

A comparative analysis between IPOs and reverse takeovers: Evidence from Europe

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Abstract

The study examines a sample of 224 reverse takeovers (RTOs) that took place in Europe between 1996 and 2015 along with a matched sample of IPOs that occurred over the same period. Particularly, our study investigates whether RTOs provoke wealth effects comparable to IPOs. Employing the classical event study methodology, we find that both RTOs and IPOs exhibit comparable short-term and long-term price performance. It is also shown that RTO firms display better operating performance than their control IPO counterparts in the post-going public period. Equivalent survival rates for both groups are reported, as well. By splitting the overall population into UK and non-UK sub-samples, it seems that our results are not UK-driven but rather it is a pan-European phenomenon. In sum, reverse takeovers should offer a viable alternative to IPOs for certain types of firms.

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Abstract

The study examines a sample of 224 reverse takeovers (RTOs) that took place in Europe between 1996 and 2015 along with a matched sample of IPOs that occurred over the same period. Particularly, our study investigates whether RTOs provoke wealth effects comparable to IPOs. Employing the classical event study methodology, we find that both RTOs and IPOs exhibit comparable short-term and long-term price performance. It is also shown that RTO firms display better operating performance than their control IPO counterparts in the post-going public period. Equivalent survival rates for both groups are reported, as well. By splitting the overall population into UK and non-UK sub-samples, it seems that our results are not UK-driven but rather it is a pan-European phenomenon. In sum, reverse takeovers should offer a viable alternative to IPOs for certain types of firms.

Introduction

Going public has always been regarded as one of the most important options that the owners of every private firm consider at some point of the business life. The conventional going-public mechanism is that of an initial public offering (IPO), which is the first time that the stock of a private company is offered to the investing public. The IPO, though, entails substantial compliance obligations undertaken by companies which aspire to be publicly traded in terms of eligibility requirements, transparency and disclosure prerequisites and minimum corporate governance standards. An alternative to the expensive and time-consuming IPO procedure can be found in a reverse takeover, where a private company merges with a public one and thus obtains its listing status. It is worth mentioning that in the rest of the study the terms “reverse takeovers (RTOs)”, “reverse mergers (RMs)” and “backdoor listings (BDLs)” are used interchangeably. The reverse lies in the fact that while technically the public company is the bidder, the initiator of the merger is the target (the private company), which ultimately takes control over the new enlarged entity. Indicatively, the New

York Stock Exchange went public through a reverse merger with the electronic-trading company Archipelago Holdings Inc.¹ This transaction signals to researchers that reverse takeovers deserve their attention.

Since 1980 reverse mergers have gained increased popularity in the US over-the-counter (OTC) markets, in which public shell companies have been used as vehicles for RM deals.² Despite the larger publicity of US RTOs, back-door listings are a global phenomenon. For instance, in Australia reverse merger activity is highly intense in the mining industry.³ In Hong Kong, RMs are quite popular in the real estate development sector.⁴ In the UK, reverse takeovers, especially in the form of synergistic mergers, provide a considerable alternative to IPOs (Appadu et al., 2014). Moreover, in Sweden after the dot-com bubble many public IT-companies have been used as vehicles for RTO transactions.⁵

Recent fraudulent activities associated with reverse mergers⁶ triggered pertinent regulatory responses around the world.⁷ Thereby, the traditional time and cost benefits linked with reverse mergers have been disputed. Faelten et al. (2013) argue that in the context of a regulated market reverse takeovers are employed by private companies that a) aim at the synergy gains which arise from the combination with a regularly operating listed company, b) seek for a listing status in times when IPO markets are harsh.

Matching a sample of 224 reverse takeovers that occurred in Europe between 1996 and 2015 with a control sample of IPOs that took place over the same period, our study attempts to answer whether European RTOs constitute a viable alternative to IPOs. Particularly, using the classical event study methodology, we compare the

¹ Lucchetti, A., Craig, S., and D. Berman, "NYSE to Acquire Electronic Trader and Go Public", The Wall Street Journal, 21 April 2005.

² See e.g. Floros and Sastri (2010)

³ Brown et al. (2010)

⁴ Fung, E. "Chinese Developers Take the Backdoor to Hong Kong Listings", The Wall Street Journal (Moneybeat), 1 July 2013.

⁵ Svensson et al. (2008)

⁶ Concerning Chinese companies entering the US markets via RMs, see Jindra, et al. (2014). For a UK case, see Josephine Moulds, "Bumi reveals \$200m black hole in financial results", The Guardian, 31 May 2013.

⁷ For US, UK and Swedish regulation see section "Comparative Regulation". For other jurisdictions, see Vermeulen (2014).

short-term and long-term market reaction to RTOs with that of their matched IPOs. Furthermore, computing various financial ratios, we evaluate the differences between the operating performance of RTOs and the operating performance of their IPO counterparts. Finally, we report the survival rates of the two groups.

To the best of our knowledge, this is the first study that examines the efficiency of RTO transactions in comparison with a control sample of IPOs using pan-European data. We also split the overall population into UK and non-UK sub-samples to see whether our results are valid throughout Europe. Our research comes to the light when laxer listing rules and regulations have been adopted by policy makers in order to rejuvenate IPO markets. For instance in the US, the “emerging growth company” (EGC) status under the JOBS Act facilitates high growth companies to conduct IPOs.⁸ Similarly in Europe, NYSE Euronext has presented ENTERNEXT, the new pan-European Exchange with more flexible listing rules, which is orientated towards small and medium-sized enterprises.⁹ Thus, we hope that our empirical findings will be useful to regulators in the difficult task of achieving a balance between credibility of capital markets and access to external capital.

The dissertation is organized as follows. Section 1 describes the process of going-public in general and the reverse merger mechanism in particular. Section 2 provides an analysis of the US, UK and Swedish regulatory frameworks and highlights the three distinctive approaches to the regulation of backdoor listings. Section 3 analyses the advantages and disadvantages of RTOs over IPOs and cites a reverse merger case. Section 4 presents a review of the relevant literature. Section 5 presents the data and the methodology employed in this study. Section 6 reports the empirical findings and Section 7 summarizes the inferences of the study.

⁸ The Jumpstart Our Business Startups (JOBS) Act encourages the financing of small and medium-sized enterprises by loosening many of the US securities regulations. It was signed into law on April 5, 2012. Available at: <https://www.sec.gov/spotlight/jobs-act.shtml>

⁹ ENTERNEXT was launched in May 2013. Available at: <https://www.enternext.biz/en>

SECTION 1

The going public decision: pros and cons

The introduction to the stock markets has traditionally been regarded as an inevitable step in the development of a company. However, a few well-known companies have remained private. Consider the cases of Robert Bosch GmbH (Bosch), PwC or Deloitte. These facts denote that going public is not a step that all companies ultimately reach; it is rather an option (Pagano et. al., 1998).

On the one hand, there are certain advantages exploited by a listed company. First, access to external funds is easier since public firms are more appealing to investors than private firms. This is because public companies: a) must release their financial statements promoting investors' confidence towards their management¹⁰, b) create liquidity through the trading of their stocks offering an exit strategy to interested investors, c) face less pressure than private companies regarding investors' demand to control the management of the company, d) enjoy higher valuation in their shares. Empirical studies seem to suggest that the higher the publicity of a company, the higher its stock price.¹¹ This alternative method of raising capital renders listed companies less dependent on bank financing allowing them to reduce the amount of outstanding debt. Moreover, public information about a company's financial condition prompts competition between its incumbent lenders and other aspiring lending institutions, leading to a lower cost of capital and/or an increase in the supply of external finance (Rajan, 1992). Second, liquidity provides an exit strategy not only for new investors, but also for company founders, executives and initial investors.¹² The latter are thus enabled to cash out without conceding control. Third, the company can use its trading stock as consideration for future acquisitions keeping, therefore, cash reserves for other activities. Fourth, potential conflicts of interest between shareholders and management can be mitigated by granting stock options to executives. Furthermore, the possibility of a hostile takeover and subsequent

¹⁰ Restating, accountability of managers increases.

¹¹ See Merton (1987) and Kadlec and McConnell (1994) for the impact of investor recognition to stock valuations.

¹² Shareholders of private companies seek to diversify their portfolios by investing in several companies.

replacement of current managers impose extra discipline to them (Shleifer et al., 1986).

On the other hand, being public implies specific disadvantages for a company. First, the continuous pressure to reach market expectations each quarter shifts companies' priorities from implementing long-term strategies to generating short-term profits (e.g. by reducing R&D expenses). In this sense, listed companies have stronger motives than unlisted companies to get involved in fraudulent activities, such as earnings management. Second, disclosure requirements coerce companies into revealing important information about their comparative advantages (Campbell, 1979). Third, the public status entails significant costs for a company (compliance costs, audit fees etc.).¹³ Last, public companies are susceptible to lawsuits, even if the claims are worthless.

The reverse takeover (merger) process

According to the SEC (Investor Bulletin, 2011), "in a reverse merger transaction, an existing public shell company, which is a public reporting company with few or no operations, acquires a private operating company - usually one that is seeking access to funding in the U.S. capital markets." In a similar manner, pursuant to Listing Rule 5.6 of the FCA¹⁴, a reverse takeover occurs when a listed company acquires a "business, company or assets...which in substance results in a fundamental change in the business or in a change in board or voting control of the issuer." Therefore, the public counterparty in the transaction can be either a going-concern company or a non-operating company, as a result of bankruptcy, business failure or simply a clean shell seeking to merge with another firm.

In a typical merger the bidding firm acquires the target firm and the bidder's existing shareholders obtain the majority of the combined entity's shareholdings. In a reverse merger the inverse happens: the target firm's stockholders become the majority

¹³ In the context of a reverse merger with synergistic effects, the transaction might serve a dual role: On the one hand, the private company goes public. On the other hand, the new combined public entity is larger, implying that it is in a better financial condition to meet the costs of being public.

¹⁴ Financial Conduct Authority (FCA), Bank of England's Financial Policy Committee and Prudential Regulation Authority are the three financial regulatory bodies in the UK.

shareholders of the merged public company.¹⁵ Particularly, in exchange for cash from the private company, the public company issues an adequate number of shares to the shareholders of the private company so that the latter gain a controlling interest in the new merged entity (Dasilas et. al., 2009). The private company's shareholders usually receive 65%-95% of the enlarged company (Feldman, 2005). Restating, the public shell is the legal acquirer and accounting acquire, whereas the private company is the legal acquire and accounting acquirer (Pollard, 2016). The "reverse" lies in the fact that the initiator of the merger is the private target, which ultimately takes control over the public combined entity. Subsequently, the operating assets of the former private company become the principal assets of the public merged company. Thus, the managers of the former private company are usually assigned the daily control of the merged entity. The name of the new company is that of the private company or an entirely new name.

A reverse merger can be structured as: a) a direct merger, where a public company merges directly into a private company, b) a reverse triangular merger, where a private company becomes a subsidiary of a public company and thus also being public¹⁶, c) a simple asset acquisition, where a public company acquires a proportion of the assets of a private company, giving in exchange the majority of the shares of the public company (Arellano-Ostoa et al., 2002).

