Eurasian Journal of Economics and Finance, 5(4), 2017, 142-175
DOI: 10.15604/ejef.2017.05.04.008

EURASIAN JOURNAL OF ECONOMICS AND FINANCE

www.eurasianpublications.com

REVERSE LEVERAGED BUYOUT RETURN BEHAVIOR: SOME EUROPEAN EVIDENCE*

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Abstract

This study investigates the stock performance of reverse leveraged buyouts (RLBOs) before, during, and after the global financial crisis. An RLBO consists of the return to public investors (i.e. the offering of stocks to the public) of a company that had gone private after a leveraged buyout (LBO) led by a private equity fund. The value created by an RLBO resides in the changes brought by the LBO fund while it owns the company. After a "repackaging" of the bought company, the private equity fund sells the company's shares to the public. Most of the research on this topic, based on RLBOs that occurred between 1980 and 2005 in the US, has shown that RLBOs outperform their peers (i.e. other IPOs) and outperform the market after going public again. Focusing on RLBO companies in Europe in the financial crisis era, this study investigates whether they also outperform other IPOs and the market. The study is based on a sample of 421 IPOs occurring between 2001 and 2011 in France, Germany and the UK, of which 52 are RLBOs. We examine RLBO performance one day, one month, one year and three years after the offering. We also use event study methods to investigate the impact of the global financial crisis on RLBO performance. We find that European RLBOs outperform both their peers (i.e. "classic" IPOs) and the market during the period studied. This outperformance does not diminish in the long-term. The global financial crisis appears to have affected RLBO performance, which weakened between 2007 and 2009, though RLBOs still outperformed the market. In addition, multivariable regressions were used to examine various extant explanations for RLBO outperformance. This analysis did not support any of the prevailing theories. In particular, the value created by RLBOs does not appear to be linked to LBO duration, sponsor reputation, or to the level of leverage employed. There is no evidence of time or industry effects. Moreover, RLBO performance shows no correlation with market capitalization. The explanation of why RLBOs outperform both other IPOs and the market continues to be a puzzle. Further theoretical elaboration is required.

Keywords: Empirical Asset Pricing, Leveraged Buyouts, Initial Public Offerings, Financial Crisis

JEL Classifications: G12, G14, G15, G24

*The authors wish to acknowledge the assistance of Raluca Oprean.

1. Introduction

A reverse leveraged buyout (RLBO) consists of the return to public investors (i.e. the offering of stocks to the public) of a company that had gone private after a leveraged buyout (LBO) led by a private equity fund. The fund uses leverage to buy all of the targeted company's stock. The target company's assets are used as collateral. An expanded definition of RLBO would include the subsidiaries of publicly traded companies that have been acquired through an LBO and go public subsequently, i.e. as an equity carve-out. In the literature, this kind of RLBO is commonly called a "divisional RLBO". In this study, we use the expanded definition of RLBO, following previous literature beginning with Mian and Rosenfeld (1993).

The potential value created by a RLBO resides in the changes brought by the LBO fund while it owns the company. After a "repackaging" of the bought company, the private equity fund sells the company's shares in an RLBO. Most research on this topic, based on samples of RLBOs occurring between 1980 and 2005 in the US, has shown that RLBO companies outperform their peers (i.e. other IPOs) and outperform the market after going public again. The current study investigates the stock return performance of European RLBOs in comparison to their peers and the market on the first trading day after the IPO, one month after, and one year and three years after the IPO. We use a sample of European RLBOs that occurred between 2001 and 2011 in order to identify any changes in performance that may have occurred in conjunction with the global financial crisis of 2007-09.

Utilizing RLBO companies in Europe before, during and after the financial crisis, this paper investigates whether they still outperform other IPOs and the market. At the same time, it utilizes a sample of European RLBOs, whereas almost all previous research has been based on US data. Our reference point is the hypothesis and conclusions of Cao and Lerner (2009), according to which RLBOs outperform both their peers and the market, with no deterioration in that outperformance in the long run. We utilize a financial model that conjectures the differences in equilibrium returns for the RLBOs, their peers and the market in order to provide a defensible framework for the tested hypothesis, the statistical tests, the database utilization, and the explanation of results.

Several approaches are used to compare the RLBO performance to a benchmark market portfolio and a portfolio of "classic" IPOs. We then try to explain the outperformance, focusing particularly on three possible explanations:

- The duration of the LBO before the company goes public again: This raises issues of management and information asymmetry. We might expect that a longer LBO period would stabilize the performance of the company and that any outperformance might be lower but more sustainable.
- The impact of the buyout sponsor's reputation on RLBO performance: This may be important inasmuch as LBO sponsors are dependent on their reputation in the LBO market.
- Industry and geographical effects in the data: The RLBO market appears to differ among countries (more particularly between the UK and continental Europe) and among industries. The underlying question here is why there are potential differences between countries and/or industries.

This study also investigates the potential impact of the 2007-09 financial crisis on RLBO performance. To do so, we undertake a long-run event study (using a three-year estimation window). We have chosen July 2007 as the event date (monthly returns are used, because of the long term) because the summer of 2007 is often considered as the starting point of the global financial crisis in both the literature and the media. Moreover, we investigate potential breach points in the LBO market and July matched in several cases. For instance, the private-equity firm KKR announced the takeover of the British pharmaceutical company Alliance Boots for $21.6 billion in April 2007, whereas in July 2007 most of the American banks experienced enormous difficulties in selling the $18.1 billion of bonds they had committed to KKR. Another example would be the inability of the private equity firm Terra Firma to find the $3.0 billion of debt required to complete the LBO of the EMI group in a $6.4 billion deal.

In the next section, we review the previous literature dealing with RLBOs and their performance. This will be followed by a discussion of the methodology employed and the data collected. The following section will describe the statistical analysis and present and discuss the results of the study. The study concludes with a summary of our findings and suggestions for further research.

2. Literature Review

2.1. Overview of Previous Studies

For the last three decades, investors have shown increased interest in RLBOs, but they have been researched very little, especially those occurring in Europe. Based on a sample of 62 RLBOs between 1983 and 1987, Degeorge and Zeckhauser (1993) found that RLBO accounting performance the year before the return to the public was superior to the accounting performance of other IPO companies over the same period. According to Chou *et al.* (2002), funds and managers manipulate RLBO accounting performance to optimize their return on investment. In another study, based on a sample of 90 RLBOs between 1983 and 1988, Holthausen and Larcker (1996) point out that RLBOs outperform other companies (in accounting and stock performance) both the day the company goes public and over a four-year horizon. They explain this outperformance in terms of better management of some aggregates like investment expenditure and working capital. They also point out that this outperformance tends to dissipate in the long-term. The conclusions of Mian and Rosenfeld (1993) are quite similar, based on a sample of 85 RLBOs over the same period.

More recently, Cao and Lerner (2009) show, using a sample of 496 RLBOs between 1980 and 2002, that RLBOs outperform both the market and their peers. Moreover, they argue that there is no evidence of any decrease in this outperformance in the long-term. They also show that the leverage level has no significant impact on RLBO performance. In this respect, they are close to Muscarella and Vetsuypens (1990), for whom the outperformance of RLBOs is linked to the organizational changes brought by the funds that took them private, as these changes allowed an improvement of the operating results. In a more recent study, Cao (2011) found no significant deterioration of RLBO operating performance in the years following the IPO. According to Cao (2011), the results of Degeorge and Zeckhauser (1993) may be biased because of the small size of their sample.

The literature dealing with IPO performance is relevant for our topic, as RLBOs are a particular kind of IPO. For instance, Cao (2011) tries to make a link between IPO timing, buyout sponsors' exit strategies and RLBO performance. There are also a number of studies analyzing IPO performance. Of particular interest is Brav and Gompers (1997), who looked at the potential long-run underperformance of IPOs.

2.2. Evidence of RLBO Outperformance

2.2.1. The Traditional IPO Underperformance

Brav and Gompers (1997) deal with the traditional long-run underperformance of IPOs. The authors base their study on a sample of 4,341 IPOs that occurred between 1972 and 1992. They separate venture-backed IPOs (934 IPOs in the sample) from non-venture-backed IPOs. A venture-backed IPO is the offering to the public of a company that was previously private. According to the literature, particularly Ritter (1991), IPOs are believed to underperform in the years following the offering, whatever the geographical market (i.e. not only in the USA). Brav and Gompers investigate three issues resulting from this assumed underperformance. The first is the potential impact of venture funds on the performance of the companies they bring public. This is why they separate the venture-backed IPOs from the non-venture-backed IPOs in their sample. Second, they look at the robustness of the assumed IPO underperformance. Here the authors employ several methodologies and benchmarks. They compute both value-weighted and equally-weighted returns, and use the Fama-French Three Factor model to measure the performance. The authors then investigate the sources of IPO underperformance. They raise the issue of IPO correlations in calendar time and investigate several potential causes of IPO underperformance.

Brav and Gompers (1997) report the following: Over a five-year observation period, venture-backed IPOs experience better performance than non-venture-backed IPOs. There are two possible explanations for this: First, venture-backed IPOs are less sensitive to investor sentiment, as they tend to provide more information to investors together with the security of a stronger institutional investor stockholding. Second, venture funds are very dependent on their reputation and therefore should be less tempted to overprice the company's stock. The underperformance of non-venture-backed IPOs in the sample seems to be led by the poor performance experienced by small non-venture-backed companies, with market capitalizations below fifty million US dollars. The relative underperformance is reduced when value-weighted portfolios are employed, whatever the benchmark. In other words, underperformance has nothing to do with an IPO effect, as it seems to be the norm for small companies with poor book-to-market ratios. A non-IPO company of small size with a low book-to-market ratio experiences underperformance in the same way as a small non-venture-backed IPO.

Even if Brav and Gompers (1997) do not deal with RLBOs specifically, their findings are relevant. RLBO performance should be similar to venture-backed IPO performance. RLBOs should also tend to outperform their peers (i.e. classic IPOs). The measure of RLBO performance should also be affected when value weighting RLBO portfolios. The asymmetry of information between buyers and sellers should be reduced in RLBOs, since the available information is higher for RLBOs than for classic IPOs. In addition, there may be more institutional shareholders in RLBOs than in other IPOs, because these investors are often the main source of capital for LBO funds. The presence of institutional investors may reduce the probability of overpricing during an RLBO.

2.2.2. The RLBO exception: evidence of RLBO outperformance

Degeorge and Zeckhauser (1993) investigate a sample of 62 RLBOs that occurred between 1983 and 1987. As indicated above, they found that RLBOs show superior operating performance to other LBOs the year before they go public, but this outperformance diminishes during the post-offering year as RLBOs experience significant deterioration in their operating performance. In their study, Degeorge and Zeckhauser (1993) assume that the stock performance of RLBOs in the post-offering year should indicate whether investors are fooled by RLBO performance manipulation by managers or not. If investors are fooled in this way, RLBO stock should underperform. According to Degeorge and Zeckhauser (1993), if investors anticipate the poor operating performance in the post-offering era, RLBO stock prices should not be affected by investor reaction and should perform in line with the overall market. On the contrary, when there is no anticipation of RLBO underperformance after going public by investors, RLBO stock prices should be affected and underperform on average. The authors find no evidence of any RLBO stock underperformance in their study. Indeed, they find that RLBOs experience better stock performance than comparison companies, even if this outperformance is not statistically significant. According to the authors, these findings are consistent with the results of Ritter (1991), who found that large IPOs experience normal stock performance on average. RLBOs are usually larger than other IPOs. The main implication of this result is that RLBOs appear to be more correctly priced than other IPOs, as the market does not appear to be surprised by their operating performance before and after the offering.

Mian and Rosenfeld (1993) compare RLBO performance with other IPO performance using a sample of 85 American RLBOs that occurred between 1983 and 1988. Starting with the results of Ritter (1991), they assume that an investment in an IPO should perform less well than an investment in the seasoned stock of a company in the same industry and of a similar size. They try to explain this underperformance with the systematic "mis-pricing" of IPOs resulting from a lack of information to determine the IPO value in an accurate way. According to Mian and Rosenfeld, the pricing of RLBOs should show less uncertainty and mis-valuation among investors, as they have more information than with a classic IPO. The RLBO firm was publicly traded before becoming private. Therefore, the large amount of available information should reduce investor uncertainty and RLBOs should not have greater required returns than other IPOs. On the contrary, RLBO should underperform. In their study, Mian and Rosenfeld (1993)

find that over a three-year horizon RLBOs show high positive abnormal performance after the IPO and outperform a portfolio of companies of comparable sizes and industries. The results are quite different from the findings of Ritter (1991), and show that RLBOs do not underperform the market like other IPOs.

Holthausen and Larcker (1996) use a sample of 90 RLBOs occurring between 1985 and 1987 to investigate the financial performance of RLBOs. They compare the post-offering financial performance of RLBOs to those of their industries. The authors find that RLBOs outperform their industries and that this outperformance persists in the long run (that is, for at least the four post-offering years). They find a decline in the RLBO accounting outperformance in the long run, but no evidence of any RLBO stock underperformance. The authors assume that the concentration of equity ownership in LBOs provides the motivation for these companies to improve their operating efficiency. RLBOs should outperform their industries, as they remain companies with higher leverage and more concentrated managerial ownership than their industry peers. As for the stock performance, Holthausen and Larcker (1996) find that it is either positive or close to zero depending on the chosen observation period.

