	0.001 (0.022)	0.036*** (0.012)	0.019 (0.027)	0.044*** (0.013)
<i>Diff_underpricing</i>	0.063 (0.045)	0.026 (0.021)	0.063 (0.053)	0.027 (0.021)
<i>Diff_reputation</i>	0.004 (0.004)	0.004** (0.002)	0.008* (0.005)	0.006** (0.002)
<i>Diff_VC</i>	0.048 (0.030)	0.024* (0.014)	0.062* (0.037)	0.026 (0.017)
<i>Diff_retention</i>	0.057 (0.075)	0.102*** (0.037)	0.115 (0.091)	0.146*** (0.041)
<i>Diff_MB</i>	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
<i>Crossborder</i>	-0.024 (0.054)	0.031 (0.032)	-0.007 (0.065)	0.039 (0.035)
<i>Diversification</i>	0.043 (0.044)	0.019 (0.021)	0.064 (0.053)	0.022 (0.023)
<i>Cash</i>	0.023 (0.036)	0.042* (0.021)	0.020 (0.045)	0.041* (0.024)
<i>Stock</i>	0.168** (0.071)	0.085** (0.034)	0.191** (0.085)	0.083** (0.037)
<i>Listed</i>	0.479** (0.212)	0.173** (0.070)	0.522** (0.244)	0.155** (0.064)
<i>Hostile</i>	-0.404 (0.247)	-0.206** (0.102)	-0.367 (0.281)	-0.182* (0.099)
<i>Pre-IPO RoA</i>	—	0.319*** (0.030)	—	—
<i>Pre-IPO CFRoA</i>	—	—	—	0.243*** (0.022)
Constant	-0.014 (0.106)	0.085 (0.087)	0.015 (0.161)	0.037 (0.124)
Adj. <i>R</i> -square	0.147	0.398	0.131	0.330
<i>P</i> -value <i>F</i> test	0.000	0.000	0.000	0.000
Number of observations	775	775	756	756

Notes: This table presents the multivariate regression between change in operating performance with respect to the matched firm or the post-event matched firm adjusted operating performance. The variables are described in the text. Coefficients are reported (standard errors robust to heteroscedasticity in brackets).

Sample size varies due to data availability.

* = significant at the 10% level, ** = significant at the 5% level, *** = significant at the 1% level.

underwriter rank are positively associated with performance measures. The effect of a one-point increase in ranking is an operating performance increase ranging from 0.4% to 0.8% depending on the model employed.

Intercept models show that the operating performance of IPO acquirers improves relative to non-IPO acquirers when they are smaller in size, while two out of four models report increased operating performance when a venture capitalist is backing the acquirer and not the matched firm belonging to the control sample.

These results are consistent with the findings reported in Table 5 and support the evidence that the relationship emerging from the empirical analysis does not hold for any newly listed company, but is conditioned to a precise set of IPO-specific characteristics.

Among the set of control variables related to the acquisition-specific characteristics, we find that the operating performance improves when the target is already listed on the stock exchange and when the acquisition is fully paid with stock.

The first result contrasts with Officer (2007), who reports lower cumulated abnormal returns at the announcement of an acquisition when the target company is listed. One possible explanation for our finding is that already listed firms are subject to the scrutiny of the market. Their stock is daily monitored by institutional investors and equity analysts (Kolasinski & Kothari 2008, Bonini et al. 2010); this flow of information characterizing listed firms can reduce the risk of overpayment by managers of the IPO firm. Indeed, due to the separation between ownership and control, consistent with agency theory, managers of the IPO firm could be incentivized to pursue their personal objectives, for example, through building empires by pursuing acquisitions aggressively. Our results suggest that the monitoring role played by the stock market can reduce these incentives.

Officer et al. (2009) document larger cumulated abnormal returns at the announcement when the target is difficult to be evaluated (i.e. when the target is not listed). As in our sample, stock-financed acquisitions are mostly related to private targets (only in 15 cases out of 202 fully stock-financed acquisitions involve listed targets) which are more difficult to be evaluated compared to already listed firms, we can accordingly argue that running stock for stock deals reduces the target valuation uncertainty and allows to effectively split the risk of overvaluation between the acquirer and the target.

Furthermore, intercept models show that the change in operating performance is also positively related to pure cash acquisitions and negatively related to hostile takeovers. The first finding is consistent with Ghosh (2001), while the second result is consistent with Martynova et al. (2007).

3.4. Survival analysis

In order to complement our results on the long-term operating performance of acquiring IPO firms, we perform a survival analysis through Cox Proportional Hazard models (see, among the contributions using this methodology, Jain & Kini (1999), Manigart et al. (2002), Audretsch & Lehmann (2005), Jain & Kini (2008), Pommet (2012), Ben Amor & Kooli (2016)).

The sample comprises all the 3823 IPO firms. The dependent variable is the logarithm of hazard ratios. The time variable is the number of months from the 13th month after the IPO date (as the first 12 months comprise the acquisition period) to the end of 2013 or to the delisting date, if earlier.

In Table 7, we apply the model to all the delisted companies (first column). We then run separate models in columns 2 and 3 for delistings due to bankruptcy

Table 7. Survival analysis.