Finally, reverse takeovers have two distinctive aspects. From the public company's stance, RMs signify a fundamental corporate restructuring in terms of ownership structure, business, board structure and management. From the private company's point of view, RM is an alternative means of going public.

¹⁵ RM should not be confused with sell-outs. In a sell-out, a private company is acquired by a public company, resulting in the shareholders of the public company having a controlling ownership of the combined firm.

¹⁶ The procedure is the following: The public company creates a wholly-owned subsidiary, which then merges into the private company. The private company shareholders swap their stock of the private company for stock of the public company, rendering them the majority shareholders of the public company. Effectively, the private company is a wholly owned subsidiary of the public company.

SECTION 2

Comparative Regulation

US Regulatory Framework

The story of reverse takeovers in the United States dates back in 1970-80 when various market participants were forming new unregulated entities, the so called “blank check” companies, with the stated purpose of merging with a going-concern business after raising funds via IPOs. However, deceitful practices arose along with successful corporate combinations. Particularly, a few founders of these companies kept the IPO proceeds for themselves instead of seeking merger candidates.¹⁷In 1990, the Congress passed the Penny Stock Reform Act which granted the SEC the legal permission to intervene in the shell marketplace. In 1992, the SEC passed Rule 149 according to which: 1) 90% of the funds raised in the IPO must be held in escrow and no trading of shares is allowed until the consummation of a merger, 2) there is a deadline of eighteen months after the public offering during which the shell must undertake a deal, otherwise investors receive all proceeds back, 3) investors in the shell can oppose a suggested deal and get their portion back. Effectively, investors’ approval is necessary in order for the merger to be completed.

Blank check companies that have at least \$5 million in assets prior to their IPO or raise \$5 million at the minimum in their public offering avoid the implementation of Rule 419 and the aforementioned regulatory constraints. This legal gap enabled the emergence of specified (or special) purpose acquisition vehicles (SPACs).¹⁸ Furthermore, public shells that derived from the liquidation of formerly operating companies became popular, as Rule 419 did not stipulate such shells. Moreover, another mechanism became feasible: creating a blank check without conducting an IPO just for the sake of obtaining a listing status. The so called “virgin shell” would

¹⁷ For a thorough review of shell companies’ fraudulent activities, see Feldman (2006). “Reverse Mergers: Taking a company public without an IPO”, pp. 77-89.

¹⁸ SPACs voluntarily adopt Rule 419 provisions (funds held in trust account, opt-out clauses, eighteen months deadline for the completion of a merger) in an attempt to entice investors. However, their shares are traded even before the acquisition (Sjostrom, 2007).

then seek for a reverse merger¹⁹. The SEC considers legitimate this type of shell since no public offering is entailed (Feldman, 2005).

In 2005, the SEC adopted a rule amendment requiring the disclosure of all information related to the reverse merger within four days after the consummation of the deal, just like in an IPO prospectus. Previous rules, in contrast, allowed the combined entity to prolong the disclosure of such information for up to seventy-one days from the completion of the merger. Although this rule change aimed at eliminating “pump and dump” schemes²⁰, it may disdain the time advantages associated with reverse mergers (Sjostrom, 2007). During the same year, the definition (and implicitly the recognition) of a shell company was provided by the SEC as a company with a) “no or nominal operations and b) either: (i) no or nominal assets, (ii) assets consisting solely of cash and cash equivalents, or (iii) assets consisting of any amount of cash and cash equivalents and nominal other assets”.

In the presence of growing allegations of accounting irregularities attributed to foreign reverse mergers and mainly Chinese companies entering the US capital markets through back-door listings, the SEC released an investor bulletin emphasizing the risks linked with investing in RM companies (June 9, 2011).²¹ Consequently, in November 2011, the SEC adopted stricter listing prerequisites for companies seeking to go public through reverse mergers: a) a one-year seasoning period is required during which the company must trade in a market other than the major US exchanges, b) the company’s shares must trade for a “sustained period” at the minimum initial listing price required by the major exchanges.²²

Summarizing, public shells can be divided into two groups. The first group consists of public companies created for the sole purpose of merging with private companies: a) a “blank check” company under Rule 419, b) a SPAC as an exemption to Rule 419²³, c)

¹⁹ These shells operate under a Form 10-SB filing pursuant to Securities Exchange Act of 1934, rather than Rule 419.

²⁰ During the seventeen-one-day period, companies were publishing only positive features of their operations leading to increases (pumps) in stock prices. Initial investors were then selling their shares to uninformed buyers.

²¹ “SEC Investor Bulletin: Reverse Mergers”, June 9, 2011. Available at: <https://www.sec.gov/investor/alerts/reversemergers.pdf>

²² “SEC approves new rules to toughen listing standards for reverse merger companies”, Press release, 9 November 2011, Available at: <https://www.sec.gov/news/press/2011/2011-235.htm>

²³ It is noteworthy that not all SPAC transactions take the form of reverse mergers (Sjostrom, 2008).

a “virgin” shell by filing Form 10-SB. The second group comprises shells that stem from previously going concern companies: a) a “development stage” shell emerges from a business plan that fails to be realized, b) a “natural” shell is the consequence of a liquidation process following bankruptcy (Feldman, 2006). Other authors, e.g. Kolb et al. (2014) adopt a more general distinction between natural shells and cash shells. Natural shells are the outcomes of a former operating company’s bankruptcy or business failure. Cash shells (including SPACs) are public companies incorporated for the sole purpose of acquiring a going-concern company.

UK Regulatory Framework

Reverse takeovers in the UK have also suffered from bad reputation due to fraudulent activities of the involved companies.²⁴ As a response in October 2012²⁵, the Financial Services Authority (FSA), -now Financial Conduct Authority (FCA) – adopted new rules aiming at enhancing disclosure quality and corporate governance standards. First, a clear definition of a reverse takeover was provided focusing on two characteristics: if there is a “fundamental” change in the business or a change in the control of the board (and not in its composition) of the listed company as a result of the merger. Second, under the new regime a takeover between two already listed companies will be treated as a reverse takeover if they belong to different listing categories (e.g. if one company has a premium listing and the other has a standard listing). The rationale of this amendment is relevant to a certain shady tactic followed by SPACs: these companies, which initially obtained a standard listing, intended to acquire a listed operating company of senior listing status in order to become premium listed, although they were ineligible. Furthermore, as a general rule the FCA will cancel the listing of a company’s shares after the shareholders (of the listed company) approve the consummation of a reverse merger. Essentially, the combined entity must apply for admission as a new applicant following the usual procedure of an IPO company, such as the release of a prospectus and audited financial statements.

²⁴ For two indicative examples, see: David Oakley, “City Watchdog to tighten listing rules”, *The Financial Times*, 2 October 2012.

²⁵ a) Financial Services Authority, “Amendments to the Listing Rules, Prospectus Rules, Disclosure Rules and Transparency Rules” (CP12/2), January 2012. b) Financial Services Authority, “Enhancing the Effectiveness of the Listing Regime and Feedback on CP12/2” (CP12/25), October 2012.

Exemptions from the cancellation rule can be recognized by the FCA.²⁶ Finally, the FCA can suspend the trading of a company's shares (before the consummation of a merger since after that a cancellation can be imposed) when investors do not access adequate information regarding the deal. The public company is obliged to timely inform the FCA about prospective reverse takeovers.²⁷

Swedish Regulatory Framework

Since the second largest group of reverse takeovers in our sample took place in the Stockholm Stock Exchange, a brief overview of the relevant regulation is presented. Generally, under Rule 3.3.12 a public company has the obligation to disclose information concerning major changes in its business, in the cases that the company may be deemed as an utterly new entity. As a reverse takeover is the acquisition of another business and affects drastically the ownership structure of the listed company, the aforementioned disclosure requirements are applied. In addition, the Swedish Financial Supervisory Authority (known as Finansinspektionen) can give an "observation status" to a company which released inadequate information (Rule 2.7).²⁸ This status acts as a warning bell for investors who wish to invest in companies associated with reverse takeovers. In any case, the Finansinspektionen can proceed with the cancellation or suspension of the trading in a company's securities.

Summary

It is evident from the previous analysis that the track records of reverse takeovers in each country have provoked different regulatory reactions, which can be segregated in three distinctive approaches. First, the SEC has embraced a specific regulatory regime with seasoning period and minimum share price requirements. Second, the FCA evaluates reverse takeovers on an individual basis and requires IPO-style procedures at the admission stage. In fact, UK reverse mergers include not only traditional shell

²⁶ See LR 5.6.23 G to LR 5.6.29 G of LR 5.6 concerning Reverse Takeovers. Available at: <https://www.handbook.fca.org.uk/handbook/LR/5/6.html>

²⁷ See LR 5.6.10 G to LR 5.6.18 R of LR 5.6 concerning Reverse Takeovers for exemptions from suspension provision.

²⁸ For Rules 3.3.12 and 2.7, see "Nasdaq Stockholm Rulebook for Issuers". Available at: http://business.nasdaq.com/media/Nasdaq%20Stockholm%27s%20Rule%20book%20for%20Issuers%20-%208%20December%202016_tcm5044-23124.pdf

companies, but also a significant number of operating companies seeking for synergistic mergers (Appadu et. al., 2014). Third, the Finansinspektionen adopts a more flexible stance (the “observation status”) focusing on warning the investors.²⁹

SECTION 3

Reverse Mergers versus IPOs

Advantages of RMs over IPOs

Traditionally, reverse mergers had been considered as a back-door entry to the stock markets in terms of avoiding the extensive listing requirements and lengthy preparations associated with IPOs. Particularly, the total direct costs including all underwriting, legal and auditing costs for an IPO have been estimated at approximately 11% of the total offer (Ritter, 1998). On the other hand, the joint fees of the target and the acquirer in an RM account for 3% of the transaction value (Gleason et al., 2005).³⁰ However, this cost does not contain the value of the stock ownership held by shell promoters in the new combined entity (Hurduzeu et al., 2012). In addition, there is the argument that the cost of an RM combined with a seasoned equity offering equals to the 7% typical spread of an IPO (Chen et al., 2000 and Arellano-Ostoa et al., 2002).

The second often mentioned advantage of reverse mergers relates to time. An IPO takes between six months and a year and a half to be completed while an RM takes between one and six months to be consummated (Gleason et al., 2006).³¹ The time factor can also be perceived by the fact that the senior managers of a private company pursuing an IPO have to devote significant amount of time to support the financial advisors (e.g. during road shows, due diligence meetings). Therefore, managers have less time available to handle the daily operations of the company leading to extra costs (Song et al., 2014). However, the time saving benefit of RMs is debatable. First, comparing the maximum duration of an RM process with the minimum duration of an IPO process (six months), the speed advantage is doubtful. Second, upon completion

²⁹ This flexibility might be explained by the relatively small number of reverse takeovers in Sweden.

³⁰ While an IPO typically costs several million dollars, gaining controlling interest in a trading shell costs \$700,000 - \$800,000 (Floros et. al., 2009).

³¹ Brenner et al. (2004) report that the RM process lasts between two and nine months.

of an RM, the public merged company must comply with the relevant Authority's listing requirements, for which the preparation requires substantial time (Jindra et al., 2014). Third, it is not clear when the two processes start rendering possible comparisons concerning the duration of the transactions inaccurate (Brown et al., 2010). For instance, an IPO could start much earlier than the kick-off meeting; an RM could begin much earlier than the announcement date (e.g. from the time the negotiations start).