Chou *et al.* (2006) investigate asymmetric information issues in RLBOs, and, more particularly, earnings management during the RLBO pre-offering period. Degeorge and Zeckhauser (1993) show that it is possible for managers to manipulate the reported operating performance of the company before the IPO (through the reduction of investment or R&D costs for example). They base their study on a sample of 247 RLBOs occurring between 1981 and 1999. The authors find RLBOs do not underperform and may outperform both other IPOs and the market after the offering.

Finally, in a study dealing with the performance of RLBOs specifically, and based on a sample of 496 RLBOs that occurred between 1980 and 2002, Cao and Lerner (2009) investigate three- and five-year RLBO stock performance. They find that RLBOs outperform both other IPOs and the market in a consistent and significant way. Though outperformance remains ambiguous in the second and third year, the results show strong outperformance of the market in the first, fourth and fifth post-issuing years. The buyout market was very competitive during the 1990s and 2000s. As a consequence, there were fewer opportunities to purchase companies at low prices. The returns from buyout investments experienced a strong deterioration. Since the results show no evidence of any deterioration of RLBO stock returns over three- and five-year horizons, the authors point out that RLBO performance appears to be unaffected by the growth of the buyout market. Although the buyout market experienced great changes (in terms of amount of capital deployed and competitiveness) between the 1980s and the 1990s and 2000s, RLBOs performed well. In a more recent paper, Cao (2011) finds once again that RLBO companies do not experience any deterioration in their post-offering performance (both operating and stock performance).

The findings when looking at RLBO operating and stock performance have been analyzed in several very different ways, and authors have presented various theories to explain RLBO performance. It appears RLBOs experience strong operating performance during the years closest to the offering (both before and after the IPO), but authors do not agree on the explanation. Results for long-term operating performance vary. At the same time, there is no evidence of RLBO stock underperformance in the long-term in the literature. Moreover, more recent studies on this topic have found that RLBOs outperform both their peers (i.e. other IPOs) and the market and that this outperformance persists in the long-term.

2.3. RLBO Performance Interpretation

2.3.1. RLBO Performance and LBO Wealth Creation

In a study based on a sample of 72 RLBOs, Muscarella and Vetsuypens (1990) raise the issue of the motivation for going-private operations and, more particularly, LBOs. According to Muscarella and Vetsuypens (1990), an improvement in the ownership structure in terms of efficiency may explain these transactions. That is, the LBO should improve the acquired company's operating performance by bringing changes in the ownership structure. Following this assumption, LBOs should create real wealth, though some, as Lowenstein (1985) has

argued, only result in wealth transfers. As 75% of their sample is formed of divisional RLBOs, Muscarella and Vetsuypens (1990) assume that improvement in terms of efficiency of RLBOs in their sample should reflect a wealth creation process rather than a wealth transfer, because divisional LBOs are more likely to be at arm's length. Muscarella and Vetsuypens (1990) claim the value-added of LBO sponsors is their capability to supervise the reorganization of operations in an efficient way. Therefore, LBO sponsors need exit strategies to deploy their efforts and their capital in other companies. As soon as the restructuring of operations is achieved, RLBOs are assumed to bring buyout sponsors two exit strategies. First, the buyout sponsor can sell its equity interest due to the IPO. Second, the IPO and the public markets allow an easier potential subsequent sale of the whole firm to a third-party investor. RLBOs are thus argued to be the setting where the reorganization of operations by an LBO specialist is more likely to be achieved.

Mian and Rosenfeld (1993) investigate the results and explanations of Muscarella and Vetsuypens (1990), who report that RLBOs go public at a higher price than their going-private price because of the efficiency brought to the organizational structure when the company remains private. Mian and Rosenfeld (1993) challenge this explanation relying on Ritter (1991): if the company goes public at a higher price, it may be the effect of a systematic over-valuation by investors. After the IPO, investors should detect the over-valuation and the price may decrease, showing a lack of efficiency in the organizational structure of the RLBO. In such a case, Muscarella and Vetsuypens' (1990) explanation would be invalidated. On the contrary, if there is no evidence of RLBO underperformance, the pricing of RLBOs by the market would be assumed to be fair, and the results should support the explanation of Muscarella and Vetsuypens (1990) in terms of organizational efficiency. Mian and Rosenfeld (1993) find that over a three-year horizon RLBOs show high positive abnormal performance after the IPO and outperform a benchmark. These results support the explanation of Muscarella and Vetsuypens (1990): the privatized period appears to bring the RLBO firm some efficiency gains, as the going-public price is higher than the going-private price.

2.3.2. Manager Opportunism and RLBO Performance around the IPO

Degeorge and Zeckhauser (1993) investigate two potential explanations of RLBO operating performance. First, the outperformance of RLBOs during the pre-offering year is a result of performance manipulation by the managers who use their private information to plan the IPO. With this assumption, the authors discuss issues in terms of information asymmetry and IPO timing. For instance, managers may boost performance reported shortly before the offering. Second, there may be a "pure selection" phenomenon, i.e. a selection of the better LBOs in terms of operating performance. The better performers are assumed to be more likely to go public than the others. Here Degeorge and Zeckhauser (1993) investigate issues dealing with behavioral effects and debt management. Buyers are assumed to be reluctant to buy a company with poor performance and would choose a better one, even if its sale price is very high. Sellers are assumed to be reluctant to sell their companies at a poor IPO price when they could have received a better price earlier. As for debt management, Degeorge and Zeckhauser (1993) assume that risky debt should discourage any potential RLBO, as raising public equity may reduce the risk and increase the price of the bonds. These assumptions appear to be relevant considering the results of the study. The operating performance of RLBOs decreases during the post-offering years and is worse than comparison companies' operating performance. According to Degeorge and Zeckhauser (1993), it is evidence of hidden action and hidden information. Managers benefit from information asymmetry during the pre-offering year, and RLBOs may experience performance manipulation. The potential explanation of pure selection due to behavioral effects and debt overhang is rejected, as Degeorge and Zeckhauser (1993) find no significant association between RLBO performance and debt risk in their sample.

On the contrary, Holthausen and Larker (1996) claim that the decline in RLBO accounting performance they observe cannot be explained by manager opportunism, as RLBO stock performance provides support for this hypothesis. Indeed, the use of timing and information asymmetry by managers to sell overpriced shares should result in negative excess

stock returns after the offering. This assumption differs from Degeorge and Zeckhauser's (1993) explanation. As there is no evidence of negative excess returns, the authors assume that RLBO pricing appears to be more rational than other IPO pricing. After running cross-sectional regressions, they find that cross-sectional variation in RLBO stock returns cannot be explained with cross-sectional variation in managerial ownership changes or changes in leverage. These results appear to be consistent with the hypothesis of efficient RLBO pricing at the offering and the findings of Degeorge and Zeckhauser (1993), who show that even if there is operating performance manipulation by managers, it does not result in RLBO stock underperformance. Public investors are not fooled at the time of the IPO and anticipate deterioration in operating performance.

Degeorge and Zeckhauser (1993) claim that it is possible for managers to manipulate the reported operating performance of the company before the IPO - for instance, by borrowing on the past or future. Chou *et al.* (2006) investigate this hypothesis by looking at earnings management around the RLBO initial public offering. The authors compute abnormal discretionary current accruals. Earnings management is characterized by an abnormal level of discretionary current accruals. The expected level of accruals, used as a benchmark, is computed using a cross-section regression model. The authors find that RLBOs experience positive and significant abnormal discretionary current accruals around the IPO period. These results are consistent with Teoh *et al.* (1998a, 1998b), who find earnings management around the offering period and a negative relation between the management earnings level and the stock underperformance after the company goes public. Chou *et al.* (2006) investigate the potential causes of earnings management around the offering of the RLBO. They report that earnings management in RLBOs results from information asymmetry between buyers and sellers during the IPO, but to a lesser extent than in classic IPOs. Indeed, RLBOs provide investors with more available information than do other IPOs. Therefore, information asymmetry between issuers and investors should be reduced. The existence of earnings management in RLBOs may be reinforced by the presence of institutional investors and LBO specialists as they may have some interest in earnings management too. Chou *et al.* (2006) divide their sample into quartiles based on the level of managed earnings. They find that the most aggressive quartiles experience lower stock returns than the most conservative ones in the year following the offering. Moreover, they highlight a significant negative relation between the abnormal stock returns and the abnormal discretionary current accruals during the year following the IPO. This relation persists after checking for several variables, from management involvement to firm size. According to the authors, it is evidence that earnings management provides a potential explanation of post-offering RLBO stock returns, even if RLBOs are assumed to outperform in the years after the IPO. Earnings management is traditionally employed in the literature to explain IPO underperformance after the offering. The results of this study support the hypothesis of managerial opportunism, as managers appear to practice earnings management even in RLBOs, where the information asymmetry is assumed to be lower than in other IPOs.

Cao (2011) chooses to focus on RLBOs because of the increasing role played by private equity sponsors in the IPO market. He investigates whether financial sponsors create value in the company during the leveraged buyout restructuring process, as some critics claim that buyout sponsors use market timing to buy low and sell high according to IPO market conditions. In doing so, financial sponsors would not improve the company's operating performances or value. The author looks at two hypotheses to examine the IPO timing of financial sponsors in RLBOs and the impact of this timing on company performance and the leveraged buyout restructuring process. First, the performance timing hypothesis: financial sponsors wait for a peak in pre-offering operating performance (brought by some temporary value enhancements) before reversing leveraged buyouts. As the previous literature finds patterns of deterioration in operating performance for RLBOs in the post-offering period, Cao (2011) tests the performance timing hypothesis by looking at the RLBOs' operating performance after the offering. Deterioration in operating performance should validate the hypothesis. Second, he examines the "market timing hypothesis": the leveraged buyout restructuring process duration is shortened when IPO market conditions are favorable. As financial sponsors can sell more equity in a favorable market, they have an opportunity to earn higher proceeds

even if the restructuring process is not finished. Following this hypothesis, sponsors are assumed to sell immature leveraged buyout companies to get quick cash returns. To test the "market timing hypothesis", Cao (2011) employs a multivariable analysis to examine the relation between post-offering declines in RLBO performance and market conditions. He assumes that there is a negative relation between leveraged buyout duration (employed as a proxy for the restructuring efforts inside the leveraged buyout company) and market returns. Therefore, IPO timing should result in lower RLBO performance. The results of his study appear to reject the performance timing hypothesis. Cao (2011) finds no deterioration in RLBO operating performance after the IPO. A potential explanation may be the low volatility in the profitability of RLBOs. The market timing hypothesis is supported by Cao's (2011) results, as he finds a negative relationship between favorable IPO market conditions and leveraged buyout duration. Moreover, Cao (2011) points out that the probability of bankruptcy is higher for RLBOs experiencing shorter leveraged buyout duration. The performance of such RLBOs appears to undergo greater deterioration. According to Cao (2011), this may be evidence of financial sponsors' attempts to enhance operating efficiency in RLBOs before the offering using market timing. Investigating the post-offering presence of financial sponsors in RLBOs, Cao (2011) also finds that buyout sponsors' exit strategies are not affected by IPO timing. However, the decisions of financial sponsors in terms of exit strategy can be explained by IPO market conditions, ownership and sponsors' reputation. The reputational effect is assumed to align financial sponsor interests with those of the public, as do lockup provisions. IPO timing also has no impact on post-offering monitoring and financial sponsors seem to look at both IPO market conditions and company fundamentals to make decisions about their post-offering presence.

2.3.3. How to Explain RLBO Long-Term Performance

Mian and Rosenfeld (1993) find that more than 38% of RLBOs are taken over before the end of the three years following the IPO. This, they argue, must be an explanation of the high positive abnormal performance of RLBOs after the IPO. The RLBO return performance would be driven by takeover activity. Indeed, they found that RLBOs that are taken over within the three years after the IPO show a significant outperformance (by over 100%) in comparison to the market, while other RLBOs show only average performance. In order to understand the high positive abnormal performance of RLBOs after the IPO, Mian and Rosenfeld (1993) examine several potential factors, such as the company's ownership structure, operating performance when the company was privately-owned, reliance on leverage, and board composition, and find that the presence of an LBO sponsor (assumed to be an active investor) is the only robust factor, as it is the case for more than 80% of the acquired companies.

Holthausen and Larker (1996) run cross-sectional regressions to understand the changes in accounting performance after the offering. They find that RLBO performance appears to be correlated with ownership but has no relationship with leverage. The positive relationship between RLBO performance and managerial equity ownership may be explained by the lower incentive structure implied by the dispersion of equity ownership. The authors also highlight the fact that managers may take advantage of information asymmetry in the offering period.

Cao and Lerner (2009) investigate the cross-sectional differences in stock performance among RLBOs. They find a positive relation between RLBO performance and size and the level of capital held by managers. The larger RLBOs appear to be those that are likely to outperform. Their results also indicate a cross-sectional association between governance, ownership and issuer reputation and RLBO performance. At the same time, they find no evidence that more leveraged RLBOs perform less well than other RLBOs. Even if the performance of companies using RLBO proceeds to lower their debt is better, the results with the value-weighted benchmark are not significant and the differences between companies using RLBO funds to lower debt and other RLBOs are significant only at the 10% level. Cao and Lerner (2009) also find that "quick flips" experience poor performance after an IPO. A quick flip occurs when an investment of a private equity fund is sold off within a year after going private. At the same time, companies that were kept private more than three years seem to experience poorer

performance than other RLBOs. Cao and Lerner (2009) finish with an analysis of cross-sectional differences between RLBOs. They run multivariable regressions to test some explanations of the performance of RLBOs, including the age of a buyout company, logarithm of the equity capitalization and underwriter reputation. Controls are added for the industry and the issuing year, as the industry composition and the relative performance of IPOs are assumed to experience some variations across time. The authors find a cross-sectional association of stock performance with governance, ownership and issuer company reputation.