	Time to delisting	Time to being acquired	Time to bankruptcy
<i>M&A</i>	0.100** (0.047)	0.099** (0.050)	0.099* (0.056)
<i>Reputation</i>	-0.006 (0.005)	-0.002 (0.005)	-0.006 (0.006)
<i>Underpricing</i>	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
<i>Assets</i>	-0.028 (0.019)	0.030 (0.021)	-0.067*** (0.022)
<i>Leverage</i>	0.187** (0.092)	0.011 (0.102)	0.208** (0.105)
<i>Retention</i>	0.611*** (0.059)	0.580*** (0.062)	0.634*** (0.067)
<i>VC_backed</i>	0.056 (0.040)	0.127*** (0.043)	0.022 (0.047)
<i>M/B</i>	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
<i>Investments</i>	-0.144** (0.066)	-0.120* (0.071)	-0.088 (0.073)
<i>Age</i>	-0.107*** (0.020)	-0.079*** (0.021)	-0.100*** (0.023)
<i>P-Value of F-test</i>	0.000	0.000	0.000
Number of observations	3058	2705	2281

Notes: This table presents the survival analysis. The independent and control variables are defined in the text. Coefficients are reported (standard errors in brackets).

Sample size: 3058 IPO companies delisted before the end of 2013.

* = significant at the 10% level, ** = significant at the 5% level, *** = significant at the 1% level.

(CRSP delisting code higher than 300) and delisting due to the firm's acquisition (delisting code in CRSP lower than 300) to understand the different impact of M&As on the alternative causes of exit from the financial market.

The independent variables are the same variables used in the first set of multivariate models, namely: *Reputation*, *Underpricing*, *Proceeds*, *Leverage*, *Retention*, *VC_backed*, *M/B*, *Investments*, *Age* and *M&A*.

Considering the aggregate sample, we find that the time to the delisting is positively correlated to *Underpricing*, *Leverage* and *Retention*, while there is a negative correlation with *Investments* and *Age*. We posit that the riskiest firms (those with higher underpricing and higher level of leverage) are likely to delist faster from the market. Interesting to observe, *M&A* is also positively correlated with the time to delisting, this indicates that acquiring firms delist faster from the stock exchange.

However, this result does not seem to contradict our previous findings. In fact, by looking at the coefficients reported in column 2 for the acquired IPO companies, we find that the time to being acquired is positively correlated with *Underpricing*, *Retention*, *VC_backed* and *M&A*, while it is negatively correlated with *Investments* and *Age*. Our results show therefore that the probability of being acquired is larger when the IPO company is backed by a venture capitalist and when the IPO firm pursues a

growth strategy focused on taking over other companies in the first year after the IPO. In other words, the more an IPO company is active in acquiring other companies, the more likely it will be acquired in the future, arguably as a consequence of its increased attractiveness in the market for corporate control.

Column 3 reports the results based on the time to bankruptcy. We thus exclude from the sample firms that delisted because they were acquired. We find that the time to failure is shorter with *Underpricing*, *Leverage*, *Retention* and *M&A*, while it is longer with *Size* and the *Age* of the IPO company.

Not reported in the tables, we find that the mean change in RoA (adjusted considering the matching companies) for acquiring IPO firms that were acquired within five years from their IPO is 10.15%, compared to 3.81% for firms that did not delist. The difference in performance between the two groups is statistically significant at the 5% level. We also find that the mean-adjusted change in RoA for the acquiring IPO firms that failed within five years from their IPO is -3.77% , and the difference in performance with the acquiring IPO firms that did not delist is negative and also statistically significant at the 5% level.

Overall, our results suggest that when acquiring IPO companies deliver good operating performance, they get acquired faster by other companies. On the other hand, when they underperform, they follow the path to bankruptcy more quickly. These results suggest that M&A strategies performed by newly listed firms lead to clear and unambiguous results, which could be either positive or negative change in operating returns. In the former case, the straight consequence will be an acquisition while in the latter, a bankruptcy. In both cases, M&A strategies structurally affect the traditional duration of the IPO companies' life cycle, accelerating the time to failure or to success.

4. Conclusions

Our paper analyzes the performance and survival of 715 US acquiring IPO firms running at least one acquisition in the first year after going public in the period 1986–2008.

As a major finding from our empirical analysis, contrary to some previously cited contributions, we find that IPO acquirers experience on average an improvement in RoA and CFRoA when compared to non-acquiring IPO firms. The acquiring IPO companies' observed change in operating performance, furthermore, is in line with that of their listed peer companies, in a period up to five years after the listing. These results hold after controlling for both IPO and firm-specific characteristics.

Among the acquisition-specific characteristics that are likely to be predictors of an improvement over time in the IPO company's operating performance, we find stock payments and acquisition of listed targets to be the most persistent and statistically significant ones. One possible explanation for these findings can be attributed to either the higher monitoring on already listed targets, which avoids overpayment, or the market certification for IPO companies' stocks, which makes target companies' shareholders more eager to accept to be paid with buyers' shares.

We also investigate the impact of acquisitions on the time to delisting. We find that acquiring IPO companies leave the stock exchange faster when compared to non-acquiring matching companies, regardless the reason of the delisting. However, as a further finding emerging by successive regression analyses, acquiring IPO companies showing positive changes in operating performance are more likely to be the target of other bidders, whereas acquiring IPO companies with poor operating performance tend to go bankrupt more quickly. Therefore, post-IPO M&A activity does seem to structurally affect companies' survival, accelerate either their time to success or their time to failure.

We think that our research can be valuable for both academicians and practitioners. This work sets the ground for further academic research on the effect of M&As on IPO performance, highlighting the importance of considering operating returns and cash flows as appropriate proxies for profitability and value creation. Finally, a possible implication for executives of IPO companies lies in the impact produced by M&A-focused strategies on future survival: a more in-depth investigation about the deal structure, the target selection and the estimated sources of synergies will allow to shed further light on alternative future growth/decline paths available after the access to stock markets.

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