The aforementioned cost and time saving advantages of RMs had arisen from the lax regulatory frameworks applied to these transactions. However, several cases of frauds and abuses around RMs have led to accelerated regulatory scrutiny over the years.³² Thus, potential benefits should also be found in other aspects of this going-public mechanism.

First, since in a reverse merger the new combined entity does not necessarily raise new capital at the time of the listing, there is typically not much post-merger trading activity and thus the current market sentiment is less important. Consequently, there is no risk of underwriter's withdrawal as in an IPO. In this sense, reverse mergers exist in all markets: when IPO markets flounder, RMs offer an alternative means of going public; when IPO markets flourish, RMs remain an option due to their other benefits (Feldman, 2006).³³ Second, RMs enable another funding option, a private investment in public equity financing (PIPE). In a PIPE financing, a small group of sophisticated investors purchase stock of the public merged company at a discount to the current market price. Upon consummation of the reverse merger, a resale registration statement is filed and thus PIPE investors can sell their shares to the public.³⁴ Third, as an RM is not inevitably completed in conjunction with an equity offering, founders and initial investors of the former private company experience less share dilution than in an IPO. Besides, the public shell's shareholders gain a minority stake in the

³² See the section "Comparative Regulation"

³³ Indeed, Gleason et al. (2005) find that " ...a little more than 40% or 49 of the transactions in our sample occur during the hot IPO wave of the mid to late 1990s." Similarly, Faelten et al. (2013) find that "when the number of IPOs dropped by 96% during 2007-2009, the decline of RTOs was relatively modest".

³⁴ PIPE financing offers a valuable funding solution to small public companies, as PIPE investors are attracted by appealing contract terms (e.g. warrants, cash flow rights). For a comprehensive analysis of PIPE financing, see: S. Chaplinsky and David Haushalter, "Financing under Extreme Risk: Contract Terms and Returns to Private Investments in Public Equity".

enlarged company. The share dilution is also reduced in the case of a PIPE financing, since the amount of raised money is typically smaller than in an IPO.³⁵ Fourth, since the public merged company can proceed with an equity public offering at a later stage back-door listing represent the two-stage strategy of listing by introduction in the UK (Brown et al., 2010). Through this process, a private company can gain an exchange listing status as an in IPO but without the simultaneous equity offering. Derrien et al. (2007) argue that the trading occurred in the aftermarket assists in mitigating the valuation uncertainties of these firms leading to lower degree of underpricing when shares are offered at a later stage. At this point in time, higher company valuations result to less ownership dilution for the founders and initial investors of the former private company. Fifth, tax losses of a public shell can be carried forward and thus the combined entity can offset partially the taxation of future capital gains (S. Ojha et al., 2013).³⁶ Sixth, IPO underwriters tend to modify the profile of the company in an attempt to render the company look more profitable in the short term (that is in the time that the equity offering takes place), at the expense of long-term strategy (Feldman, 2006). Last but not least, reverse mergers with public operating companies in similar types of business provide synergy prospects either in the form of cost reductions or revenue enhancements.

Disadvantages of RMs over IPOs

The crucial difference between RMs and IPOs is that in the former no underwriters are involved. According to Ellis et al. (2000), the underwriters in an IPO undertake the development of a liquid secondary market in the company's stock by employing price stabilization techniques³⁷ and promoting the business to investors. In an RM, by contrast, the public merged company should exhibit positive operating performance for several quarters until it triggers the interest of the investing public. Then, an equity offering and an active trading market in the company's stock is feasible. However, during this restructuring period the funding sources of the company are usually limited, either because no capital has been raised as part of the RM transaction or

³⁵ Floros et al. (2009) estimate that the median value of proceeds raised through PIPE financings reaches \$3.2m.

³⁶ This benefit can be applied only in the case of an RM with a shell that emerged from a previous operating company.

³⁷ For a thorough review of the price stabilization activities, see: Aggarwal (2000), "Stabilization activities by underwriters after initial public offerings."

because potential financing alternatives (e.g. PIPE) offer inadequate funds. In this context, Carter et al. (1990) claim that going public via an IPO indicates a company of higher quality and lower risk; inversely, the absence of underwriters in an RM serves as a signal of lower quality/higher risk company. Therefore, the shares may trade at a discount to the market to depict the low quality and the relative illiquidity (Sjostrom, 2007). Furthermore, Dasilas et al. (2009) contend that the private company runs the risk of inheriting the liabilities and negative reputation of the public company; it will be thus a challenge for the new management to establish a sound image for the enlarged entity.

For the sake of accuracy, it is noteworthy that the aforementioned disadvantages apply in the case of natural shells.³⁸ On the other hand, SPACs, which belong to the category of cash shells, have their own distinctive characteristics. First, in an RM with a SPAC the public merged company obtains the proceeds from the SPAC's IPO (Cumming et al., 2014). Moreover, an active secondary market in the SPAC's shares already exists and underwriters who participated in the SPAC's IPO will likely have a vested interest in supporting the trading of the combined entity's stock post-merger (Sjostrom, 2007). Furthermore, SPACs are "clean" shells without existing operations and hidden liabilities. Finally, we conjecture that synergistic mergers with going-concern public companies strengthen the financial position of the enlarged entities in terms of increased capital resources during the reorganization period. In addition, an established trading market exists for the public company's stock pre-merger.

A Reverse Takeover Case

On 28 April 2014, Terrace Hill, a listed company which shares were trading on the AIM market of the LSE since 1995, announced that it had conditionally agreed to merge with Urban & Civic, an unlisted company. Terrace Hill business included property development for commercial purposes, focusing on food stores, Central London offices and leisure sites. Urban & Civic provided residential development solutions in growth areas of the UK. The combination of two established real estate

³⁸ For the concept of natural shells, see section "Comparative Regulation".

companies would create significant synergies, leading to a new “Best in Class” UK real estate company.³⁹

Pursuant to Listing Rule 5.6 concerning reverse takeovers, the trading of Terrace Hill ordinary shares on AIM was suspended (on 28 April) until the release of a prospectus relating to the acquisition details. Later at the same date, the prospectus was published. Under the terms of the deal, Terrace Hill would issue 43.1 million shares to the shareholders of Urban & Civic. As the existing ordinary shares of Terrace Hill at the time of the issue were 21.2 million, it is apparent that the shareholders of Urban & Civic would hold more shares in the enlarged group than the existing Terrace Hill shareholders. In addition, a change in board control of the combined entity took place: Nigel Hugill, former Executive Chairman of Urban&Civic, was appointed as Executive Chairman; Robin Butler, former Managing Director of Urban&Civic, was appointed as Managing Director. The name of the new public company was also changed to “Urban & Civic plc”. Unsurprisingly, the transaction was treated as a reverse takeover. It is noteworthy that a concurrent placing of 75.6 million new shares occurred resulting to £170 million new funds for the enlarged group. According to the timetable, on 22 May 2014, trading on AIM was cancelled and the new enlarged company was admitted to the standard listing segment of the Official List and to trading (only) to the Main Market of LSE. It is noteworthy that as at 29 April 2014, the first trading day after the announcement of the merger, the stock price of former Terrace Hill increased by 14%, implying that the market viewed positively the synergies associated with the proposed deal.

Summarizing, it is evident from the previous example from Europe, in contrast to the US, strictly defined shell companies are not necessarily the prevailing type of listed firms participating in reverse mergers. Furthermore, the transaction is usually structured as a stock-swap merger with simultaneous raise of capital, in line with the findings of Appadu et al. (2014). The fact that the acquisition was consummated on 22 May 2014, 24 days after the announcement of the transaction, justifies partially the

³⁹ “Urban & Civic To Reverse Into Terrace Hill And Raise GBP170 Million”, 28 April 2014. Available at: http://www.morningstar.co.uk/uk/news/AN_1398680225845129500/urbancivic-to-reverse-into-terrace-hill-and-raise-gbp170-million.aspx

time-saving argument associated with reverse takeovers. Moreover, the suspension requirement assists in reducing existing information asymmetries, while the cancellation and readmission requirement implies that reverse takeovers and IPOs are homogeneously treated. Therefore, the superiority or not of IPOs versus RTOs remains an open empirical question.

SECTION 4

Relevant Literature

While literature on RMs has substantially increased over the years, the vast majority of studies focuses on the U.S capital markets. The most popular topics relate to the characteristics, motivations, aftermarket performance, earnings quality and applicable regulation of RMs.

US Evidence

Gleason et al. (2005) were the first to examine the characteristics, incentives and wealth effects of reverse takeovers, using a relatively small sample of 121 reverse takeovers occurred in the US over the period 1987-2001. According to the proxy statements in which the RMs are described, managers of public firms participate in RMs mostly due to the sound financial condition of the private counterparty. On the other hand, managers of private companies choose the RM alternative mainly aiming at growth or moving into related types of business. In fact, 27% of the public and private firms included in the sample operate in the same industry, while 31% and 41% belong to related or different industry sectors respectively. Although the public companies engaged in reverse takeovers exhibit on average poor pre-merger performance, their shareholders gain significantly positive returns upon deal announcement. These wealth gains remain significant even when the sample of public firms is split into distressed and healthy. The authors show that a) the shareholders of distressed firms realize positive returns implying that the RMs allow them to partially recover their investment; b) financially healthy firms exhibit higher returns suggesting that corporate combinations might provoke synergistic effects.⁴⁰ Furthermore, the post-merger operating performance of the new entities is feeble and less than half of the sample survives 2 years after the RM. The authors conclude that RMs represent risky alternatives to IPOs as they fail to generate long-term wealth for the shareholders of the public-merged company.

⁴⁰ Besides, the sample comprises strictly defined shell companies as well as operating companies.

Gleason et al. (2006) examine reverse takeovers and self-underwritten IPOs in comparison with a matched sample of traditional IPOs for the period 1986-2003. Despite the frequently referred belief that smaller firms with greater risks prefer alternatives to the conventional underwritten IPO, the RTO sample is not statistically different from the matched IPO sample in terms of total assets and financial distress in the year prior to going public. Two years after going public, reverse takeovers and self-underwritten (“SUs”) firms have lower profitability (in terms of ROA) and balance sheet liquidity, yet their ROE and financial leverage are not statistically different from the control IPO firms. Regarding stock market performance, RTOs and SUs outperform the control IPO firms in the short-term and experience equivalent performance three years after going public. It can thus be inferred that reverse mergers should constitute a viable alternative to IPOs for certain types of firms.

Using a small sample of 23 reverse mergers that occurred over the period 1999-2001, Aydogdu et al. (2007) report increased trading activity and sporadic but statistically significant positive returns surrounding merger announcement, suggesting that the market is receptive to such transactions.

Adjei et al. (2008) examine 286 RMs that took place between 1990-2002 in comparison with a control sample of IPOs in terms of industry, listing exchange and time. The authors find that only 1.4 % of the RM sample is unable to meet at least one of the initial listing standards, implying that the majority of these companies have the privilege of choosing between an IPO and an RM. However, three years after going public 42.7% of RMs were delisted in contrast to 27% of their matched IPOs. To the authors’ view, the lower survival rates for RMs may be attributed to the absence of underwriters’ support in the aftermarket. In addition, these findings accord with the notion that small, young and inferior firms prefer the RM route due to the lower costs incurred (Arellano Ostoa et al., 2002).