2.4. Study limitations

First, some of these studies present limitations in terms of data. Muscarella and Vetsuypens (1990), Mian and Rosenfeld (1993), Degeorge and Zeckhauser (1993) and Holthausen and Larcker (1996) employ samples with small numbers of RLBOs (less than a hundred in most cases). This may bias their results, but later literature, such as Cao and Lerner (2009), with their sample of 496 RLBOs, seem to have overcome this problem. Another data issue resides in the observation periods, as all of these studies deal with RLBOs that occurred before the 2007 financial crisis. Then, there is a geographical weakness. All of these studies are dealing with RLBOs that occurred in the US market; there is therefore an interest in conducting similar research for other markets, including Europe (both the UK and Continental Europe).

Another weakness of some of these studies is the set of indicators employed to measure RLBO performance. Some authors focus on operating performance and use the stock performance only to investigate the market reaction to decreasing operating performance, overpricing, manager manipulation, etc. This issue appears to be addressed by Cao and Lerner (2009), who focus on stock returns to measure post-offering firm performance. With regard to “performance measure”, there are also differences in the methodology employed. Some authors use cumulative returns whereas others employ buy-and-hold returns.

2.5. Expectations

This topic raises key issues in terms of management and operational changes in a company. Some studies try to show that the performance of companies undergoing LBOs is improved by the changes brought by the LBO funds. These funds may use leveraged buyouts to increase the target company’s efficiency and reduce the agency costs inside the target in order to increase the performance of the company after the LBO. That is, LBOs aim to improve a company’s performance and its organizational structure. We also expect that free cash flow and capital expenditures will decrease substantially while a company is privately owned because of the increase in the use of leverage to finance the purchase. Moreover, the company’s “repackaging” during its privatization should lead to higher post-RLBO valuations, as the repackaging is expected to lead to an increase in the company’s growth and an improvement in its cost structure.

There are several other possible expectations indicated by the literature, but we focus on three previous results. First, LBO funds have little interest in listing poorly performing and immature RLBOs, as it may affect their reputation. Therefore, LBO sponsors’ incentives should be aligned with the public interest and there should be no RLBO stock underperformance in comparison to other IPOs and the market. This expectation is consistent with the findings of previous literature, which finds no evidence of RLBO stock underperformance. Second, we expect no strong impact from the financial crisis as Cao and Lerner (2009) found that RLBO performance followed similar patterns over the 1980s, the 1990s and the 2000s and appeared not to be affected by the changes in the LBO market during the 1990s. There might be a slight deterioration of RLBO performance, but RLBOs should still outperform both the market and other IPOs after 2007. RLBOs should outperform other IPOs, even after the financial crisis, as RLBOs benefit from structural improvements brought by the LBO repackaging, whereas other IPOs do not. We expect other IPOs to underperform the market, in line with previous evidence on IPO performance.

Leverage is not expected to have any correlation with RLBO performance. Previous literature found no evidence of a relation between RLBO debt levels and RLBO performance.

This may be because RLBO stock performance has no relation with the company's efforts to reduce or remove its debt.

3. Data and Methodology
3.1. Research Approach

The sample covers the period 2001-2011, and includes the 2007 financial crisis. 2001 appears to be a relevant start date for European RLBOs as it corresponds to a peak in the LBO market because of the dot-com bubble. 2001 was the beginning of the LBO market's stagnation, following the collapse of major telecommunication firms. The sample ends in 2011, as we need an adequate horizon to analyze IPO and, more particularly, RLBO performance. Following Mian and Rosenfeld (1993), who found that many listed companies are bought back in the three years following their IPO, we have chosen a three-year horizon to assess RLBO stock performance. Mian and Rosenfeld (1993) found that about 40% of the RLBO companies were bought back in the three years following the IPO.

The sample is focused on three markets: Frankfurt, Paris and London. These markets are the most active markets for an IPO in Europe. Moreover, they are the main European LBO markets. This allows us to focus on two different LBO models: the Continental and the British. It also allows us to compare the models using various differences in the sample (industry, size, leverage, etc.). These markets provide us with the most fulsome sample. This is particularly true for the UK. Because of the heterogeneity of these markets, we have excluded certain markets from our sample, specifically unregulated markets devoted to SMEs, such as the AIM of London and the free markets of Paris and Frankfurt. These markets present some issues in terms of liquidity (very weak, if any) and lack significant regulatory oversight

3.2. Data
3.2.1. Data Collection

Data were obtained from the Bloomberg financial database and the Thomson Financial Securities Data Company Platinum database. The SDC Platinum database provides all the IPOs and all the capital increases that have occurred on the main financial markets since 1962. This database is widely used in studies of private equity, M&A, new issues, etc. We have used the Bloomberg Financial database to extract information and stock returns for the selected deals. There are several kinds of data required:

i. The RLBO stock prices and the market levels, used for the quantitative analysis
ii. The "qualitative" data, used to analyze the sample (firm size, country, industry, etc.)
iii. The data concerning the proxies and variables tested in the regressions (buyout firm age before the RLBO, debt-to-asset ratio shortly after the IPO, LBO duration, governance structure of the RLBO, impact of leverage, company reputation).

The Bloomberg Security database provides all of these data. The SDC Platinum database is used to identify IPOs and RLBOs that occurred over the observation period. For the IPO extraction, we used the Bloomberg Financial database as well.

IPOs with an amount offered to the public lower than USD 10 million were excluded from the sample on the premise they are likely to be illiquid. 1,235 IPOs occurring between 2001 and 2011 either in London, Paris or Frankfurt remained. Companies listed on the AIM and the French and German free markets were then removed, as were companies for which not all of the data required for the study could be found. This left 114 IPOs in France, 130 in Germany and 177 in the UK, for a total of 421 IPOs.

The identification of the companies that have been leveraged before their IPO presents a problem, as there are few available data on LBO operations. The LBO funds are very "secretive", especially in continental Europe. Funds do not want to reveal too much information about their LBO operations. Another issue lies in the activity of these funds, as they often engage in activities other than LBO operations. Most LBO partners are involved in private equity operations. Therefore, LBO identification is difficult, and the capital distribution is useful but often insufficient information. However, the capital distribution and the presence of an LBO fund in the capital of an IPO are the first criteria for identifying an RLBO. The absence of any LBO

funds in the IPO capital would lead to the removal of the IPO from the sample. The level of debt is not a relevant criterion to identify an RLBO, as the leverage of a company about to exit an LBO should not be very high. On the other hand, when an LBO does not perform well, it is not likely to go public.

The IPO ticket of a company is needed to determine whether the company is an RLBO or not. These tickets were downloaded from the Thomson Reuters and Bloomberg databases. We also used the archives of the various regulatory and control authorities, and the Factiva.com database, which can be found using Proquest, in order to access financial press archives at the time of the IPO. When we could not find the IPO ticket of a company using these tools, we removed the company from the sample. The LBOs for which we could not find sufficient information were typically very small.

The data collection effort was time-consuming inasmuch as the reference date changed for each firm. We had to enter hundreds of individual manual requests on Bloomberg. The strength of such a data collection method is its reliability: the identified RLBOs should really be RLBOs; a mistake in the identification was not very likely. As we removed IPOs for which we did not find enough information to determine whether they were RLBOs or not, the sample size was of course reduced. After reading each IPO prospectus, checking whether the company had been the object of an LBO in the past and whether it has been listed or had belonged to a listed group, we obtained a sample of 52 RLBOs.

3.2.2. Sample Description

As noted above, the sample comprises 421 IPOs, which occurred between 2001 and 2011; 114 in France, 130 in Germany and 177 in the UK. Of these, we identified 52 RLBOs occurring in the same period: 7 in France, 15 in Germany and 30 in the UK. Tables 1 and 2 present the distribution of IPOs and RLBOs by country for each year. Most IPOs occurred between 2004 and 2007, as did the RLBOs. We found no RLBOs in 2008, but this seems to be consistent with the small number of IPOs occurring that year in Europe. This may be a result of the financial crisis. 2006 was the most favorable year for IPOs, with 101 IPOs occurring during the year. This may be linked to the end of the recession caused by the dot-com bubble at the beginning of the decade. Most RLBOs occurred between 2004 and 2007, just before the crisis.

Table 1. Sample Distribution – Values

	RLBOs				**Other IPOs**				**Total**		
Year	UK	France	Germany	**Total**	UK	France	Germany	**Total**	UK	France	Germany
2001	1	1	0	**2**	6	10	5	**21**	7	11	5
2002	4	1	0	**5**	13	4	3	**20**	17	5	3
2003	3	0	0	**3**	9	0	0	**9**	12	0	0
2004	8	1	1	**10**	35	9	4	**48**	43	10	5
2005	3	1	2	**6**	23	19	16	**58**	26	20	18
2006	2	1	2	**5**	24	35	37	**96**	26	36	39
2007	6	2	4	**12**	13	17	28	**58**	19	19	32
2008	0	0	0	**0**	6	2	2	**10**	6	2	2
2009	1	0	0	**1**	1	1	3	**5**	2	1	3
2010	2	0	5	**7**	10	6	6	**22**	12	6	11
2011	0	0	1	**1**	7	4	11	**22**	7	4	12
Total **Average**	30 57.7%	7 13.5%	15 28.8%	**52** **100.0%**	147 39.8%	107 29.0%	115 31.2%	**369** **100.0%**	177 42.0%	114 27.1%	130 30.9%

Table 2. Sample Distribution - Percentages

	RLBOs				Other IPOs				Total		
Year	UK	France	Germany	**Total**	UK	France	Germany	**Total**	UK	France	Germany
2001	3.3%	14.3%	0.0%	**3.8%**	4.1%	9.3%	4.3%	**5.7%**	4.0%	9.6%	3.8%
2002	13.3%	14.3%	0.0%	**9.6%**	8.8%	3.7%	2.6%	**5.4%**	9.6%	4.4%	2.3%
2003	10.0%	0.0%	0.0%	**5.8%**	6.1%	0.0%	0.0%	**2.4%**	6.8%	0.0%	0.0%
2004	26.7%	14.3%	6.7%	**19.2%**	23.8%	8.4%	3.5%	**13.0%**	24.3%	8.8%	3.8%
2005	10.0%	14.3%	13.3%	**11.5%**	15.6%	17.8%	13.9%	**15.7%**	14.7%	17.5%	13.8%
2006	6.7%	14.3%	13.3%	**9.6%**	16.3%	32.7%	32.3%	**26.0%**	14.7%	31.6%	30.0%
2007	20.0%	28.6%	26.7%	**23.1%**	8.8%	15.9%	24.3%	**15.7%**	10.7%	16.7%	24.6%
2008	0.0%	0.0%	0.0%	**0.0%**	4.1%	1.9%	1.7%	**2.7%**	3.4%	1.8%	1.5%
2009	3.3%	0.0%	0.0%	**1.9%**	0.7%	0.9%	2.6%	**1.4%**	1.1%	0.9%	2.3%
2010	6.7%	0.0%	33.3%	**13.5%**	6.8%	5.6%	5.2%	**6.0%**	6.8%	5.3%	8.5%
2011	0.0%	0.0%	6.7%	**1.9%**	4.8%	3.7%	9.6%	**6.0%**	4.0%	3.5%	9.2%

Table 3. Industry Sectors

Sector	Number	%
Consumer, C	10	19.23
Consumer, N	11	21.15
Basic Materials	2	3.85
Communication	7	13.46
Technology	3	5.76
Industrial	9	17.3
Energy	5	9.61
Financial	5	9.61
Total	**52**	**100%**

More than half of the RLBOs occurred in the UK (57.7%). This seems to be consistent with the composition of the IPO sample and is not unexpected as the British market is more mature than the French and German LBO markets. The sectoral distribution in Table 3 has been created using the eight Bloomberg main industry sectors: consumer cyclical, consumer non-cyclical, basic materials, communications, technology, industrial, energy and financial. RLBOs mainly occurred in four industry sectors: consumer cyclical, consumer non-cyclical, communications and industrial. Part of the communications sector in the sample may be explained by the heavy LBO fund investment in this sector during the dot-com bubble at the end of the previous decade. The low weight of the technology sector in the sample (only 5.8%) may be explained by the age of RLBO companies, which were listed before the LBO and are more mature, whereas new technology companies are generally younger companies. It may also be linked to the fact that venture capital funds are more likely to invest in such companies than are LBO funds, which focus on established companies. The presence of other sectors in the sample, such as basic materials, is limited.

The market capitalization in Table 4 (measured at the end of the IPO quarter) for the whole RLBO sample is equal to USD 2.816,514 billion with an average market capitalization of USD 54,164 million for each RLBO. The mean total debt to total asset ratio for RLBOs (which we employ as a proxy for financial leverage) is 69.6%. The mean LBO duration for the RLBO sample is 3.66 years (i.e. 44 months), with a median equal to 3.46 years (about 42 months). The median is a bit higher than in the Muscarella and Vetsuypens (1990) sample, in which the median was about 39 months, and the 37-month median of Cao and Lerner (2009).