Floros and Sastri (2009) compare RMs⁴¹ with penny stock IPOs (PSIPOs) that took place between 1979 and 2006. Private firms involved in RMs tend to be younger, smaller, more at a growth phase, less profitable and liquid than their matched PSIPOs. The authors contend that the RM mechanism enables companies with substantial information asymmetries to obtain a listing status and seek financing via private placements (e.g. PIPEs). Since existing valuation uncertainties discourage potential outside investors, it is easier for RM firms to convince a small group of sophisticated investors.⁴² This argument is consistent with the notion that the

⁴¹ The sample comprises RMs with both shell and regularly operating public companies.

⁴² In fact, 47.06% of the entire RM sample is associated with PIPE transactions.

level of information asymmetries plays a pivotal role in the choice between issuing public or private equity (Chemmanur and Fulghieri, 1999).

Floros and Sapp (2011) explore 585 US reverse takeovers with trading shell companies⁴³ for the period 2006-2008⁴⁴; shell companies have no assets or operations and their stock prices decrease over time. Given a three-month cumulative abnormal return of 48.1% surrounding the completion of the RM, the authors support that investing in a shell firm with high probability of conducting an RM within five months is a rational choice. In addition, 111 SPACs listed on the US stock exchanges between 2006 and 2009 are analyzed. Recall that a typical SPAC has eighteen months deadline to locate a target, otherwise the fund is liquidated and the proceeds are returned to the shareholders. The authors report that SPAC investors incur negative returns upon consummation of an RM. Therefore, in contrast with shell firms, SPACs offer a risk-free option during the target search period at the expense of the post-acquisition performance.

Asquith et al. (2011) analyze the short-term price performance of a sample of RTO companies during 1990-2008 and find that the average announcement day return for reverse mergers is equivalent to the average first-day return for IPOs. Most of the theories explaining IPO underpricing are based on underwriters' incentives⁴⁵; these theories do not apply to reverse mergers, in which no underwriters participate. According to the authors, the similar initial pricing behavior of IPOs and RTOs implies that either a) the current IPO underpricing theories are invalid, or b) RMs and IPOs are distinct going-public methods and thus explained by distinct theories.

Motivated by the recent allegations of fraudulent accounting practices surrounding RM companies, Schumann et al. (2013) challenge the common perception that only foreign firms seeking to enter the US capital markets through back-door listings account for the bad reputation of the RM transactions. Indeed, examining a sample of RM firms matched with a sample of non-RM firms listed on the US stock exchanges between 1987- 2010, the authors find that both domestic and international RM firms exhibit lower accounting quality (higher earnings management) than non-RM companies.⁴⁶ Furthermore, the involvement of a higher

⁴³ For the sake of accuracy, the authors divide trading shell companies into "development stage" and "natural" shells, in contrast with SPACs. (see section "Comparative Regulation")

⁴⁴ In contrast to the work of Gleason et al. (2005) in which the RM sample consists of larger public operating companies.

⁴⁵ Concerning IPO underpricing theories see in the same paper, pp. 7-9. For a more comprehensive view, see Ritter and Welch (2002), "A Review of IPO Activity, Pricing and Allocations", pp. 1802-1816.

⁴⁶ This finding is in line with Warfield (1995) and Richardson (2000) who document a positive relationship between the level of information asymmetries and the degree of earnings management.

quality auditor seems to serve a monitoring role, as those RM companies that hire Big 4 auditors display less earnings management behavior and have a higher likelihood of survival in the U.S markets.

One of the few studies on the wealth effects of RMs from the perspective of the private firm shareholders is that of Greene (2016), in which RMs are examined in comparison with IPOs and sellouts that occurred between 2005 and 2010. The author shows that private firm owners that “exit” their firm through the RM method experience significantly less post-exit wealth than the wealth that could be gained via an IPO. This finding is attributed to differences in pre-exit characteristics of private firms that opt for an RM instead of an IPO⁴⁷, not to the use of RM method itself. In fact, when RMs are closely matched with IPOs, the post-exit wealth difference between the two groups disappears. Thus, this paper sheds further light to the notion that RMs can be sustainable alternatives to IPOs for certain types of firms.

Since 2000, the number of Chinese firms entering the US stock exchanges through RMs has noticeably increased. According to the PCAOB⁴⁸, between 2007 and 2011 157 Chinese RMs (CRMs) in US markets took place; in contrast, only 56 Chinese companies conducted an IPO over the same period. Recent fraud allegations against CRMs prompted researchers to elaborate on the characteristics and performance of these investments.

Using a dataset spanning from 2001 through 2010, Lee et al. (2013) examine CRMs in comparison with US RMs and a matched sample of listed companies based on exchange, date (of the RM’s first 10-k filing), industry and size. CRMs are on average better capitalized and further developed than their US counterparts or their control firms. Three years after listing, CRMs outperform the two aforementioned groups in all aspects⁴⁹ (e.g. profitability, market liquidity, stock returns and survival rates). The authors conclude that the negative publicity of CRMs is overstated. Within this context, Darrough et al. (2015) show that the fraud allegations against certain CRMs had also a negative impact on the stock prices of other non-deceitful CRMs and U.S listed Chinese IPOs.

Jindra et al. (2014) compare CRMs with Chinese IPOs (CIPOs) that occurred between 1994-2010 and find evidence that larger Chinese firms seek IPOs, while smaller Chinese firms seek RMs. Interestingly, over the three-year post-listing era, the difference between mean CAR of

⁴⁷ RM firms tend to be smaller, younger and of lower quality compared to IPOs in line with previous studies such as Arellano-Ostoa et al. (2002), Adjei et al. (2008) and Floros and Sastri (2009).

⁴⁸ The PCAOB is a nonprofit corporation established by the Sarbanes-Oxley Act of 2002 to supervise the audits of the public firms in order to enhance investor protection.

⁴⁹ These results hold although the sample contains most (81%) of the CRMs that have been accused of fraud since 2011.

CRMs and mean CAR of CIPOs is not statistically significant. However, CRM firms have higher probability of facing class action litigation in the U.S.

Givoly et al. (2014) find that RM firms exhibit lower accrual quality than matched non-RM firms; yet, within the RM sample, no significant difference in the financial reporting quality between foreign RM firms and U.S RM firms is detected. Moreover, the accounting quality of CRMs is comparable to that of all other RM firms. Likewise, Pollard (2016) finds that the inferior financial reporting quality of RMs in the US market derives from the non-Chinese RM firms.

Non-US Evidence

One of the few studies relied upon non-US data is that of Brown et al. (2010), which consists of 174 reverse takeovers (or back-door listings as they are referred) that took place in the Australian Stock Exchange between 1992 and 2007. The institutional framework in Australia differs from that in North America, as approximately 80 percent of the sample BDL⁵⁰ firms are subject to readmission and prospectus disclosure requirements and also undertake concomitant capital raisings. Matching the BDL sample with an IPO sample in terms of size, industry and listing year, the authors claim that the Australian market facilitates a more accurate comparison between the two-alternative going public mechanisms. In the listing year, BDL firms tend to be less liquid and profitable and at an earlier development stage than their control IPO firms. Moreover, both BDL and IPO firms exhibit, on average, similar degree of underpricing. Thus, when RMs become directly comparable to IPOs, the argument that backdoor listings reduce the indirect costs of underpricing becomes questionable.

Using a sample of 1,455 IPOs and RMs that took place in Canada between 1993 and 2003, Carpentier et al. (2012) provide evidence concerning the economic consequences of capital market regulation. In contrast to the US case, Canadian securities market is characterized by lax initial listing standards. In addition, no formal definition of the RM mechanism is stipulated in the Securities Laws or Rules of the responsible exchange Commission; in fact, new listings are divided almost equally between the two-alternative going-public routes. While both Canadian RMs and IPOs exhibit poor post-merger performance, the former are inferior to the latter both in terms of financial and share price performance. The authors attribute this underperformance to the larger valuation errors and higher cost of capital associated with RM firms. It can, therefore, be deduced that in the context of a deregulated

⁵⁰ Back door listings or reverse takeovers or reverse mergers.

capital market, investments in IPO firms rather in RM firms are less detrimental to the investors' wealth.

Song et al. (2014) base their research on the assumption that RMs offer an exit strategy to venture capitalists similarly to IPOs, as venture capitalists can sell their shareholdings of the combined firm in the public upon completion of the mergers. Using data from South Korea, where a typical IPO process lasts more than a year since the private companies need to comply with stringent prerequisites in order to be admitted for IPO, the authors report that VC-backed RM firms are smaller, less profitable and more leveraged than VC-backed IPO firms. The authors also find that RMs significantly underperform IPOs in the long term, as measured by negative buy-and-hold abnormal returns. These findings are consistent with the notion that opaque firms with large information asymmetries prefer the reverse takeover path avoiding thus the higher costs incurred and extra time spent in a traditional IPO.

Appadu et al. (2014) investigate 243 reverse takeovers along with a control sample of IPOs listed on the London stock exchange between 1995 and 2012. In contrast with US RTOs, UK RTOs are treated similarly to UK IPOs in terms of entry requirements; most UK RTOs undertake public offerings at the time of the listing and participate in post-merger corporate activities. The authors report three separate groups of RTOs: Mature (or natural) shells, SPACs and Synergies. It is noteworthy that while the private companies in the RTO sample are generally smaller and less profitable than their IPO counterparts, synergy RTOs are equivalent in size and more profitable than their control IPO firms. Furthermore, no significant differences between RTOs and matched IPOs in terms of long-term stock price performance and survival rates are detected. The authors conclude that the adoption of higher transparency standards may positively impact the profile of RTOs, rendering them a true alternative to IPOs.

Recently, Dasilas et al. (2017) analyze for the first time the wealth effects of reverse takeovers employing pan-European data. The authors report significant positive returns for the shareholders of the public firms involved in reverse takeovers surrounding the merger announcement dates. These wealth gains remain statistically significant even when reverse takeovers in the UK and the rest of Europe are examined separately, suggesting that positive RM announcement effects are a broader phenomenon. Moreover, a positive relationship between corporate governance standards and market reaction to RM announcements is documented, implying that investors in public firms engaged in RMs are willing to pay higher premiums when deals take place in countries with stricter investor protection mechanisms.

However, two years upon completion of the merger, the new combined entities exhibit poor performance both in terms of stock returns and various financial measures.

SECTION 5

Data and Descriptive Statistics

Our study focuses on the effective (and completed) reverse takeovers⁵¹ and initial public offerings⁵² that took place in Europe between 1996 and 2015.⁵³ To begin with, the RTOs'⁵⁴ announcements were culled from the Thomson One database. After having imposed the three restrictions that we stated above, the initial sample consisted of 492 deals. However, we excluded all those cases, which were considered either as ordinary acquisitions or had missing data for both their share prices and key fundamentals, as did Gleason et al. (2005) and Dasilas et al. (2017). Thus, our final sample consists of 224 RTO deals. Next, we matched each RTO with one IPO which would be comparable. For this reason, we set the following three criteria for each match: a) to be from the same country, b) to be from the same macro industry, and c) the total assets to be as close as possible.⁵⁵ All fundamentals and stock prices for RTOs and their control IPOs were derived mainly from the Bloomberg database, while in some cases the contribution of Thomson One database was needed.

Time illustration

Table 1 shows the distribution of the deals of RTOs and matched IPOs that took place per year over the period 1996-2015. Among the 20 examined years, IPOs and RTOs mainly took place in 2007 and 2000 respectively, being 27 and 25 deals per category. The RTOs of the periods 1999-2002 and 2005-2008 represent approximately 30.36% and 29.02% of the total number of deals or otherwise 59.38% of the total number of deals for the entire period under examination. These two peaks in the total number of RM deals are triggered by the general conditions in the stock market of those periods (Dasilas et al., 2017). The peaks of the IPOs are quite close to those of the RTOs. More specifically, the two periods that mainly firms preferred to go public through an IPO were from 1998 till 2000 (50 deals or 22.32%) and

⁵¹ For the RTOs, we required both private and public firms to be located in Europe.

⁵² For the IPOs, the new entity had to be located in Europe.

⁵³ For practical reasons, we extended our dataset till September of 2017, in order to have as much available data as possible for the long-term stock price and operating performance over 24 months after each deal took place.

⁵⁴ For RTOs, we supposed that a private entity merged with a public one to create a combined public company which is controlled by the old private (Dasilas et al., 2017).

⁵⁵ According to Thomson One database, during the period 1996-2015 9041 IPOs were conducted in Europe. From this pool, we spotted 224 IPO cases that were well matched with our RTO sample.

between 2004 and 2007 (93 deals or 41.52%). The explanation of the aforementioned unprecedented growths could be again the buoyant stock market conditions, given that the periods with the most IPOs and RTOs are almost identical. It is worth mentioning, that even after the financial crisis in 2008, the number of deals in both categories remained quite high.⁵⁶

Table 1: Distribution of the deal announcements in Europe 1996-2015.

Year	No. of RTOs	%	No. of IPOs	%
1996	1	0.45%	2	0.89%
1997	10	4.46%	4	1.79%
1998	7	3.13%	10	4.46%
1999	14	6.25%	6	2.68%
2000	25	11.16%	25	11.16%
2001	18	8.04%	9	4.02%
2002	11	4.91%	7	3.13%
2003	8	3.57%	1	0.45%
2004	7	3.13%	19	8.48%
2005	22	9.82%	23	10.27%
2006	17	7.59%	24	10.71%
2007	13	5.80%	27	12.05%
2008	13	5.80%	2	0.89%
2009	9	4.02%	6	2.68%
2010	12	5.36%	14	6.25%
2011	11	4.91%	4	1.79%
2012	6	2.68%	7	3.13%
2013	6	2.68%	8	3.57%
2014	9	4.02%	17	7.59%
2015	5	2.23%	9	4.02%
Total	224	100%	224	100%

⁵⁶ In line with Feldman (2006) and Semenenko (2011), who argue that reverse takeovers exist in all markets.

Origin illustration

Table 2 presents the distribution of reverse takeovers (the private and public entities) and the initial public offerings across the country of origin. UK seems to be the most popular host country for the RTOs with 167 private and 154 public companies involved in a deal. Sweden and Spain follow the UK market by holding the second and third positions respectively. In the fourth positions, Germany and Poland have both 4 deals. It is important to mention that UK market represents almost three- fourths of the total amount of deals that took place between 1996 and 2015. It is obvious that the most IPOs in our study come from the UK as well as the rest have the same origin with that of the private firms of the RTO deals, as that was one of our principal criteria for the creation of our matched sample.

Table 2: Distribution by country.

Country	IPOs	Private firms	Public firms
Belgium	3	3	6
Czech Republic	-	-	1
Denmark	3	3	1
Finland	3	3	3
France	3	3	3
Germany	4	4	6
Ireland Rep.	-	-	3
Isle of Man	-	-	2
Italy	2	2	2
Netherlands	3	3	4
Norway	3	3	5
Poland	4	4	3
Russian Fed.	-	-	2
Spain	5	5	6
Sweden	22	22	21
Switzerland	2	2	2
United Kingdom	167	167	154
Total	224	224	224

In Table 3, we observe that 12% of the 224 firms merged with a foreign company. The vast majority of the companies preferred to expand domestically, by acquiring a private firm operating in the same country. Our results for the cross-border RTOs could be explained as a desire for 26 companies to either expand in a different market or to access a new capital market. It is worth noting that the most cross-border deals were between countries that are neighbors, i.e. France and Germany, Germany and Belgium, Sweden and Norway, France and Spain, Isle of Man and Ireland Republic with the UK, etc. Thus, probably those deals were indeed a way for the firms to expand in the countries with which they border.

Table 3: Distribution between cross-border and domestic RTO deals.

	RTOs	%
Cross-border	26	12%
Domestic	198	88%

Macro and Mid industry illustration

Table 4 shows the distribution of the RTOs and their matched IPOs among the macro industries and sectors in a descending order. One fifth of the total sample or 46 firms opted to merge with a firm or proceeded to an initial public offering at the industry of high technology. 15.63% of the deals took place in the financial industry. The third position was held by the consumer products and services and the media and technology sectors, with 24 deals for each of the two sectors.

Table 4: Distribution by macro industry and sector.

Macro Industry	No. of firms	%
High Technology	46	20.54%
Financials	35	15.63%
Consumer products and services	24	10.71%
Media and Entertainment	24	10.71%
Healthcare	17	7.59%
Telecommunications	15	6.70%
Industrials	14	6.25%
Materials	12	5.36%
Energy and Power	11	4.91%
Real Estate	11	4.91%
Consumer staples	9	4.02%

Retail	5	2.23%
Government and Agencies	1	0.45%
Total	224	100%

Table 5 displays the distribution of the mid industries and sectors for each IPO and RTO deal during the period 1996- 2015. In this table, we observe that there is a higher distribution for the same number of firms, as the firms are separated to 50 different mid industries, while they were distributed to only 13 macro industries. More specifically, there are 25 deals that took place in mid industries with just 1 or 2 firms in total.

Table 5: Distribution by mid industry and sector.

Mid Industry	No. of firms	%
Professional Services	16	7.14%
Software	15	6.70%
Other Financials	14	6.25%
Internet Software and Services	13	5.80%
Other Real Estate	10	4.46%
Asset Management	9	4.02%
Metals and Mining	8	3.57%
Telecommunications Services	8	3.57%
Advertising & Marketing	7	3.13%
IT Consulting & Services	7	3.13%
Oil & Gas	7	3.13%
Other Consumer Products	7	3.13%
Recreation & Leisure	7	3.13%
Building, Construction & Engineering	5	2.23%
Food and Beverage	5	2.23%
Healthcare Equipment & Supplies	5	2.23%
Insurance	5	2.23%
Motion Pictures and Audio Visual	5	2.23%
Pharmaceuticals	5	2.23%
Biotechnology	4	1.79%
Brokerage	4	1.79%
Computers & Peripherals	4	1.79%

Transportation & Infrastructure	4	1.79%
Wireless	4	1.79%
Alternative Financial Investments	3	1.34%
E-commerce / B2B	3	1.34%
Electronics	3	1.34%
Healthcare Providers & Services (HMOs)	3	1.34%
Machinery	3	1.34%
Publishing	3	1.34%
Telecommunications Equipment	3	1.34%
Automotive Retailing	2	0.89%
Chemicals	2	0.89%
Food & Beverage Retailing	2	0.89%
Hotels and Lodging	2	0.89%
Power	2	0.89%
Textiles and Apparel	2	0.89%
Agriculture & Livestock	1	0.45%
Automobiles & Components	1	0.45%
Household & Personal Products	1	0.45%
Non-Residential	1	0.45%
Other Industrials	1	0.45%
Other Materials	1	0.45%
Other Retailing	1	0.45%
Paper and Forest Products	1	0.45%
Petrochemicals	1	0.45%
Pipelines	1	0.45%
Public Administration	1	0.45%
Semiconductors	1	0.45%
Travel Services	1	0.45%
Total	224	100%

Table 6 presents the number of deals that took place among the same macro or mid industry. We observe that 93 firms or approximately 41.52% of the total companies merged with an entity of the same macro industry, showing that the main motive of those entities is to broaden their market share in the same sector and are industrial focused (Dasilas et al., 2017). In addition, 72.04% or 67 of the (public) firms that belong to the same macro industry as their private counterparties had also the same mid industry, while 16.13% of them had quite similar

mid industries. However, the vast-majority of the reverse merged firms (approximately 58.04% of the total firms) opted to merge with an entity from a different macro industry.

Table 6: Number of deals within the same industry.

Macro industry	No. of deals	Mid industry	No. of deals
Same	93	Same	67
Quite similar	1	Quite similar	15
Cross industry	130	Cross industry	142
Total	224	Total	224

Key fundamental characteristics

Table 7 presents some key fundamentals for the year 0⁵⁷ of the RTO deals. The average return on assets (ROA) and return on equity (ROE) are -27.74% and -32.59% respectively. The negative sign in front of the values of ROA and ROE ratios indicates that the public companies suffer from low-quality management. Thus, there is inefficiency to generate revenues and earnings by using the assets of the firm and, therefore the entities are suffering losses, being on average unprofitable and poor performers. Moreover, the average cash to total assets ratio is 16.49% revealing the low liquidity of the entities. The debt to total assets ratio is 16.17%, demonstrating that the public companies do not make extensive use of external financing to their business. The current, quick and cash ratios are on average higher than 1 and we could thus assume that the companies are well-positioned to cover their short-term liabilities. The asset turnover ratio is on average 65.24%, implying that the firms are generating less than one euro of revenue per euro of assets. Moreover, we observe that the total asset bases of the public entities are quite low and are approximately € 326.17 million. Taking into account all the key fundamentals, we conclude that the public entity's financial position in the year of the merger is extremely poor. To recover from these losses, the strong financial position of the private company is considered to be the most powerful motive for the public firm to be involved in a reverse merger deal.

Table 7: Selective key fundamentals for the year 0 of the RTO deals.

	Mean	Median	No.	Max	Min	Std. Dev.
ROA (%)	-27.74	-1.65	154	52.78	-517.09	82.64
ROE (%)	-32.59	-2.8	127	156.83	-829.55	86.1
CASH/TOTAL ASSETS (%)	16.49	9.89	197	76.3	0	17.44

⁵⁷ The year 0 for each reverse takeover deal is the year that the deal became effective.