Table 4. RLBO Descriptive Statistics (USD thousands)

	Mean	Median	First Quartile	Third Quartile	Std deviation	Min	Max
Market cap	54163.72	18553.47	1609.54	93919.62	75382.39	147.28	348715.53
Total assets	1059.86	625.42	239.29	1411.35	1203.44	27.24	6044.20
Total debt to total asset ratio	0.70	0.68	0.59	0.80	0.30	0.01	1.67

As for the LBO sponsors (Table 5), we have a mean buyout sponsor age at the time of the IPO equal to 24.74 years, with a median equal to 23.42 years. Most of the private equity and LBO firms have grown up during the last three decades. We have computed a reputation ranking of the buyout sponsors using the private equity rankings published each year by *Private Equity International Magazine* together with the amount of funds raised and managed by the private equity firm. We have graded the LBOs firms from 1 to 9. On this scale, LBO funds with the best reputation ranked as 9. Buyout sponsors with the best reputation for this sample are often the biggest: the Carlyle Group, the Blackstone Group and KKR.

Table 5. LBO Funds Descriptive Statistics

	Mean	Median	First Quartile	Third Quartile	Std deviation	Min	Max
Buyout sponsor age at the IPO (years)	24.74	23.42	19.23	29.56	11.72	1.83	79.33
LBO duration (years)	3.66	3.46	1.98	4.50	2.16	0.92	12.25
Buyout sponsor rank (1 to 9)	4.69	4.00	3.00	7.00	2.59	1.00	9.00

4. Methodology

We employed several measures for RLBO stock performance. To assess the performance in both the short-term and the long-term, we use four different horizons: one day, one month, one year and three years after the IPO. For each of these four horizons, we test the following hypotheses:

***H_0**: RLBO returns are not significantly different from those of either the market or other IPOs.*

The high pre-offering operating performance of RLBOs results from value-enhancing activities by managers and LBO sponsors who time the market. If RLBOs do not outperform other IPOs, it may mean that RLBOs act as “classic IPOs” and that there is no RLBO exception. Then, either there may be no improvements brought by LBO sponsors in companies they take over or they may be good at timing the market and sell at a high price.

***H_1**: RLBO returns are significantly different from both those of the market and other IPOs.*

As LBO sponsors have no interest in taking public immature and poorly performing companies, we expect the RLBO outperformance to be a result of some operating improvements brought during the restructuring process.

For each RLBO, on each of the four horizons, we measure the performance in three different ways:

i. The buy-and-hold raw (unadjusted) return: the historical performance of the company for an investor following a buy-and-hold strategy; i.e. the investor keeps the stock until

its maturity, which corresponds to the chosen observation period (one day, one month, one year, three years).

ii. The buy-and-hold market adjusted return: the methodology used by Mian and Rosenfeld (1993) to adjust buy-and-hold stock returns by subtracting the buy-and-hold market return (using a broad-based stock index).

iii. The Jensen alpha from the CAPM (i.e. the buy-and-hold abnormal returns using the Capital Asset Pricing Model). This model assumes that the abnormal return for each company is:

$$Abnormal\ Return\ m = Ri,m - [Rf,m + ßi * (RM,m - Rf,m)], \quad (1)$$

where $R_{i,m}$ is the return on company i in month m, $R_{M,m}$, the return for the market in month m, $R_{f,m}$, the risk free rate and $ß_i$, the beta of company i. We compute the beta using monthly returns over a three-year period. The use of monthly returns should reduce the potential effects of bid-ask spreads, and provides thirty-six periods of data. A broad-based stock index of companies (FTSE 100, CAC 40, etc.) will be used as a proxy for the market portfolio. By choosing the CAPM model, we accept the model's assumptions and its limits, particularly the joint normality of returns assumption. These three indicators are used in previous studies, particularly Holthausen and Larcker (1996), Brav and Gompers (1997) and Cao and Lerner (2009).

As we need to cover both short-run (one day, one month) and long-run (three years) observation periods, we compound daily returns for the first month (i.e. the month of the IPO) and then the monthly returns for the thirty-five following months. If the sample company delists during the observation period, the performance indicators will be set equal to the return of a risk-free asset (ten-year government bond yield) for the remaining period.

In this study, we use buy-and-hold returns, as proposed by Barber and Lyons (1997), in order to detect long-run abnormal stock returns. Even if cumulative abnormal returns and buy-and-hold abnormal returns are similar for short horizons, buy-and-hold returns appear to be conceptually more relevant for long horizons. For this reason, we will use a geometric sum to aggregate the abnormal returns:

$$Abnormal\ Return\ i,t = Return\ i,t - E[Return\ i,t \mid Xt], \quad (2)$$

where Return i,t is the return on a given portfolio i and E[Return i,t | Xt] is the expected return of portfolio i, i.e. the return on the market portfolio. We can compute the buy-and-hold abnormal return of stock i over period t to t+k as follows:

$$BHARi(t,t+k) = \Pi(t,t+k)\,(1+Ri,t) - \Pi(t,t+k)\,[1+E(Ri,t \mid Xi,t)] \quad (3)$$

Jensen's alpha is used to measure RLBO performance, as it provides a risk-adjusted performance measure.

5. Empirical Results

5.1. Event-time RLBO Stock Performance

Tables 6 and 7 summarize the results of the RLBO performance measures for each horizon, from one day after the IPO to three years after. For the one-day and one-month horizons, we have used daily data, whereas for the one-year and three-year horizons we have employed monthly returns. The table presents the cross-sectional mean and median for the entire RLBO sample. We have created two portfolios in order to check the robustness of the results: Table 6 presents the means and medians for value-weighted returns and Table 7 the results for equal-weighted returns. The market capitalization at the end of the IPO quarter is used to compute the weights. The use of value-weighted returns allows us to take into consideration the size differences among the sample companies. For the mean, significance is tested using a two-tailed t-test. For the median, we have employed a two-tailed Wilcoxon test. As we are interested in relationships in both directions (i.e. either an RLBO outperformance or an RLBO underperformance), we have run two-tailed tests. P-values are given in parentheses.

Table 6. Value-weighted Portfolios - Event Time RLBO Performance

	Value-weighted Portfolios							
	Daily Data				Monthly Data			
	One Day Mean	N=52 Median	One Month Mean	N=52 Median	One Year Mean	N=52 Median	Three Years Mean	N=52 Median
Raw return	-0.13% (0.29)	0.19% (0.44)	1.53% (0.76)	2.33% (0.46)	13.67% (0.97)	1.89% (0.03)	43.65% (0.00)	39.50% (0.16)
Market adjusted return	-0.44% (0.14)	-0.34% (0.21)	2.69% (0.00)	1.39% (0.25)	9.53% (0.26)	5.09% (0.05)	33.44% (0.01)	29.63% (0.19)
Jensen alpha	-0.34% (0.65)	-0.62% (0.08)	-0.04% (0.12)	0.14% (0.21)	-0.02% (0.11)	-0.02% (0.71)	0.93% (0.00)	0.86% (0.06)

When value-weighted, RLBOs present a mean buy-and-hold raw-return of -0.13% over one day, 1.53% over one month, 13.67% over one year and 43.65% over three years. The negative mean for the one-day horizon disappears when using equal-weighted returns. These means are not significantly different from zero, except for the buy-and-hold raw return over three years, which is significant at the 0.01 level. Conclusions in terms of statistical significance are the same when using equal-weighted returns (significant at 0.05 for the three-year buy-and-hold raw return case). The median over three years is also significant at a 0.05 level when using equal-weighted returns.

Table 7. Equal-weighted Portfolios - Event Time RLBO Performance

	Equal-weighted Portfolios							
	Daily Data				Monthly Data			
	One Day Mean	N=52 Median	One Month Mean	N=52 Median	One Year Mean	N=52 Median	Three Years Mean	N=52 Median
Raw return	0.38% (0.22)	0.01% (0.55)	1.43% (0.14)	0.90% (0.20)	10.12% (0.25)	-3.06% (0.93)	38.22% (0.93)	28.55% (0.04)
Market adjusted return	0.12% (0.68)	-0.22% (0.54)	2.17% (0.03)	2.15% (0.03)	7.18% (0.39)	-3.41 (0.98)	28.19% (0.08)	12.41% (0.12)
Jensen alpha	0.43% (0.21)	0.10% (0.68)	0.03% (0.75)	0.14% (0.04)	-0.02% (0.75)	-0.02% (0.04)	0.46% (0.10)	0.68% (0.02)

When the buy-and-hold raw return is adjusted by the market buy-and-hold return, we get significant mean buy-and-hold market-adjusted returns over one month and three years with both value-weighted and equal-weighted returns, albeit at lower levels of significance when employing equal-weighted returns. Medians, in contrast, are not significant, except the one-month median of equal-weighted returns. This is consistent with Holthausen and Larcker (1996), who found no significant returns over one-year in their study. Risk-adjusted returns from the market model are not significant except over three years.

The means and medians for the market-adjusted buy-and-hold returns are interesting: the median is well below the mean, except for the one-day horizon (and the one-month horizon when employing equal-weighted returns). The Jensen alphas have similar means and medians whatever the time horizon; they are identical for the one-year horizon. This may be the result of a large dispersion in RLBO buy-and-hold returns. The sample includes both negative returns and large positive returns. When computing the Jensen alpha, regression control variables should reduce the return magnitude and, in turn, the disparity between the means and medians.

The Jensen alpha coefficients suggest that RLBOs outperform the market by around 0.9% per month over the post-offering three years. As market-adjusted returns and Jensen alphas over three years are significantly different from zero and show p-values higher than their

critical value, we can reject the null hypothesis H_0 for a three-year horizon. There seems to be a long-term RLBO outperformance.

In order to highlight potential differences among countries, we created value-weighted and equal-weighted RLBO portfolios for each of France, Germany and the UK, and looked at the buy-and-hold raw returns, the buy-and-hold market-adjusted returns and the Jensen alphas. The results are summarized in Tables 8 to Tables 13. As the portfolio construction reduces each RLBO sample size considerably, there is little evidence of statistical significance.

For France (Tables 10 and 11), the Jensen alpha for a three-year horizon is significant at 10% in the value-weighted portfolio. The three-year Jensen alpha is positive, equal to 0.86%. It is a bit lower than the three-year Jensen alpha for the value-weighted portfolio of the UK, which is equal to 0.94% with significance at the 0.01% level. British RLBOs experience higher positive abnormal returns than those in France. This may be related to the maturity of the LBO market in the UK. The German results are not significant.

Table 8. Value-weighted Portfolios - Event Time RLBO Performance - UK

	UK Value-weighted Portfolios							
	Daily Data				Monthly Data			
	One Day Mean	N=30 Median	One Month Mean	N=30 Median	One Year Mean	N=30 Median	Three Years Mean	N=30 Median
BH raw return	-0.15% (0.71)	-0.19% (0.66)	1.50% (0.25)	2.33% (0.45)	13.84% (0.22)	1.89% (0.43)	44.13% (0.02)	45.37% (0.39)
BH market adjusted return	-0.45% (0.25)	-0.49% (0.66)	2.68% (0.03)	1.39% (0.36)	9.70% (0.39)	5.09% (0.37)	33.70% (0.04)	29.63% (0.73)
Jensen alpha	-0.35% (0.41)	-0.62% (0.57)	-0.04% (0.81)	0.14% (0.36)	-0.02% (0.97)	-0.02% (0.61)	0.94% (0.00)	0.86% (0.29)

Table 9. Equal-weighted Portfolios - Event Time RLBO Performance - UK

	UK Equal-weighted Portfolios							
	Daily Data				Monthly Data			
	One Day Mean	N=30 Median	One Month Mean	N=30 Median	One Year Mean	N=30 Median	Three Years Mean	N=30 Median
BH raw return	0.19% (0.66)	0.09% (0.83)	0.99% (0.44)	0.90% (0.91)	13.60% (0.31)	0.21% (0.73)	51.05% (0.04)	38.65% (0.98)
BH market adjusted return	-0.12% (0.78)	-0.22% (0.83)	2.51% (0.05)	2.18% (0.85)	11.83% (0.37)	-2.51% (0.64)	39.18% (0.09)	25.87% (0.98)
Jensen alpha	0.29% (0.57)	-0.33% (0.64)	0.00% (0.99)	0.14% (0.75)	-0.15% (0.87)	-0.15% (0.98)	0.56% (0.20)	0.86% (0.89)

Table 10. Value-weighted Portfolios - Event Time RLBO Performance - France

	France Value-weighted Portfolios							
	Daily Data				Monthly Data			
	One Day Mean	N=7 Median	One Month Mean	N=7 Median	One Year Mean	N=7 Median	Three Years Mean	N=7 Median
BH raw return	0.05% (0.76)	0.00% (0.24)	3.59% (0.36)	8.22% (0.50)	4.62% (0.47)	-10.21% (0.13)	-0.29% (0.98)	16.65% (0.40)
BH market adjusted return	-0.25% (0.00)	-0.30% (0.24)	3.65% (0.08)	5.60% (0.50)	12.95% (0.52)	7.28% (0.13)	32.48% (0.11)	2.29% (0.18)
Jensen alpha	-0.29% (0.28)	-0.44% (0.18)	0.18% (0.16)	0.18% (0.31)	0.74% (0.41)	-0.09% (0.31)	0.86% (0.06)	0.43% (0.31)

Table 11. Equal-weighted Portfolios - Event Time RLBO Performance - France

	France Equal-weighted Portfolios							
	Daily Data				Monthly Data			
	One Day Mean	N=7 Median	One Month Mean	N=7 Median	One Year Mean	N=7 Median	Three Years Mean	N=7 Median
BH raw return	0.95% (0.32)	0.00% (0.24)	2.62% (0.38)	5.15% (0.18)	3.03% (0.89)	-10.91% (0.50)	12.57% (0.66)	16.65% (0.40)
BH market adjusted return	0.65% (0.49)	-0.30% (0.24)	2.27% (0.28)	3.59% (0.40)	11.39% (0.50)	-1.91% (0.40)	25.47% (0.20)	2.29% (0.18)
Jensen alpha	0.99% (0.38)	-0.44% (0.18)	0.08% (0.44)	0.14% (0.31)	0.75% (0.36)	-0.01% (0.31)	0.60% (0.21)	0.43% (0.31)

Table 12. Value-weighted Portfolios - Event Time RLBO Performance - Germany

	Germany Value-weighted Portfolios							
	Daily Data				Monthly Data			
	One Day Mean	N=15 Median	One Month Mean	N=15 Median	One Year Mean	N=15 Median	Three Years Mean	N=15 Median
BH raw return	1.02% (0.08)	0.09% (0.02)	2.65% (0.14)	1.42% (0.28)	2.19% (0.85)	-3.46% (0.50)	23.53% (0.36)	-23.98% (0.10)
BH market adjusted return	0.82% (0.14)	-0.07% (0.10)	2.60% (0.19)	3.16% (0.17)	-9.12% (0.43)	-14.26% (0.23)	7.84% (0.73)	-9.26% (0.50)
Jensen alpha	0.77% (0.07)	0.24% (0.50)	0.14% (0.10)	0.18% (0.57)	-0.35% (0.68)	-0.24% (0.28)	0.31% (0.46)	0.43% (0.36)

Table 13. Equal-weighted Portfolios - Event Time RLBO Performance - Germany

	Germany Equal-weighted Portfolios							
	Daily Data				Monthly Data			
	One Day Mean	N=15 Median	One Month Mean	N=15 Median	One Year Mean	N=15 Median	Three Years Mean	N=15 Median
BH raw return	0.50% (0.33)	0.02% (0.36)	1.74% (0.36)	0.54% (0.43)	6.48% (0.59)	-3.46% (0.50)	24.55% (0.35)	-23.98% (0.10)
BH market adjusted return	0.36% (0.45)	-0.22% (0.26)	1.43% (0.50)	0.16% (0.46)	-4.09% (0.70)	-14.26% (0.23)	7.50% (0.73)	-9.26% (0.50)
Jensen alpha	0.43% (0.30)	0.24% (0.50)	0.08% (0.38)	0.11% (0.33)	-0.11% (0.88)	0.00% (0.65)	0.20% (0.65)	0.43% (0.36)

5.2. Wealth Relative Analysis

Tables 14 to 19 present the performance of RLBOs and classic IPOs over different time horizons. The companies in the sample are divided by year. In each table, companies that went public the same year are gathered together in one portfolio. To build these portfolios, we use the following reasoning: we assume an investor chose to subscribe to all of the IPOs or RLBOs occurring within the year. The portfolio is built by successive contributions; i.e. the global value of the portfolio increases gradually with each IPO. Therefore, there is no need to pay for dormant capital over the year. To compare the performance of RLBOs with the market, we have built a benchmark portfolio for each portfolio. The benchmark portfolio will be constructed in the same way as the others; i.e. as if a potential investor subscribes to an IPO at a given date and receives the reference index performance over the observation period in exchange. For instance, the benchmark for a company that goes public in London should be the performance of the Financial Times Stock Exchange 100 (FTSE 100) over the same period, with the IPO

date as the first day. In the same way, a company listed in Frankfurt will use the DAX performance over the same period (beginning the day of the IPO) as the benchmark.

Following Brav and Gompers (1997) and the measure they used in their long-horizon study of venture capital-backed initial public offerings, we use wealth relatives to measure the performance of RLBO companies. The wealth relative can be defined as the observed company's performance compared with the performance of the benchmark portfolio:

$$Wealth\ Relative\ \ i,t\ = \frac{(1+Company\ Return\ \ i,t)}{(1+Benchmark\ Return\ \ i,t)}, \qquad (4)$$

where Company $Return_{i,t}$ is the buy-and-hold return for the observed company i for period t and Return $Benchmark_{i,t}$ is the buy-and-hold return for the benchmark portfolio over the same observation period.

If the wealth relative is higher than 1, then the observed company or the observed portfolio has outperformed the benchmark portfolio; i.e. the market. Conversely, if the wealth relative is lower than 1, then the observed portfolio has underperformed the market. The returns are the portfolios' buy-and-hold returns over the chosen time horizon. We assume the investor follows a buy-and-hold strategy; i.e. they keep the stock for the chosen time horizon (in our case, from one to three years). All the buy-and-hold returns are computed using monthly data. When the company delists during the observation period, we use the risk-free asset return for the time remaining.

To undertake this analysis, we follow the methodology employed by Cao and Lerner (2009), and build two portfolios:

- An equal-weighted portfolio: built without considering the size differences between the companies of the sample. The portfolio performance will be an arithmetic average of each company's performance during the observation period.
- A value-weighted portfolio: takes into account size differences. The portfolio performance will be the company's average performances weighted by the market value of the companies. To get the value-weighted return, we follow Cao and Lerner (2006). They use the company's market value at the end of the quarter during which the IPO occurred.

After one year, both RLBOs and classical IPOs outperform their benchmark on average. Classic IPOs have the best performance with a wealth relative of 1.26 on average against 1.23 for RLBOs when using equal-weighted portfolios. When we employ the value-weighted portfolios, we get similar results, with an average wealth relative of 1.26 for classic IPOs and 1.18 for RLBOs. RLBOs have a lower performance in both cases. This result is consistent with Degeorge and Zeckhauser (1993), who predict that RLBO stock performance lags that of other IPOs.

Table 14. One-year Wealth Relatives for Equal-weighted Returns

Equal-weighted Portfolios								
Year	**Number of RLBOs**	**RLBO Performance**	**Benchmark Performance**	**Wealth Relative**	**Number of Classic IPOs**	**Classic IPO Performance**	**Benchmark Performance**	**Wealth relative**
2001	2	17%	-17%	1.41	21	-19%	-43%	1.42
2002	5	20%	-27%	1.64	20	48%	-17%	1.79
2003	3	202%	16%	2.6	9	37%	16%	1.18
2004	10	126%	26%	1.79	48	91%	29%	1.47
2005	6	25%	28%	0.97	58	92%	34%	1.43
2006	5	75%	18%	1.48	96	24%	24%	1
2007	12	-4%	-20%	1.21	58	-26%	-36%	1.15
2008	0	0%	0%	-	10	3%	-13%	1.19
2009	1	-46%	7%	0.51	5	42%	20%	1.19
2010	7	14%	26%	0.91	22	8%	-5%	1.14
2011	1	3%	-1%	1.04	22	-20%	-6%	0.85
	52				*369*			
Average		39%	5%	1.23		25%	0%	1.26

Table 15. One-year Wealth Relatives for Value-weighted Portfolios

Equal-weighted Portfolios								
Year	**Number of RLBOs**	**RLBO Performance**	**Benchmark Performance**	**Wealth Relative**	**Number of Classic IPOs**	**Classic IPO Performance**	**Benchmark Performance**	**Wealth relative**
2001	2	28%	-12%	1.46	21	-22%	-37%	1.23
2002	5	39%	-23%	1.81	20	66%	-16%	1.98
2003	3	113%	16%	1.83	9	2%	16%	0.88
2004	10	105%	25%	1.64	48	99%	28%	1.56
2005	6	60%	23%	1.30	58	94%	26%	1.54
2006	5	37%	8%	1.28	96	7%	15%	0.93
2007	12	-15%	-19%	1.06	58	-24%	-31%	1.10
2008	0	0%	0%	-	10	-32%	-11%	0.76
2009	1	-46%	7%	0.51	5	88%	16%	1.61
2010	7	22%	15%	1.06	22	-20%	4%	0.77
2011	1	3%	-1%	1.04	22	42%	-2%	1.45
	52				*369*			
Average		32%	3%	1.18		27%	1%	1.26

Table 16. Two-year Wealth Relatives for Equal-weighted Portfolios

Equal-weighted Portfolios								
Year	**Number of RLBOs**	**RLBO Performance**	**Benchmark Performance**	**Wealth Relative**	**Number of Classic IPOs**	**Classic IPO Performance**	**Benchmark Performance**	**Wealth relative**
2001	2	-16%	-38%	1.35	21	-25%	11%	1.27
2002	5	111%	-18%	2.56	20	56%	-9%	1.71
2003	3	372%	34%	3.52	9	63%	34%	1.21
2004	10	175%	40%	1.97	48	125%	49%	1.51
2005	6	68%	48%	1.14	58	94%	34%	1.45
2006	5	-45%	-29%	0.77	96	-35%	-25%	0.87
2007	12	-28%	-22%	0.92	58	-17%	-23%	1.08
2008	0	0%	0%	-	10	20%	-8%	1.30
2009	1	-40%	6%	0.57	5	6%	12%	0.95
2010	7	3%	11%	0.93	22	-22%	9%	0.71
2011	1	37%	11%	1.23	22	-41%	14%	0.52
	52				*369*			
Average		58%	4%	1.36		20%	4%	1.14

Table 17. Two-year Wealth Relatives for Value-weighted Portfolios

Equal-weighted Portfolios								
Year	**Number of RLBOs**	**RLBO Performance**	**Benchmark Performance**	**Wealth Relative**	**Number of Classic IPOs**	**Classic IPO Performance**	**Benchmark Performance**	**Wealth relative**
2001	2	-9%	-30%	1.30	21	-10%	-36%	1.40
2002	5	140%	-16%	2.85	20	92%	-9%	2.10
2003	3	187%	34%	2.14	9	7%	34%	0.80
2004	10	168%	36%	1.97	48	136%	44%	1.64
2005	6	91%	34%	1.42	58	17%	33%	0.88
2006	5	-81%	-32%	0.28	96	37%	-28%	1.92
2007	12	12%	-18%	1.36	58	5%	-16%	1.25
2008	0	0%	0%	-	10	-48%	-5%	0.55
2009	1	-40%	6%	0.57	5	84%	5%	1.74
2010	7	8%	3%	1.05	22	-44%	10%	0.51
2011	1	37%	11%	1.23	22	73%	14%	1.51
	52				*369*			
Average		47%	2%	1.29		32%	4%	1.30

When we look at the two-year performance, we can see that on average both classic IPOs and RLBOs outperform their benchmark. RLBOs have better performance with a wealth relative equal to 1.36, against 1.14 for classic IPOs when using equal-weighted portfolios. When employing value-weighted portfolios, we can see that RLBOs and classic IPOs have a similar wealth relative, with 1.29 for RLBOs and 1.30 for classic IPOs. This result, with a wealth-relative a bit higher for classic IPOs, may mean that classic IPO performance is pulled up by large companies, whereas RLBO performance is pulled up by small companies. This would be consistent with the post-crisis decrease in LBO deal size. It is more complicated to build LBO operations for big companies. A good way to be certain of this is to regress the performance against the deal size. Cao and Lerner (2009) find that the deal size seems to have a positive impact on performance: performance is better in the case of large LBOs. But they nuance their findings, as it appears to be the buyout sponsor's size more than the deal size that drives RLBO performance in their sample.

Three years after the IPO, RLBO performance is higher than classic IPO performance for equal-weighted portfolios, with a 1.48 wealth relative for RLBOs against 1.23 for classic IPOs. As for value-weighted portfolios, RLBOs also have a higher wealth relative than classic IPOs (1.58 against 1.44). These results are not consistent with Holthausen and Larcker (1996), who found a slight deterioration in RLBO outperformance in the long-term. Our results are consistent with Cao and Lerner (2009), who show that RLBOs outperform both their peers (other IPOs) and the market (in our case their benchmark portfolios). According to Cao and Lerner (2009), the outperformance is particularly high for one-, four- and five-year horizons. In our case, the outperformance is most significant for the three-year horizon. Like Cao and Lerner (2009), we find no evidence of any RLBO performance deterioration in the long-term.

Table 18. Three-year Wealth Relatives for Equal-weighted Portfolios

Equal-weighted Portfolios								
Year	**Number of RLBOs**	**RLBO Performance**	**Benchmark Performance**	**Wealth Relative**	**Number of Classic IPOs**	**Classic IPO Performance**	**Benchmark Performance**	**Wealth relative**
2001	2	-10%	-28%	1.25	21	4%	-35%	1.58
2002	5	124%	-8%	2.43	20	155%	5%	2.44
2003	3	378%	49%	3.20	9	40%	49%	0.94
2004	10	110%	51%	1.39	48	38%	49%	0.92
2005	6	32%	9%	1.21	58	7%	-12%	1.22
2006	5	61%	83%	0.88	96	4%	-12%	1.18
2007	12	5%	-19%	1.29	58	-11%	-16%	1.06
2008	0	0%	0%	-	10	26%	-8%	1.38
2009	1	-39%	13%	0.54	5	48%	43%	1.03
2010	7	40%	35%	1.04	22	0%	33%	0.76
2011	1	113%	36%	1.57	22	24%	21%	1.03
	52				*369*			
Average		74%	20%	1.48		31%	11%	1.23

If we look at the wealth relative among the different years, we can see differences according to market conditions. After one year, for the equal-weighted portfolio, the wealth relative of RLBOs occurring in 2003 is five times the wealth relative of RLBOs occurring in 2009, and more than two times the wealth relative of RLBOs occurring in 2010. The gap increases when looking at the two- and three-year wealth relatives. This may be a result of the financial crisis, which seems to have affected RLBO performance: RLBOs occurring between 2008 and 2010 have low performance and, in some cases, underperform the benchmark. The trend is reinforced when we look at the two- and three-year performance for the 2006 portfolio: the wealth relative for the equal-weighted portfolio decreases. The poor RLBO performance observed for the 2009 portfolio is biased by the fact there is only one RLBO in the sample, which is a financial company. It may have been affected more by the financial crisis than industrial companies.