CURRENT	2.61	1.225	190	42.49	0.3	4.46
QUICK	1.95	0.78	190	28.64	0.02	3.57
CASH	1.59	0.325	190	28.64	0	3.57
DEBT/TOTAL ASSETS (%)	16.17	7.195	184	80.85	0	19.73
ASSET TURNOVER (%)	65.24	41.29	183	490.54	0	75.83
ALTMAN'S Z Score	3.83	2.515	104	70.8	-33.79	11.18
TOTAL ASSETS (in € million)	326.17	30.85	222	14128.8	0.08	1325.17

Table 8 depicts some major fundamentals for the year 0⁵⁸ of the IPO deals. The average ROA and ROE are negative for the companies that proceeded to an initial public offering as well. Nevertheless, IPO companies suffered lower losses than the losses incurred by their RTO counterparts, implying that the quality of the management is a bit higher than that of the reverse merged firms. Furthermore, we observe higher performance in the liquidity measures and thus the firms are sufficiently able to meet their current obligations. Altman's Z score is almost three times higher than the equivalent score of the public firms involved in RTO transactions. Finally, comparing the total assets of the firms that went public through IPOs with those of the combined entities that derived from reverse mergers, we see that their average amounts are close enough, implying that the matched sample has similar characteristics for the rest analysis in our study.

Table 8: Selective key fundamentals for the year 0 of the IPO deals.

	Mean	Median	No.	Max	Min	Std. Dev.
ROA (%)	-2.83	3.27	161	27.7	-123.02	23.62
ROE (%)	-0.94	7.22	120	36.83	-166.56	32.64
CASH/TOTAL ASSETS (%)	26.64	17.83	209	99.55	0.2	25.77
CURRENT	4.22	2.22	202	47.09	0.64	6.77
QUICK	3.5	1.47	201	41.67	0.08	6.51
CASH	2.97	0.92	202	41.64	0.01	6.46
DEBT/TOTAL ASSETS (%)	16.03	7.45	197	94.57	0	20.26
ASSET TURNOVER (%)	74.63	54.06	199	353.33	0	72.05
ALTMAN'S Z Score	10.91	6.24	85	146.9	0.75	19.96
TOTAL ASSETS (in € million)	297.14	50.07	222	15627.74	0.9	1232.37

⁵⁸ The year 0 for each initial public offer is the year that the deal became effective.

In the last section of the descriptive statistics analysis of our sample, we present some specific characteristics for the RTO and IPO deals. More specifically, in the cases of RTOs, Table 9 shows the number of public and private companies that had the assistance of a financial advisor in order to succeed in their deal. As we can see, the majority of the public entities (62.5% of the total sample) or 140 public firms had an advisor for their financial issues. On the other hand, 56.25% or 126 private companies preferred not to use external financial advisors to consult them for their RTO deal. In general, public entities of the transaction seek for a consultation more often than the private firm and there are cases, in which the very same firm might receive consultation from more than one financial advisor.

Table 9: Public and private firms that had a financial advisor.

	Private firm	Public firm
Financial advisor	98	140
No financial advisor	126	84
Total	224	224

Table 10 indicates the number of book runners and managers that had been requested by each company that went public. We do not comment the part of the firms for which the databases gave us a result of either “not available” or “not applicable”. In general, we can see that the vast-majority of the firms had at least one book runner and one manager. UBS, Morgan Stanley, Goldman Sachs, Deutsche Bank and Credit Suisse were the most frequently used book runners. Companies that used more than one manager usually had some global coordinators, some co-managers, some co-lead managers or some joint book runners. It is remarkable that 36 firms chose four or more managers to handle their IPO procedure. However, it is worth mentioning that there is no correlation or empirical evidence (in our sample) suggesting that the more managers or book runners a firm chose, the higher the amount of the deal was.

Table 10: Number of Bookrunners and managers per initial public offer.

No. of Bookrunners	IPOs	No. of Managers	IPOs
Not available/ Not applicable	91	Not available/ Not applicable	64
1	106	1	80
2	14	2	24
3	8	3	20
4	3	4	13
5	2	5	7

6	0	6	7
7	0	7	5
8	0	8	1
10	0	10	2
13	0	13	1

Methodology

Univariate method

We first examine whether RTOs differ significantly from their control IPO counterparts in terms of financial and operating characteristics during the year of the going public transactions, by using t-tests for differences in means.

Short-term performance - Cumulative Abnormal Returns (CARs)

To measure the share price reaction to the announcement of a reverse takeover we use the classical event study methodology that has been introduced by Brown and Warner (1985) in order to evaluate the wealth effects of RM announcements on the wealth of the shareholders of the public firms. In our case, we use the market model, the market-adjusted returns model and the buy-and-hold abnormal return model to calculate the stock price reactions.

According to the market model, which is used as a return-generating approach, we calculated the abnormal returns as follows:

$$AR_{it} = R_{it} - (a_i + b_i * R_{mt})$$

The abnormal returns based on the market-adjusted model are calculated as follows:

$$AR_{it} = R_{it} - R_{mt}$$

Where in both models:

AR_{it} is the abnormal return,

R_{it} is the security return i at time t ,

R_{mt} is the return of the stock market at the time t as it is provided by the main index of each European country.

The parameters a_i and b_i are estimated using the Scholes and Williams (1977) technique which takes into account the thin trading problem, a commonly observed problem in companies with low trading activity. The parameters of the market model are estimated by regressing the returns of each share with the return of the stock market for the period that ranges from $t = -250$ to $t = -11$, where $t = 0$ is the announcement date for the event.

The average abnormal returns (AAR) of the sample can be calculated as:

$$AAR_t = \sum_{i=1}^N \frac{AR_{it}}{N}$$

Where N is the number of public entities announcing a RTO.

We then calculate the cumulative abnormal returns (CARs) for the event windows below: (-10, -1), (+1, +10), (-5, -1), (+1, +5), (-1, +1) and (-1, 0). The main reason of calculating CARs both prior and after the RM announcement date is to capture any potential information that leaks or sluggish the market reaction to RTO announcements. The CARs are calculated as:

$$CAR_{iT} = \sum_{t=1}^T AR_{it}$$

Long-term performance - Buy-and-hold Abnormal Returns (BHARs)

To gauge the stock price reaction to RTOs and IPOs, we use the buy-and-hold abnormal returns (BHARs) method. More specifically, we compute the BHARs over 6, 12, 18 and 24 months after the going-public event. BHARs are computed as the difference between the compounded actual return of the announcing company and the compounded return of the market and are calculated using the formula below:

$$BHAR_{it} = \prod_{t=0}^T (1 + R_{it}) - \prod_{t=0}^T (1 + R_{mt})$$

Where:

R_{it} is the time t arithmetic mean on security i,

R_{mt} is the time t arithmetic return on the benchmark.

In order to test the statistical significance of BHARs, we calculate the t-statistics for the different normal return estimation procedures. Given that in our case there is a positive skewness⁵⁹, the results will be misspecified. Thus, we compute the skewness adjusted t-statistic as⁶⁰:

$$t_{skewness-adjusted} = \sqrt{N} * (S + \frac{1}{3} * \hat{\gamma} * S^2 + \frac{1}{6N} * \hat{\gamma})$$

Where:

N is the total number of the public companies announcing a RTO or the total number of the IPOs, depending on the sample we work with,

$$S = \frac{ABHAR_t}{\sigma * BHAR_t},$$

γ is the coefficient of skewness, estimated as: $\sum_{i=1}^N = \frac{(BHAR_{i,t} - ABHAR_t)^3}{N * \sigma * BHAR_t^3}$

ABHAR_t is the sample mean,

$\sigma * BHAR_t$ is the cross-sectional standard deviation of the buy-and-hold returns.

Post-going public operating performance

We assess the long-term performance per deal, by employing some key fundamental ratios for the years 0, 1 and 2 after the effective day of the event. To reduce the effects of outliers, we trim all financials by 1.5% based upon the final RTO and matched IPO samples.

UK vs non-UK comparison

After having conducted our study in the whole sample, we examine whether the results in our sample are UK driven, given that the majority of the firms come from the UK. For this reason, we split our sample into UK and non-UK firms and we proceed to the same tests as before.

⁵⁹ Because of the employment of the market returns to estimate normal returns, the distribution of the long-run abnormal returns is positively skewed (Dasilas et al., 2017).

⁶⁰ Pastor-Llorca and Martín-Ugedo (2004)

T-tests for differences in means and medians

We use the two-tailed test for differences in means and the Mann–Whitney Wilcoxon test for differences in medians to see whether there are significant differences between RTOs and their matched IPOs in terms of long-term price reaction and post-going public operating performance.

Survival rates

We report the survival rates of RTOs and their matched IPOs based on the evidence we found on Bloomberg database according to two criteria. In particular, a company has survived if a) it has not been delisted or b) it has not been merged or acquired by a third entity for a period of two years after the going-public event.

First day returns

We compute the first-day returns to analyze the degree of underpricing between the two-alternative going public mechanisms. First-day returns for RTO firms are the percentage change in the price at the close of the effective day of the RM transaction (that is the first trading day of the new combined entity) from the closing price on the day before. For IPOs, the first-day return is calculated as the percentage change in the closing price at the first day of trading as a newly listed firm from the offer price.

SECTION 6

Empirical Results and analysis

We examine whether the key fundamental characteristics of RTOs and IPOs differ significantly at the year 0, which is the year of the going public transaction. Table 11 shows the results of the univariate tests for some selective fundamentals. The test for differences in means indicate that the RTO companies do not differ significantly from their matched IPOs in terms of total assets in the year of going public, which is not surprising as the two samples were sized matched. In general, both categories seem to have negative profitability as denoted by the ROA and ROE ratios. However, RTOs are significantly less profitable than their matched IPOs. In the table, there is also information about liquidity, leverage, asset use efficiency and distress of the two categories. The tests for differences in means indicate that in all ratios (except for leverage and asset use efficiency), the differences between the two groups are significant at the 1% level. In general, we could conclude that IPOs have higher

performance, on average, than their matched RTOs at the beginning of their lives as public companies.

Table 11: Univariate results for selective key fundamentals of RTOs and IPOs at the year of going public.

	Mean of RTOs	Mean of IPOs	RTOs vs IPOs T-Statistic	<i>p</i> value for differences in means
ROA (%)	-27.74	-2.83	3.66	0.000**
ROE (%)	-32.59	-0.94	-3.89	0.000***
CASH/TOTAL ASSETS (%)	16.49	26.64	-4.61	0.000***
CURRENT	2.61	4.22	-2.77	0.006***
QUICK	1.95	3.5	-2.91	0.004***
CASH	1.59	2.97	-2.61	0.01***
DEBT/TOTAL ASSETS (%)	16.17	16.03	0.07	0.95
ASSET TURNOVER (%)	65.24	74.63	-1.24	0.216
ALTMAN'S Z Score	3.83	10.91	-3.06	0.003***
TOTAL ASSETS (in € million)	326.17	297.14	0.81	0.811

Short term price performance analysis

Stock price reaction to RTOs announcements

In this section, we examine the short-term impact of RTO announcements on public firms' stock prices. Table 12 and Table 13 report the results from the analysis of the 21 days surrounding the event, i.e. the period of days from the day -10 till the day +10 for the reverse merged companies under examination in order to capture potential information leakages or sluggish market reaction to RTOs announcements not only prior but also after the reverse merger deals.

For the aforementioned period of the 21 days, the day 0 is the day that the reverse takeover deal has been announced. We examine 6 subsamples, which we call event windows and they are: (-10, -1), (+1, +10), (-5,-1), (+1, +5), (-1, +1) and (-1, 0). More specifically, Table 12 reports the cumulative abnormal returns (CARs) according to the market model and whether the CARs are significant for each of the periods. In addition to the market model, in Table 13, we show the CARs and their t-statistic values for the adjusted market model.