Table 19. Three-year Wealth Relatives for Value-weighted Portfolios

Value-weighted Portfolios								
Year	**Number of RLBOs**	**RLBO Performance**	**Benchmark Performance**	**Wealth Relative**	**Number of Classic IPOs**	**Classic IPO Performance**	**Benchmark Performance**	**Wealth relative**
2001	2	7%	-24%	1.40	21	17%	-30%	1.66
2002	5	143%	-6%	2.58	20	238%	5%	3.21
2003	3	171%	49%	1.82	9	51%	49%	1.01
2004	10	140%	47%	1.63	48	41%	45%	0.97
2005	6	78%	2%	1.75	58	6%	-15%	1.24
2006	5	51%	-18%	1.84	96	58%	-10%	1.76
2007	12	43%	-19%	1.76	58	10%	-11%	1.23
2008	0	0%	0%	-	10	-38%	-5%	0.65
2009	1	-39%	13%	0.54	5	114%	32%	1.62
2010	7	3%	19%	0.87	22	28%	26%	1.02
2011	1	113%	36%	1.57	22	60%	12%	1.42
	52				*369*			
Average		65%	9%	1.58		53%	9%	1.44

The strong performance of the 2003 RLBOs portfolios is interesting. 2003 classic IPOs have low wealth relatives, and, when looking at the value-weighted portfolios, we see that they underperform their benchmark for both one- and two-year horizons. This can be explained by the fact that most IPO companies are growing companies; these companies are more sensitive to market conditions than more mature companies, such as RLBOs, which have been listed previously. Indeed, RLBOs seem to be less affected by market conditions than classic IPOs, except in 2009. Another possible explanation is that RLBOs usually evolve in less volatile sectors, except, perhaps, communications. Moreover, RLBOs may and, likely, have been reorganized during the LBO: we would expect reorganization to make a company more efficient and better able to face crises than other companies.

The improved performance of RLBOs in comparison to the market and other classical IPOs may be a result of improved operational efficiency and financial performance. Holthausen and Larcker (1996) show that the accounting performance of RLBOs is higher than the accounting performance of their sectors and of the market in general, both the year before the IPO and four years after. This result is consistent with the fact that most RLBOs perform well. It is also possible that RLBOs benefit from leverage, which significantly increases their financial performance.

In contrast, Degeorge and Zeckhauser (1993) suggest that RLBO performance after their IPOs will be disappointing for investors, because of managers' influence on the accounting results the year prior to the IPO. However, they do not find any evidence of RLBO underperformance. Their results may indicate that the managers do not mislead investors: the market expects a poor accounting performance after the IPO and includes this poor performance in the IPO valuation. This is illustrated by the IPO discount, which is higher for RLBOs than for other IPOs. Such a discount, offered by the sellers to investors the day of the IPO, aims to attract investors and can be explained by the information asymmetry between the sellers and the investors. Investors often have very little information on a company going public; this is even more so when the company is an RLBO (as LBO firms are very secretive, particularly in Europe). Investors expect a premium to protect themselves from undisclosed information.

One possible explanation of IPO outperformance in comparison to the market (i.e. the benchmark portfolio) and of RLBO outperformance in comparison to other IPOs may be acquisitions during the observation period. The control premium paid by the acquirer increases significantly the performance of companies that are taken over. RLBOs seem to be targeted by takeovers more often than other IPOs. Mian and Rosenfeld (1993) find that RLBO outperformance is linked to the significant proportion of acquired companies in the three years

following the IPO. After three years, about 38% of RLBOs were acquired and delisted. The performance of the RLBOs was twice that of other companies in their sample. Moreover, Mian and Rosenfeld (1993) found that the degree to which an LBO firm stayed invested in an offering was positively correlated with the likelihood the RLBO would be repurchased. In most cases, the LBO firm would sell its shares to another LBO firm, which would then purchase the entire company and delist it. Other IPOs and listed companies, which are often controlled by family shareholders who are less willing to sell their shares in the company, are less likely to be targeted.

Over the long-term, RLBOs outperform the market. They also show better performance than other IPOs. This outperformance may be explained by LBO model effects, leverage, greater attractiveness of RLBOs for acquirers, and financial performance, which is better than expected. Size may also affect RLBO performance. We will examine various possible explanations for RLBO outperformance below.

There are also some differences in the yearly portfolio returns in the RLBO sample, including a potential impact of the financial crisis that began in Summer 2007. In what follows we report the results of an event-study focused on the crisis.

5.3. Summer 2007 Financial Crisis: Event-Studies

We have seen that RLBOs appear to be quite resistant to weak market conditions. However, RLBOs show wealth relatives inferior to 1.00 (i.e. RLBO buy-and-hold returns lower than market buy-and-hold returns) for IPOs occurring in 2009 and 2011. This is consistent with the 2006 two- and three-year wealth relative when looking at the equal-weighted portfolios: they are lower than 1.00 too. In order to investigate the impact of the crisis on RLBOs outperformance, and, more generally, on the LBO market, two event-studies, using different methodologies, follow.

The global financial crisis of Summer 2007 had its beginnings in the US subprime market. This crisis, which quickly damaged financial institutions globally, had a number of causes, among which is the default of mortgage loans. In July 2007, Standard and Poor's announced a credit watch for 612 securitized mortgage securities. A number of financial firms announced that they were in financial difficulty. At the end of the month, Bear Stearns had to liquidate two hedge funds, which had heavily invested in securitized mortgages.

The methodology for our event study is intended to investigate the impact of the financial crisis over the long-term. Using daily returns for the study would be difficult, as we need to look at performance persistence over several months at least, and several years if possible. We cannot conduct a classical long-term event study, as the pre-event period is required to check whether the event date brings some changes in the abnormal returns or not. Likewise, we cannot use a three-year "rolling portfolio", as we have an estimation window imposed by the necessity to center the study on August 2007. To manage these issues, we have chosen to use two approaches.

5.3.1. Impact of the Summer 2007 Global Financial Crisis on RLBO Performance

The first event study covers the period January 2006 to December 2008, and uses monthly data. This allows us to look at performance persistence over a three-year horizon. The difference in approach from a classical long-term event study is that the event date is a "starting date" and is the same for each company in the sample.

The sample has been designed according to the needs of the study. As we wish to investigate the potential changes brought by the crisis, and, more particularly, by the events of Summer 2007, we look at the long-term abnormal performance of RLBOs listed prior to September 2007. We want to look at performance changes, and we cannot identify a change if the company was not listed when the event occurred. We also remove RLBOs that delist before the event. This gives us 41 RLBOs listed when the event occurred.

We calculate aggregate abnormal returns between January 2006 and December 2008 for each RLBO in our sample. To do so, and to check the robustness of our results, we use the two approaches commonly used in long-term event studies:

(i) The buy-and-hold abnormal returns for each firm are computed as defined in equation (5):

$$\mathrm{BHARi,(t,t+k)} \;=\; \Pi(\mathrm{t,t+k})\,(1+\mathrm{Ri,t}) \;-\; \Pi(\mathrm{t,t+k})\,[1+\mathrm{E(Ri,t\,|\,Xi,t)}] \tag{5}$$

Then we compute the mean buy-and-hold abnormal returns, using the cross-sectional average of each measure as follows:

$$BHAARi,(t,t+k) \;=\; (1/N) \;*\; \Sigma(i,N)\,(BHAR(t,t+k) \tag{6}$$

(ii) The cumulative abnormal returns for each firm are computed as:

$$CARi,(t,t+k) = \Sigma(i,t+k)AR(t,t+k), \tag{7}$$

where the abnormal returns $AR_{(t,\,t+k)}$ are the Jensen alphas obtained with the market model. We then compute the cumulative average abnormal return, using the cross-average of each measure, as follows:

$$CAARi,(t,t+k) = \left(\frac{1}{N}\right) * \;\Sigma(i,N)CAR(t,t+k), \tag{8}$$

We compute BHAAR and CAAR for the sample over the entire observation period (thirty-six months), and we also compute BHAAR and CAAR for each of 2006, 2007 and 2008.

To test CAAR = 0 (with the null hypothesis, the CAAR is equal to zero), we employ a cross-sectional t-test, computed as follows:

$$tcross \;= CAAR(t,t+k)/6CAAR(t,t+k), \tag{9}$$

To test BHAAR = 0, we use a skewness-adjusted t-test, as the BHARs are assumed to be positively skewed. Barber and Lyon (1997) recommend using the skewness-adjusted t-test proposed by Johnson (1978).

The results are presented in Tables 20 and 21. The CAAR for the sample over three years is negative (-0.187), but not statistically significant. The CAARs for 2006 and 2007 are significant, respectively, at the 0.05 and 0.1 levels. The CAAR for 2006 is equal to 0.059. In 2007, the CAAR is negative, equal to -0.134. In both cases, we can reject the null hypothesis. It seems there is a change in direction between 2006 and 2007: RLBOs seem to outperform the market by about 0.06% per month in 2006, whereas they appear to underperform the market by around -0.13% per month in 2007.

Table 20. First Event Study - t-Tests: Cumulative Average Abnormal Returns

Statistics	CAAR	CAAR 2006	CAAR 2007	CAAR 2008
Observations	41	41	41	41
Minimum	-2.479	-0.291	-1.966	-1.571
Maximum	1.117	0.724	1.152	1.276
First Quartile	-0.394	0.000	-0.357	-0.368
Median	-0.078	0.008	-0.131	0.045
Third Quartile	0.324	0.084	0.095	0.165
Mean	-0.187	0.059	-0.134	-0.112
Standard Deviation (n-1)	0.789	0.176	0.459	0.551
Difference	-0.187	0.059	-0.134	-0.112
t (Observed Value)	-1.517	2.137	1.874	-1.297
DF	40	40	40	40
p-value	0.137	0.039	0.068	0.202

Table 21. First-Event Study - t-Tests: Mean Buy-and-hold Abnormal Returns

Statistics	BHAAR	BHAAR 2006	BHAAR 2007	BHAAR 2008
Observations	41	41	41	41
Minimum	-0.760	-0.304	-0.984	-0.598
Maximum	1.285	1.052	1.849	1.871
First Quartile	-0.448	0.000	-0.331	-0.307
Median	-0.154	0.002	-0.193	-0.083
Third Quartile	0.229	0.096	0.053	0.098
Mean	-0.087	0.071	-0.099	-0.067
Standard Deviation (n-1)	0.475	0.233	0.440	0.448
Difference	-0.087	0.071	-0.099	-0.067
t (Observed Value)	-1.173	1.943	-1.434	-0.960
DF	40	40	40	40
p-value	0.248	0.059	0.159	0.343

When looking at the BHAARs, we can see that the null hypothesis BHAAR = 0 is only rejected for BHAAR 2006. The BHAAR over the whole observation period, i.e. the BHAAR between January 2006 and December 2008 (-8.71%), is negative, as are the 2007 (-9.85%) and 2008 (-6.71%) BHAARs, whereas the 2006 BHAAR remains positive, equal to 7.06%. Here again, we can see a trend change occurring in 2007, and this time, there is a significant persistence of the 2007 trend in 2008, even if the underperformance decreases.

In order to check the robustness of the previous tests, we run a two sample parametric test on both CAARs and BHAARs in order to compare the means between 2006/2007 and 2007/2008. The results are presented in Table 22.

The results are statistically significant at the 0.01 level for both CAAR and BHAAR for the comparison between 2006 and 2007. In this case, we can reject the null hypothesis CAAR

2006 = CAAR 2007 and BHAAR 2006 = BHAAR 2007. However, the results are not significant for 2007/2008, for either CAAR or BHAAR

Table 22. First Event Study - Two-mean Comparison t-Tests

CAAR	2006-2007	2007-2008	BHAAR	2006-2007	2007-2008
Difference	0.193	-0.023	Difference	0.169	-0.081
t (Observed Value)	2.516	-0.202	t (Observed Value)	2.176	-0.321
|t| (Critical Value at 0.01)	1.99	1.99	|t| (Critical Value at 0.01)	1.99	1.99
DF	80	80	DF	80	80
p-value	0.014	0.84	p-value	0.033	0.749

The global financial crisis beginning in Summer 2007 appears to have had a negative impact on RLBO performance. RLBOs exhibit a negative performance in 2007 and underperform the market. When looking at the BHAAR, between 2007 and 2008, the 2007 underperformance is reduced, but persists in 2008. As the mean comparison test is not significant for 2007/2008, we cannot reject the null hypothesis of equal means between 2007 and 2008 for either CAAR or BHAAR. We can conclude that the global financial crisis had a significant impact on the performance of RLBOs that were listed when the crisis occurred. But we also need to investigate whether the crisis had an impact on the performance of RLBOs that went public after Summer 2007.

5.3.2. Persistence of the Impact of the Global Financial Crisis on RLBO Performance

For this event study, we employed the classic event study methodology. We use the buy-and-hold abnormal returns of the rolling portfolios formed for the three-year wealth relative analysis. We form nine portfolios (one for each year, except for 2008, as no RLBOs occurred that year in our sample) assuming an investor decides to invest in all the RLBOs occurring in the year. The investor follows a buy-and-hold strategy: they keep the stocks until the stocks' maturity, which corresponds to our observation horizon. For this event study, we use a three-year post-offering horizon. When a stock delists before the end of the horizon, we remunerate the investor with the yield on a risk-free asset (ten-year government bond).

Once again, we form both value-weighted and equal-weighted portfolios in order to check the robustness of the results. The value weights were computed using the market capitalization of each RLBO at the end of the quarter in which the IPO occurred or one quarter after the IPO. For each portfolio, we form a benchmark portfolio following the same strategy, using broadly-based indexes. We then compute the buy-and-hold returns of each portfolio and its benchmark, and then the buy-and-hold abnormal return of the portfolio.

Tables 23 and 24 present the three year buy-and-hold abnormal returns for each portfolio (value-weighted and equal-weighted) by cohort year, and provides statistical descriptive and test results for the event study. The tested hypotheses are the following:

- H_{0a}: $BHAR_{2001\ (1,t)}$ is not significantly different from $BHAR_{2002\ (1,t)}$
- H_{0b}: $BHAR_{2002\ (1,t)}$ is not significantly different from $BHAR_{2003\ (1,t)}$
- H_{0c}: $BHAR_{2003\ (1,t)}$ is not significantly different from $BHAR_{2004\ (1,t)}$
- H_{0d}: $BHAR_{2004\ (1,t)}$ is not significantly different from $BHAR_{2005\ (1,t)}$
- H_{0e}: $BHAR_{2005\ (1,t)}$ is not significantly different from $BHAR_{2006\ (1,t)}$
- H_{0f}: $BHAR_{2006\ (1,t)}$ is not significantly different from $BHAR_{2007\ (1,t)}$
- H_{0g}: $BHAR_{2007\ (1,t)}$ is not significantly different from $BHAR_{2009\ (1,t)}$
- H_{0h}: $BHAR_{2009\ (1,t)}$ is not significantly different from $BHAR_{2010\ (1,t)}$
- H_{0i}: $BHAR_{2010\ (1,t)}$ is not significantly different from $BHAR_{2011\ (1,t)}$

There is a gap between H0g and H0h, as there is no portfolio for 2008. To test the hypotheses, we use a mean comparison statistical test, implemented as follows:

$$T = ABS\,(\,((\,BHARi(1,t) - BHARj(1,t)))/\,[(\,(\sigma i\,/\,Ni) + (\sigma j\,/\,Nj))])1/2, \quad (10)$$

Table 23. Second Event Study - Two-mean Comparison Tests: Three-year Value-weighted Portfolios by Cohort Year

Value-weighted Portfolios - Three-Year Performance							
Year	**BHAR**	**Std dev**	**t-Test**	**p-value**	**α**	**Significance**	**H(0)**
2001	30.85%	0.08527					
2002	148.65%	0.06610	66.164	0.000	0.05	***	Rejected
2003	121.79%	0.06156	-18.745	0.000	0.05	***	Rejected
2004	92.29%	0.04687	-24.713	0.000	0.05	***	Rejected
2005	76.30%	0.05634	-14.241	0.000	0.05	***	Rejected
2006	68.86%	0.15219	-3.037	0.004	0.05	***	Rejected
2007	61.90%	0.10025	-2.522	0.016	0.05	**	Rejected
2008	0.00%	-	-	-	-	-	-
2009	51.97%	0.10761	-48.319	0.000	0.05	***	Rejected
2010	-15.54%	0.08790	16.130	0.000	0.05	***	Rejected
2011	77.14%	0.07990	48.456	0.000	0.05	***	Rejected

Note: *** Significant at 1%; **significant at 5%.

Table 24. Second Event Study - Two-mean Comparison t-Tests: Three-year Equal-weighted Portfolios by Cohort Year

Equal-weighted Portfolios - Three-year Performance							
Year	**BHAR**	**Std dev**	**t-Test**	**p-value**	**α**	**Significance**	**H(0)**
2001	18.17%	0.07382					
2002	132.15%	0.05762	73.771	0.000	0.05	***	Rejected
2003	328.69%	0.06052	148.753	0.000	0.05	***	Rejected
2004	59.30%	0.05304	-216.947	0.000	0.05	***	Rejected
2005	23.13%	0.05666	-30.389	0.000	0.05	***	Rejected
2006	77.25%	0.07914	36.733	0.000	0.05	***	Rejected
2007	23.41%	0.07509	-32.551	0.000	0.05	***	Rejected
2008	0.00%	-	-	-	-	-	-
2009	-51.97%	0.10761	-35.426	0.000	0.05	***	Rejected
2010	5.22%	0.05673	28.590	0.000	0.05	***	Rejected
2011	77.14%	0.07990	44.962	0.000	0.05	***	Rejected

Note: *** Significant at 1%.

When we look at the p-values, we can see that they are all statistically significant at the 0.05 level or above. All the null hypotheses appear to be rejected, whatever the cohort and the portfolio weighting (value- or equal-weighted). We can conclude there are significant differences for the years compared in terms of BHARs.

We observe a decrease in the BHARs between 2002 and 2009 when looking at the value-weighted portfolios by cohort year. The conclusions are quite similar for the equal-

weighted portfolios, except for a recovery in 2006. This suggests that even if RLBOs outperform both other IPOS and the market in the long term, they are not immune to weak market conditions.

5.4. Long-term RLBO Performance: Multivariable Analysis

We have seen that over a three-year horizon, RLBOs outperform both other IPOs and the market. There are a number of possible explanations including sample effects, such as the number of acquisitions, and theoretical issues, such as the IPO discount and the accounting performance the year before the IPO.

To investigate the explanatory power of these factors, we run several multivariable regressions, using Eview, to investigate the cross-sectional differences among RLBOs. The logarithm of the wealth relative for three-year RLBO performance is the dependent variable. The independent variables based on our earlier discussion are the following:

- The market capitalization of the equity shortly after the IPO (at the end of the IPO quarter or one quarter after the IPO date). We used the logarithm of the market capitalization
- The LBO fund age at the IPO date
- The LBO fund reputation (using a ranking from 1 to 9, 9 being the best rank)
- The LBO duration. We employ the logarithm of LBO duration
- The debt to asset ratio shortly after the IPO (one quarter after the IPO or at the end of the quarter during which the IPO occurred)
- The debt to equity ratio shortly after the IPO (one quarter after the IPO or at the end of the quarter during which the IPO occurred)
- The industry sector of the RLBO, employing an industry dummy
- The country of the RLBO, using a country dummy.

These variables have been chosen to look at three possible explanations of RLBO performance: financial leverage, the number of months the company remained private, and the buyout sponsor's reputation. We also looked at three potential effects: a size effect using market capitalization, an industry effect and a country effect.

While leverage is widely discussed in the literature and used in a number of empirical studies, such as Cao and Lerner (2009), the LBO duration and the buyout sponsor's reputation are not. These variables are of interest, however: there may be a correlation between the LBO duration and the RLBO performance, as a result of the organizational changes brought by the LBO fund when the company was private. The longer the LBO duration, the greater the time to implement organizational changes to effect efficiency. We expect to observe a negative correlation between performance and LBO duration, inasmuch as we expect some deterioration across time. That is, the company would be expected to lose the benefits of the LBO, likely gradually, after their IPO.

The results of the regressions are presented in Table 25. Most of the coefficients are not significant, whatever the horizon for the performance. For each of four performance horizons (one day after the IPO, one month after, one year and three years), we have run several regressions, changing the equations to investigate various combinations of the independent variables. RLBO performance one day after the IPO is negatively related to the LBO duration at the 0.10 significance level. The same is true for the LBO fund age, at the same level of significance. Both proxies are significant in two different regressions. For the third regression, which focuses on the buyout sponsor proxies, the LBO fund age at the IPO is significant at the 0.05 level. However, whatever the regression when using one-month performance, the LBO fund age at the IPO always obtains insignificant coefficients around zero. The coefficients remains very small over the other horizons as well. The relationship tends to be slightly negative. Considering the number of independent variables, the R^2 for the first regression for the one-day performance is satisfactory (0.209). However, the adjusted R^2 is only 0.062 and some others are negative. The low explanatory power may also be an effect of the small sample used for the study.

Table 25. Multivariable Regressions

Independent Variable	Dependent Variable: Three-year RLBO Performance *Log(Wealth Relative)*															
	One Day				One Month				One Year				Three Years			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Market cap (Log(Market cap))	-0.002	-0.001		-0.002	0.007	0.004		0.004	0.004	0.004		0.007	-0.021	0.02		0.028
	(-0.64)	(-1.08)		(-1.32)	(-0.83)	(-0.94)		(-0.83)	(-0.05)	(-0.12)		(-0.21)	(-0.18)	(-0.35)		(-0.5)
LBO fund reputation (Log(Reputation))	-0.002	-0.002	-0.001		-0.007	-0.006	-0.002		-0.09	-0.096	-0.118		0.126	0.084	0.038	
	(-0.45)	(-0.57)	(-0.21)		(-0.49)	(-0.41)	(-0.19)		(-0.81)	(-0.99)	(-1.27)		(-0.63)	(-0.48)	(-0.23)	
LBO fund age at the IPO	-0.000*	-0.000*	0.000**		0	0	0		0.001	0.001	0.001		-0.001	-0.001	-0.001	
	(-1.77)	(-1.83)	(-2.21)		(-0.96)	(-1.08)	(-1.22)		(-0.36)	(-0.25)	(-0.32)		(-0.23)	(-0.31)	(-0.19)	
LBO duration (Log(LBO duration))	-0.011*	-0.011*			-0.025	-0.025			0.05	0.038			0.153	0.132		
	(-1.90)	(-1.94)			(-1.32)	(-1.33)			(-0.35)	(-0.28)			(-0.6)	(-0.54)		
Debt to asset ratio	0	0			0.009	0.011			0.156	0.114			0.251	0.197		
	(-0.02)	(-0.18)			(-0.6)	(-0.76)			(-1.33)	(-1.09)			(-1.19)	(-1.06)		
Debt to equity ratio	0				0				0.001				0			
	(-1.17)				(-0.97)				(-0.65)				(-0.06)			
Country dummy (Dummy variable 1)	0				0.004				-0.011				-0.057			
	(-0.01)				(-0.45)				(-0.15)				(-0.45)			
Industry dummy (Dummy variable 2)	0				0.002				0.013				0.012			
	(-0.17)				(-1.19)				(-0.96)				(-0.51)			
Intercept	0.018	0.017**	0.007*	0.008	-0.019	0.01	0.021*	-0.006	-0.169	-0.099	0.025	-0.051	-0.198	-0.333	-0.035	-0.147
	(-1.28)	(-2.46)	(-1.88)	(-1.37)	(-0.42)	(-0.41)	(-1.76)	(-0.32)	(-0.49)	(-0.57)	(-0.28)	(-0.38)	(-0.32)	(-1.08)	(-0.22)	(-0.63)
Observations	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
R^2	0.209	0.184	0.092	0.017	0.136	0.088	0.031	0.014	0.096	0.064	0.033	0.001	0.053	0.043	0.002	0.005
Adjusted R^2	0.062	0.096	0.055	-0.004	-0.024	-0.011	-0.009	-0.006	-0.073	-0.038	-0.006	-0.019	-0.123	-0.061	-0.039	-0.015

Note: *, **, and **** respect statistical significance at the 10%, 5%, and 1% levels, respectively.

The LBO duration is significant for one day performance, but not over the other horizons. Other variables are not significant, whatever the performance horizon and the OLS equation: the regressions conducted on RLBO performance over one month, one year and three years do not allow us to establish a cross-sectional relationship between our independent variables and our dependent variable. Our regression equations and independent variables appear to be partially relevant to explaining RLBO performance one day after the IPO. This is consistent with the notion that the company loses the benefits of the LBO model over time: proxies involving the buyout fund are relevant and significant very shortly after the IPO, but not in the long-term.

The leverage proxies (i.e. debt to asset and debt to equity ratios), though not significant, are positive. Cao and Lerner (2009) find that high leverage is not related to lower performance. We expected, in contrast, that high debt would allow higher performance in the long-term, as higher leverage should magnify return on assets. Moreover, high debt levels may solve some principal-agent issues: that is, by aligning the interests of the managers with those of shareholders.

The industry and country dummies are not significant. To investigate industry effects, we run an OLS regression using a dummy for each industry sector. We examine performance using seven of the eight possible dummies to check for any industry effect. The results are presented in Table 26. Here again, the coefficients are not statistically significant, except for the energy sector over two years and the industrial sector over three years. The industrial sector has a negative relationship with the dependent variable, significant at 10%. The significant negative coefficient implies that RLBOs in the industrial sector exhibit lower performance than their peers. This might be explained, at least in part, by the decline of the industrial sector in Western Europe since 2001.

Table 26. Industry Effect Regressions

		Dependent Variable *Log(Wealth Relative)*			
Independent Variable	Proxy	**One Day**	**One Month**	**One Year**	**Three Years**
Consumer, Cyclical	industry 1 dummy	-0.001	-0.01	-0.11	-0.201
		(-0.12)	(-0.63)	(-1.04)	(-1.02)
Consumer, Non-cyclical	industry 2 dummy	0.003	0	0.047	0.01
		(0.52)	(0.01)	(0.46)	(0.05)
Basic Materials	industry 3 dummy	0.002	0.001	-0.022	-0.027
		(0.22)	(0.05)	(-0.14)	(-0.09)
Communications	industry 4 dummy	0	0	-0.109	-0.237
		(0.03)	(0.02)	(-0.97)	(-1.12)
Technology	industry 5 dummy	-0	-0.03	-0.152	-0.326
		(-0.45)	(-1.44)	(-1.08)	(-1.24)
Industrial	industry 6 dummy	0.003	0.013	-0.164	-0.366*
		(0.51)	(0.78)	(-1.53)	(-1.82)
Energy	industry 7 dummy	0.007	0.007	0.230*	0.168
		(1.14)	(0.36)	(1.89)	-0.73
Intercept		-0	0.01	0.019	0.101
		(-0.25)	(0.73)	(0.22)	(0.63)
Observations		52	52	52	52
R^2		0.071	0.128	0.305	0.208
Adjusted R^2		-0.077	-0.011	0.195	0.082

Note: *, **, and **** respect statistical significance at the 10%, 5%, and 1% levels, respectively.