Looking at the market model, we observe that the abnormal returns for the days -1, 0 and +1 are 1.34%, 3.66% and 2.15% respectively and they are all statistically significant at the 1%

level. Looking at the CARs for the event windows (-1, +1) and (-1, 0), we observe that they are equal to 7.14% and close to 5% respectively. Both event windows are significant at the 1% level. Moreover, the CAR of the event period of (-10, -1) is 3.66%, while on the other hand the CAR of (+1, +10) is 0.95%. In the first case the result is significant at the 1% level, while in the event window of (+1, +10), the result seems to be insignificant at any level. For the event windows of (-5, -1) and (+1, +5), we observe that the CARs are 3.45% and 1.89% respectively, being significant at the 1% and 5% levels, respectively.

For days -1, 0 and +1, using the market-adjusted model we observe that the respective abnormal returns are 1.5%, 4.66% and 4.31%. The AR of the day -1 is significant at the 5% level. Finally, the CARs of the (-1, +1) and (-1, 0) event windows are 10.51% and 6.21% and they are significant at the 1% and 5% levels respectively. For the rest periods, the results are quite close to those of the previous analysis and range from 3% to 4.5%.

In general, we could conclude that the market-adjusted model gives higher and less significant CARs compared to the market model. However, in all event windows the results are the same, apart from the period of (-5, -1) and (+1, +5), which turns to be insignificant at the market-adjusted model.

Table 12: Abnormal and cumulative abnormal returns around reverse mergers (Market Model).

Full sample of reverse takeovers (N=224)		
	AR%	t-Statistic
-1	1.34***	4.02
0	3.66***	11.02
1	2.15***	6.46
Interval		
Interval	CAR%	t-Statistic
(-10,-1)	3.66***	3.49
(-5,-1)	3.45***	4.65
(+1,+5)	1.89**	2.55
(+1,+10)	0.95	0.01
(-1,+1)	7.14***	12.42
(-1,0)	5***	10.64

This table reports abnormal returns (in %) according to the market model. *, ** and *** represent statistical significance at the 10, 5 and 1 percent levels respectively.

Table 13: Abnormal and cumulative abnormal returns around reverse mergers (Market Adjusted Model).

Full sample of reverse takeovers (N=224)		
	AR%	t-Statistic
-1	1.55**	2.09
0	4.66	1.33
1	4.31	1.05
Interval		
Interval	CAR%	t-Statistic
(-10,-1)	3.69*	1.84
(-5,-1)	3.86	0.89
(+1,+5)	4.52	1.04
(+1,+10)	3.08	0.03
(-1,+1)	10.51***	3.57
(-1,0)	6.21**	2.00

This table reports abnormal returns (in %) according to the market adjusted model. *, ** and *** represent statistical significance at the 10, 5 and 1 percent levels respectively.

Undoubtedly, RTOs' announcements are wealth-increasing transactions for the public firm's shareholders, in line with previous literature [e.g. Gleason et al., (2005), Song et al., (2014), Dasilas et al., (2017)]. The abnormal returns emanated from reverse mergers can be evaluated in conjunction with the abnormal returns associated with traditional mergers and acquisitions. Generally, the abnormal returns to bidders are insignificant whereas (publicly traded) targets receive all the positive wealth effects from the transactions.⁶¹ However, Chang et al. (1998) examine takeovers of privately held targets and show that bidders experience positive and significant abnormal returns at the takeover announcement date. In cases where a new block holder arises from the target, the average abnormal returns for the bidders are 4.96 %.⁶² The authors attribute these positive abnormal bidder returns to the monitoring hypothesis, according to which the emergence of a new block holder leads to more efficient monitoring of management and thus higher firm value. This is particularly relevant to the structure of an RTO transaction, where the private firm's shareholders become the majority shareholders of the enlarged entities; they thereby have the power to change the board composition and monitor the managers. In this sense, efficiency gains can derive from the expertise of the new block holders and these gains are depicted in the positive CARs around the RTO announcement date. Similarly, Dasilas et al. (2017) show that the market reaction to reverse takeovers announcements during the recent financial crisis is more positive than equivalent

⁶¹ See for instance: Travlos (1987), Stulz et al. (1990), Goergen et al. (2004).

⁶² For the same window [-1, 0], we find a statistically significant CAR of 5%.

announcements occurred before the crisis; investors thus believe that the new managers have the appropriate skills to restructure financially distressed public companies.

First day returns of RMs versus IPOs

In this sub-section we analyze the degree of underpricing between the two-alternative going public mechanisms by computing first trading day returns. As mentioned before, first-day returns for RTO firms are the percentage change in the price at the close of the effective day of the RM transaction (that is the first trading day of the new combined entity) from the closing price on the day before. For IPOs, the first day return is calculated as the percentage change in the closing price at the first day of trading as a newly listed firm from the offer price.⁶³ Table 14 displays first trading day returns for RMs and their matched IPOs.

Table 14: First day returns.

Sample of reverse takeovers and matched sample of IPOs (N=85)		
RTO sample mean returns (RTO sample median returns)	IPO sample mean returns (IPO sample median returns)	<i>p</i> value for differences in means (Wilcoxon <i>p</i> value for differences in medians)
3.8%	16.41%	0.083*
(0.3%)	(7.74%)	(0.000)***

This table reports first day returns (in %). *, ** and *** represent statistical significance at the 10, 5 and 1 percent levels respectively.

The mean (median) first trading day return of the RTO sample is 3.8% (0.3%), while the mean (median) first trading day return of the control IPO sample is 16.41% (7.74%).⁶⁴ The tests for differences in means and medians denote that the first trading day returns for RTOs are significantly lower than that for their matched IPOs (at the 10% level regarding means and at the 1% level regarding medians). Our results are consistent with the findings of Gleason et al. (2006), who find that the mean (median) first day returns of US RMs and their matched

⁶³ Offer prices for IPO firms were derived from IPO prospectuses. We managed to find and verify offer prices for 85 IPOs. Thus, in order for our analysis to be as comparable as possible, we matched only these 85 IPOs with their corresponding RTOs.

⁶⁴ For a holistic view of IPOs' initial underpricing across different countries, see Ritter (2003), "Differences between European and American IPO markets", pp.423-425.

IPO counterparts are 7.88% (2.12%) and 23.05% (9.15%) respectively; this difference is also statistically significant. The authors provide two reasons for the lower first day returns of RTO firms: a) a reverse merger is an expected event. Part of the initial underpricing may be absorbed in the returns to the public vehicle firm surrounding the announcement of the merger. Our findings in the previous part concerning positive and statistically significant CARs around the RM announcement dates corroborate this argument. b) The value of the RM transaction is determined by the counterparties in advance, while the offer price in an IPO is determined by the underwriters just before the first trading day. Thus, investors have more certainty when assessing RM investments than IPO investments.

In the same context, Brown et al. (2010) show that the median first day returns for RMs and control IPOs in Australia are 5% and 10.5% respectively, while this difference is statistically significant. The authors contend that the requirement of prospectus release in most RTO cases would impact on the information environment of these firms in the sense that larger publicity would lead to lower valuation uncertainty and ultimately lower degree of underpricing.⁶⁵ This is probable why in our analysis the first-day returns for both European RMs and IPOs are lower than the equivalent of US RMs and IPOs, as reported by Gleason et al. (2006). Furthermore, Floros and Sastri (2010) support an interesting explanation concerning the lower underpricing endured by RM owners. Particularly, they show that the owners of the new enlarged entities mitigate the initial mispricing by reducing the percentage of registered shares distributed as common and outstanding upon completion of the RM.

Overall, the positive and significant CARs surrounding the RM announcement date in conjunction with the significantly lower first-day returns of the combined entities compared to their IPO counterparts deconstruct the common argument that RTOs incur lower indirect costs (in terms of lower degree of underpricing). On the other hand, the elimination of this supposed advantage renders RTOs a true alternative to IPOs.

⁶⁵ Under this notion of larger publicity, Floros and Sapp (2011) split their US RTO sample into those public shell firms that announce formally an anticipated RM and those who do not. In the cases where the announcement date precedes the effective date of the merger, the authors report positive and significant CARs around the announcement date. However, over the windows [-30,+30] and [-5,+5] surrounding the effective date of the merger, the CARs for these firms are not as large as the equivalent CARs for those firms that do not announce a letter of intent. Particularly, the CARs for the latter (former) are 48.1% (17.4%) and 28.94% (18.9%) for the windows [-30, +30] and [-5, +5] respectively. Thus, a part of the expected return upon consummation of the RM transaction has already been captured in the first return around the announcement date.

Long-term price performance analysis

BHARs of RTOs vs. IPOs

In this section, we analyze the long-term price performance of RTOs and their matched IPOs, by calculating the buy and hold abnormal returns (BHARs) for the periods of 6, 12, 18 and 24 months after the going-public event. In Table 15, 16 and 17 we illustrate the long-term impact of the alternative going-public mechanisms on the stock price behavior of the public companies. Apart from the full sample, we divide the companies into UK and non-UK in order to observe any potential differences between the two subsamples.

Starting from the full sample, Table 15 shows that mean BHARs of IPOs are negative for each period and statistically significant at the 1% level. At the same table, it is observed that the average BHARs per semester for the RTOs are negative as well, but they are significant at 10% and 1% levels for the 6 and 24 months respectively. At both cases of IPOs and RTOs the BHARs are decreasing from semester to semester by almost 3.5% units and it is almost triple after two years compared to the six first months. Moreover, the BHARs for the first two periods are quite close, but in the second year a slight deviation between the averages of the two categories is observed. The tests for differences in mean BHARs between RTOs and IPOs indicate that the performance of both alternatives is comparable for the entire period under examination.

In Table 16, we compare and contrast the average BHARs per semester for RTOs and their control IPOs for the UK sub-sample. In Table 17, we provide similar analysis for the non-UK sub-sample. In the UK case, all BHARs are negative, apart from that of the 6 months period (0.001%). In general, the BHARs of both IPOs and RTOs follow a declining trend. More specifically, the UK RTOs have a BHAR of -4.07% and -14.98% after 1 and 2 years respectively, while the UK IPOs' BHARs are equal to -8.05% and -19.84% for the same periods. The difference between the mean RTO BHARs and the mean IPO BHARs is not statistically significant at any period. Turning to the non-UK sample, it seems to have a negative trend at the average BHAR values and they are all significant. More specifically, the non-UK RTOs' BHARs change from -23.13% at the end of the first semester to -35.3% at the end of the second year. The non-UK IPOs' BHARs moved from -9.64% at the first six months to -19.49% at the end of the 24 months. The mean RTO BHARs are not significantly different from the mean IPO BHARs at any examined period.