We also look at the potential time effect by running regressions employing dummies for each year of the sample. The results appear in Table 27. Once more, the coefficients are only significant for the one-day performance. The dummies for the years prior to the 2007 financial crisis are significant at the 0.05 level. The coefficients are always negative, which means that the RLBO performance decreases for companies listed during these years. The results do not contradict previous results in this study, inasmuch as they only concern the performance the

day after the IPO. However, they must be considered carefully as the null hypothesis using the Breusch-Pagan test is rejected, with a p-value equal to 0.0187. The presence of heteroscedasticity implies that the OLS estimators are unreliable. We cannot infer that there is a time effect for the one-day RLBO performance.

Table 27. Time Effect Regressions

		Dependent Variable *Log(Wealth Relative)*			
Independent Variable	*Proxy*	**One Day**	**One Month**	**One Year**	**Three Years**
2002	*2002 dummy*	-0.016**	-0.017	-0.064	0.252
		(-2.04)	(-0.68)	(-0.36)	(0.8)
2003	*2003 dummy*	-0.011**	-0.007	0.156	0.354
		(-2.02)	(-0.27)	(0.8)	(1.04)
2004	*2004 dummy*	0.015**	-0.022	-0.032	-0.021
		(-2.10)	(-0.91)	(-0.19)	(-0.07)
2005	*2005 dummy*	-0.019**	-0.005	-0.18	-0.004
		(-2.48)	(-0.19)	(-1.04)	(-0.01)
2006	*2006 dummy*	-0.018**	-0.007	-0.028	-0.085
		(-2.29)	(-0.27)	(-0.16)	(-0.27)
2007	*2007 dummy*	-0.011	-0.018	-0.143	-0.2
		(-1.56)	(-0.79)	(-0.88)	(-0.70)
2009	*2009 dummy*	-0.018	-0.027	-0.395	-0.276
		(-1.62)	(-0.72)	(-1.51)	(-0.60)
2010	*2010 dummy*	-0.017**	-0.031	-0.123	-0.11
		(-2.24)	(-1.26)	(-0.72)	(-0.37)
2011	*2011 dummy*	-0.014	-0.051	-0.068	0.175
		(-1.26)	(-1.37)	(-0.26)	-0.38
Intercept		0.015***	0.026	0.062	-0.004
		(2.31)	(1.21)	(0.41)	(-0.01)
Observations		52	52	52	52
R^2		0.183	0.115	0.186	0.187
Adjusted R^2		0.007	-0.075	0.012	0.013

Note: *, **, and **** respect statistical significance at the 10%, 5%, and 1% levels, respectively.

We also investigate potential size effects by including market capitalization within OLS regressions. The results are summarized in Table 28. We find no evidence of any relationship between market capitalization and RLBO performance. The R^2 values are close to zero for all time periods. These results are consistent with the results of Cao and Lerner (2009), who find no relationship between RLBO performance and size, or market capitalization, although they find a positive relationship between RLBO performance and buyout sponsor size.

The latter may explain why RLBOs show good stock performance in both the short- and long-term: the buyout sponsor visibility may bring them an advantage in terms of communications and investor demand. When a LBO fund or a private equity firm, like KKR or the Carlyle Group, decides to list one of its LBOs, the media are likely to share the information and to announce the IPO. This support brought by LBO firms to their companies is not related to company size. This may explain the absence of a relationship between RLBO performance and market capitalization.

Table 28. Size Effect Regression

		Dependent Variable *Log(Wealth Relative)*			
Independent Variable	*Proxy*	**One Day**	**One Month**	**One Year**	**Three Years**
Market capitalization	*Log(Market Cap)*	-0.002	0.004	0.007	0.028
		(-1.32)	(0.83)	(0.21)	(0.5)
Intercept		0.008	-0.006	-0.051	-0.147
		(1.37)	(-0.32)	(-0.38)	(-0.63)
Observations		52	52	52	52
R^2		0.034	0.014	0.001	0.005
Adjusted R^2		*0.015*	*-0.006*	*-0.019*	*-0.015*

Note: *, **, and **** respect statistical significance at the 10%, 5%, and 1% levels, respectively.

5.5. Results Comparisons and Managerial Implications
5.5.1. Comparison with Previous Studies' Results

Our results are consistent with the results of Cao and Lerner (2009): we find evidence of RLBO outperformance in the long-term in comparison to both the market and other IPOs. There is no evidence of a deterioration of the outperformance in the long-term. The results differ from Cao and Lerner (2009) inasmuch as, in this study, RLBOs sharply outperform the market in the third year after the IPO and not in the first. However, the results remain consistent with the idea of a persistence of RLBO outperformance in the long-term. Some of our regression results differ from those of Cao and Lerner (2009): we do not find any size effect, whereas they found that much of RLBO performance could be explained by the larger RLBOs. Like Cao and Lerner (2009), we do not find any evidence of a relationship between RLBO performance and financial leverage. Following Mian and Rosenfeld (1993), we conjecture that RLBO outperformance might be driven by takeover activity, especially within the three years following the IPO. This could examined in a future study.

The results are not consistent with Degeorge and Zeckhauser (1993), who found deterioration in RLBO outperformance in the long-term. Regarding our results, we conjecture that investors may anticipate managers' activities with regard to accounting and operating performance prior to the IPO. Moreover, the IPO discount paid by the seller reduces the risk of lower returns for investors.

5.5.2. Managerial Implications

Beginning with a sample of 421 companies that went public between 2001 and 2011 in France, Germany, and the UK, we examined the stock performance of these companies in both the short- and long-term, using several horizons to measure performance: one day after the IPO, one month after, and one and three years after. We focused in particular on the 52 RLBOs listed during the period and found evidence of RLBO outperformance in the long-term (one and three years) in comparison to other IPOs and the market. This outperformance seems to persist in the long-run, with no evidence of any RLBO performance deterioration.

In spite of the growing number of RLBO studies since the early 1990s, it remains difficult to explain their outperformance. There appears to be a time effect, observed in the literature since the 1980s. We investigated several potential explanatory variables to understand RLBO performance, but the results of our multivariable analysis do not identify the causal factors. We found no evidence of a size effect, and explanatory variables, such as LBO duration, do not explain RLBO outperformance in the short-term, and are not significant in the long-term.

The results of the study suggest that the global financial crisis had an impact on RLBO performance, but even if RLBOs experienced negative abnormal returns between 2007 and 2009, they still outperformed both their peers and the market. This suggests RLBOs are defensive investments to be held in periods of bad market conditions. The organizational and operational improvements brought by the LBO fund after a company is privatized may have a positive effect on performance, though we may also be able to explain RLBO outperformance with the number of acquisitions in the three years following the IPO or other elements such as temporary trends, industry sector variables, etc. However, the main managerial issue of this study deals with the "legitimacy" and the "efficiency" of LBO funds in looking at RLBO performance.

RLBO performance, even if it was affected by the global financial crisis, was quite persistent and did not follow the rest of the LBO market. LBOs have generally succeeded since 1995, in part because of the operational efficiency they bring to a company. LBO success is also based on financial leverage, which provides a way to increase the return on investment, as well as management incentives or benefit sharing programs, such as capital participation, stock options, etc. The LBO model is an efficient way to reduce agency conflicts between shareholders and managers inside the company, as it aligns the interests of the two sides. Holthausen and Larcker (1996) show that LBO, and, more particularly RLBO, outperformance is

based on improved management of operational factors such as investment costs, which are often lower in companies acquired through LBOs. In the same way, they point out that the management of working capital requirements is more efficient in companies acquired through LBOs, even if the LBO model benefits tend to disappear after the IPO.

The present study bring several contributions to the literature. First, it provides an overview of RLBOs in Europe before, during and after the financial crisis, and, more specifically, the impact of the subprime crisis on the LBO market and private equity firms. There is an interest in studying the European RLBO market, as the LBO market is far less mature in Europe than in the USA and has received much less attention in the literature. Given our results, the outperformance of RLBOs in the USA is evidently not a local phenomenon, as we find the same outperformance in Europe. The outperformance of RLBOs may be considered as a special case of the LBO findings.

The comparison with other IPOs is helpful as a means of investigating the impact of the financial crisis, as the IPO market was deeply affected by the crisis. The number of IPOs declined significantly in the post financial crisis era. As both IPOs and markets generally experienced deterioration in activity after the crisis, it was useful to examine whether RLBO performance followed the same pattern and whether its relative outperformance persisted after the crisis. Even if RLBOs were affected by the crisis, they did not follow the same trends as other IPOs and did not follow the general LBO market either. They still outperformed the market and other IPOs after the financial crisis.

We also investigated the persistence of the crisis' impact on RLBOs. RLBOs outperformed both their peers and the market, though the level of outperformance experienced deterioration when the global financial crisis occurred. The relative outperformance phenomenon varies with market conditions, but the outperformance persists. This supports the notion that operational and management changes brought by funds in companies through LBOs are important and receive the support of investors.

The examination of LBO duration and buyout sponsor age provide some support for RLBO performance in the very short-term but have no significance for long-run performance. The long-run RLBO outperformance remains difficult to explain. As LBO duration may be related to the potential improvements brought by the LBO "repackaging", this study provides some indication of the potential value creation resulting from the LBO. A short LBO duration should decrease the probability of value-creation, as the LBO repackaging may not be achieved, but our results show only a small negative relationship between the RLBO one-day wealth relative and LBO duration. In general, the value creation process does not appear to be positively linked to LBO duration. Examination of the effect of the sponsor's age highlights the importance of longevity for LBO funds and offers a potential explanation of RLBO performance: LBO funds list companies truly restructured with effective high performance in order to preserve their reputation. LBO funds have no interest in bringing public immature LBOs.

5.6. Limitations of the Study

This study is based on the use of Bloomberg and Thomson financial databases. While the Thomson Platinum database provides data that we can use to identify RLBOs, we cannot be certain we found all of them. While some RLBOs that occurred during the observation period may have been missed, this is a consequence of the lack of information available on LBOs rather than an issue of methodology. The final sample comprised only 52 RLBOs from a total of 421 IPOs.

In addition, there is a bias in the study of IPO tickets to identify RLBOs, as small LBOs are more likely to be overlooked, since they are less likely to be followed by the media than are the bigger RLBOs. On the other hand, this was counterbalanced by the quantity of information presented on each IPO ticket. The absence of a readily available RLBO database forced us to remove companies that might have been RLBOs from the sample if we did not have sufficient information to properly identify them.

Opportunities for future research include distinguishing between companies that were acquired post reverse leveraged buyout and those that were not, following Mian and Rosenfeld

(1993). This would have been difficult in our study because of the small sample size, but is an interesting subject for future study. Another interesting line of investigation would be to distinguish between RLBOs, classic IPOs and venture-backed IPOs, to determine whether an RLBO's history (i.e. years prior to IPO) affects its post-offering performance.

The main limit of this study is the limited information provided by the multivariable analysis. The tested independent variables were only significant in limited circumstances in the very short-term, and failed to explain the RLBO outperformance. Even though we find a persistent RLBO outperformance in the long-term, we were not able to find significant explanatory variables.

6. Conclusion

Based on a sample of 421 IPOs occurring between 2001 and 2011, this study investigates RLBO performance in Europe before, during and after the financial crisis. The rapid growth of the LBO market in Europe, its reaction to the financial crisis, and, more generally, the numerous changes in the private equity industry in recent years, fostered our interest in investigating RLBO post-offering performance during the decade starting in 2001.

Looking at RLBO stock-performance one day, one month, one year and three years after the offering, this study found that RLBOs outperform both their peers (i.e. classic IPOs and the overall market). This outperformance experiences no deterioration in the long-term. It may be explained by accounting performance that was better than expected and gains in management and operational efficiency brought by the LBO. RLBOs appear to have been less affected by the global financial crisis than other IPOs, and their outperformance, though it declined, continued during the crisis years. RLBO outperformance had been identified in previous studies, more particularly, Cao and Lerner (2009), in both the 1980s and the 1990s. In addition, previous studies employed samples of US companies. Our results suggest that RLBO outperformance is not a local phenomenon.

Following Cao and Lerner (2009), who find that large RLBOs appear to perform better, we investigated potential size effects that may explain RLBO performance. Cao and Lerner (2009) find a positive relationship between RLBO performance and buyout sponsor size, but they do not succeed in linking RLBO performance with market capitalization. Like our results, however, theirs are not statistically significant. We investigate other potential explanations of RLBO performance, such as LBO duration and LBO fund reputation, but once again, our regressions do not indicate statistically significant relationships. It remains something of a mystery as to why RLBOs outperform both their peers (other IPOs) and the market after the offering.

This study raises a number of issues and leaves several potential topics for further investigation. First, the study focuses on only one kind of LBO exit, i.e. RLBOs, which is not the most commonly used by LBO funds. Other forms of LBO exit are worthy of study when trying to understand LBOs. It may be helpful to look at the different kinds of companies involved in each type of exit. Second, RLBO over-performance is yet to be explained. One factor worthy of investigation may be the management incentives implemented in the acquired company after the offering in comparison to those used in classic IPOs. It may also be useful to look at the distinction between RLBOs bought back shortly after the IPO and other RLBOs, following Mian and Rosenfeld's (1993) findings.

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