To conclude, we could say that at the end of the second year RTOs display almost identical losses (-21.48%) to that of their matched IPOs, which suffer losses of -19.80%. In addition,

they both lose an average of 10.24% at the end of the first 12 months. Furthermore, it seems that UK RTOs exhibited the best performance compared to the rest companies. More specifically, at the end of the 4th semester after going public, the UK RTOs have a BHAR of -14.98% which is the highest BHAR compared to the UK IPOs (-19.84%) and the non-UK IPOs (-19.49%) and less than half of the non-UK RTOs, which had an average BHAR of -35.3%. In sum, the long-run price performance of RTOs is comparable to that of their matched IPOs in all sub-periods under examination. By splitting the overall RTO and IPO population into UK and non-UK samples, we demonstrate that the equivalent performance of the two-alternative going-public routes is non-UK-driven, but rather a pan-European phenomenon.

Table 15: BHARs of RTOs vs. matched IPOs (full sample).

N=224					
Period (in months)	RTO sample mean BHARs	Adjusted t-statistic	IPO sample mean BHARs	Adjusted t-statistic	<i>p</i> value for differences in means
24	-21.48***	-3.36	-19.80***	-4.45	0.852
18	-11.51	-1.39	-16.71***	-3.96	0.567
12	-10.22	-1.50	-10.26***	-2.89	0.996
6	-7.14*	-1.69	-6.67***	-3.11	0.920

This table reports BHARs (in %) for 6, 12, 18 and 24 months after the going-public event. Adjusted t-statistic is calculated as in Pastor-Llorca and Martin-Ugedo (2004). *, ** and *** represent statistical significance at the 10, 5 and 1 percent levels respectively.

Table 16: BHARs of RTOs vs. matched IPOs (UK sample).

N=167					
Period (in months)	RTO sample mean BHARs	Adjusted t-statistic	IPO sample mean BHARs	Adjusted t-statistic	<i>p</i> value for differences in means
24	-14.98*	-1.85	-19.84***	-3.73	0.610
18	-3.07	-0.23	-18.05***	-3.57	0.194
12	-4.07	-0.49	-8.05*	-1.93	0.641
6	0.001	0.02	-5.39**	-2.15	0.309

This table reports BHARs (in %) for 6, 12, 18 and 24 months after the going-public event. Adjusted t-statistic is calculated as in Pastor-Llorca and Martin-Ugedo (2004). *, ** and *** represent statistical significance at the 10, 5 and 1 percent levels respectively.

Table 17: BHARs of RTOs vs. matched IPOs (non-UK sample).

N=57					
Period (in months)	RTO sample mean BHARs	Adjusted t-statistic	IPO sample mean BHARs	Adjusted t-statistic	<i>p</i> value for differences in means
24	-35.3***	-3.45	-19.49**	-2.30	0.242
18	-30.41***	-2.80	-12.63*	-1.64	0.194
12	-24.00*	-1.80	-15.82**	-2.25	0.593
6	-23.13***	-2.81	-9.64**	-2.33	0.156

This table reports BHARs (in %) for 6, 12, 18 and 24 months after the going-public event. Adjusted t-statistic is calculated as in Pastor-Llorca and Martin-Ugedo (2004). *, ** and *** represent statistical significance at the 10, 5 and 1 percent levels respectively.

The long-run underperformance of IPOs and RTOs has been widely documented in the relevant literature.⁶⁶⁷ Semenenko (2011) provides evidence of the market timing hypothesis from the perspective of RTOs.⁶⁸ Particularly, managers of companies that go public via RMs exploit “windows of opportunity” (Loughran & Ritter, 1995) and sell overvalued equity to investors. The market corrects downwards the initial mispricing leading to long-run underperformance. Moreover, Dasilas et al. (2017) contend that since reverse mergers are corporate combinations, the task of reshaping companies with minimal or no actual business is challenging. After the completion of the merger shareholders of the combined entities view with mistrust the managers’ restructuring initiatives putting thus downward pressure on the stock price.

Using Korean evidence, Song et al. (2014) find that over 18 months after the going-public events the median BHARs for RTOs and their matched IPOs are -72% and -47% respectively and the difference is statistically significant. The inferior quality of the firms entering the Korean Stock Exchange through RMs seems to play a decisive role in the significantly worse long-run price performance of RTOs compared to their control IPOs. This is because until

⁶⁶ For a concise view of IPOs’ long-run performance across different countries, see Kooli et al. (2004), “The aftermarket performance of initial public offerings in Canada”, p.50.

⁶⁷ Regarding explanations of IPOs’ long-run underperformance see Ritter and Welch (2002), “A Review of IPO Activity, Pricing and Allocations”, pp. 1821-1822.

⁶⁸ Concerning market timing in the IPO markets, see: Loughran et al. (1995), Spiess et al. (1995).

2006 the minimum listing requirements of firm size and profitability were being applied only to IPOs; thus, private companies which could not meet these standards were exploiting the back-door alternative. Employing data from the Canadian market, where the initial listing requirements are lax and private companies using an RM to go public benefit from prospectus and registration exemptions, Carpentier et al. (2010) show that over 3 years after the transaction the mean BHARs for RTOs and their control IPOs are -82% and -33% respectively and the difference is statistically significant. By contrast, Appadu et al. (2014) examine a sample of RTOs vs. matched IPOs collected by the London stock exchange, in which the same entry requirements are applied to both IPOs and RTOs. The authors find that over 2 years after listing the mean equal-weighted BHARs for RTOs and their IPO counterparts are -17% and -16%, respectively. Furthermore, Gleason et al. (2006) show that over three years after listing the median equal-weighted BHARs of US RTOs and their matched IPOs are -18% and -16% respectively and the difference is not statistically significant.

The aforementioned papers, taken together, provide further support to the argument that the stricter the regulatory framework (as in the cases of UK and US in contrast to Korea and Canada), the closer the performance of RTOs with that of comparable IPOs. These outcomes are in alignment with theories suggesting that companies which comply with higher listing standards receive better valuations and incur less mispricing.

Post-going public operating performance of RMs versus IPOs

In this section, we examine the financial performance of the new combined entities in comparison with their control IPOs for the year in which the going-public transaction occurs (0 year) and the subsequent two years (+1 and +2). Table 18 reports changes in the accounting performance of RTOs and whether these changes are statistically significant. Table 19 shows if the change in the values of various financial ratios for RTOs differs significantly from the change in the values of the same financial ratios for their matched IPOs.⁶⁹

First, the profitability of RTO firms as measured by ROA and ROE improves (becomes less negative) in the post-reverse takeover era. Particularly, in both ratios the increase between the first full reporting year as a public company and the actual year of the transaction is statistically significant, while for the same period the profitability of their control IPOs decreases. In fact, over the whole period under examination (0, +2) the increase in the

⁶⁹ The absolute change.

profitability of RTOs is significantly different from the decrease in the profitability of their IPO counterparts.

Turning our attention to the liquidity of RTO firms as calculated by the cash to total assets ratio, we report a statistically significant reduction for the period 0, +1. However, for the same period the decline in the cash to total assets ratio for the control IPO firms is significantly greater than that of the RMs (at the 10% level as indicated by the mean changes). Furthermore, we evaluate the ability of RMs and their matched IPOs to comply with their short-term obligations by employing three liquidity ratios: current, quick and cash ratio. Specifically, two years after the going public transaction, both mean and median liquidity ratios of RTO firms reach their lowest values. In fact, over the period 0, +2 the cash ratio decreases significantly (at the 10% level). Compared to their matched IPOs, RTOs experience significantly lower decline in their liquidity levels, as measured by the difference between the change in the values of the three liquidity ratios for RTOs and the change in the values of the same liquidity ratios for IPOs for the periods 0,+1 and 0,+2.

Examining the debt levels of the new enlarged entities, we show that the debt to total assets ratio increases over the two years after going public (though insignificantly) and in any case it remains close to 20%. However, their IPO counterparts exhibit significantly greater increase in their debt levels (as indicated by the mean change in the values of the debt/total assets ratio for RTOs versus the mean change in the values of the same ratio for IPOs over the periods 0, +1 and 0, +2).⁷¹

In order to assess the efficiency with which RTO companies deploy their assets in generating revenues, the asset turnover ratio (ATO) is analyzed. Although both mean and median ATO is less than unity during the examination period, it increases significantly over the two years after the going-public transaction. Compared to their control IPOs, RTOs display a significantly larger increase in ATO (as denoted by the change in the values of ATO for RTOs versus the equivalent of IPOs for the periods 0, +1 and 0, +2).

Looking at the likelihood of bankruptcy as measured by Altman Z-score, RTO firms experience a statistically significant decline in distress (at the 10% level) during the period 0, +2. Nevertheless, the decline in distress of their IPO counterparts is significantly greater (at

⁷¹ In results not reported in tables, two years post-IPO the average debt to total assets ratio is 26%.

the 1% level as measured by the median change in the value of Altman Z-score for RTOs versus the equivalent of IPOs over the period 0, +2).⁷²

Table 18: Post-going public operating performance of RTOs (full sample).

Panel A: Return on Asset surrounding the going-public year						
Years	0	1	2	Period	(0,+1)	(0,+2)
Mean	-27.74	-12.64	-14.00	Change	15.1	13.74
Median	-1.65	-0.27	-1.45	<i>p</i> value	0.024**	0.044**
				Wilcoxon <i>p</i> value	0.289	0.682
Panel B: Return on Equity surrounding the going-public year						
Years	0	1	2	Period	(0,+1)	(0,+2)
Mean	-32.59	-13.58	-19.96	Change	19.01	12.63
Median	-2.8	0.7	-2.31	<i>p</i> value	0.048**	0.201
				Wilcoxon <i>p</i> value	0.287	0.872
Panel C: Cash to total assets ratio surrounding the going-public year						
Years	0	1	2	Period	(0,+1)	(0,+2)
Mean	16.49	13.45	15.63	Change	-3.04	-0.86
Median	9.89	8.14	7.55	<i>p</i> value	0.065*	0.642
				Wilcoxon <i>p</i> value	0.054*	0.227
Panel D: Current ratio surrounding the going-public year						
Years	0	1	2	Period	(0,+1)	(0,+2)
Mean	2.61	2.13	2.03	Change	-0.48	-0.58
Median	1.23	1.25	1.19	<i>p</i> value	0.224	0.141
				Wilcoxon <i>p</i> value	0.400	0.154
Panel E: Quick ratio surrounding the going-public year						
Years	0	1	2	Period	(0,+1)	(0,+2)
Mean	1.95	1.58	1.49	Change	-0.37	-0.46

⁷² In results not reported in tables, two years after the going-public events, RTOs and their matched IPOs do not exhibit fundamentally different levels of distress. Particularly, the median Altman Z-score for RTOs and IPOs is 2.47 and 3.44 respectively, denoting that both scores are closer to 3 rather to 1.8.

Median	0.78	0.78	0.75	<i>p</i> value	0.269	0.168
				Wilcoxon <i>p</i> value	0.488	0.344
Panel F: Cash ratio surrounding the going-public year						
Years	0	1	2	Period	(0,+1)	(0,+2)
Mean	1.59	1.19	1.06	Change	-0.4	-0.53
Median	0.33	0.27	0.27	<i>p</i> value	0.232	0.114
				Wilcoxon <i>p</i> value	0.08*	0.079*
Panel G: Debt to total assets surrounding the going-public year						
Years	0	1	2	Period	(0,+1)	(0,+2)
Mean	16.17	17.04	18.97	Change	0.87	2.8
Median	7.2	11.85	13	<i>p</i> value	0.67	0.186
				Wilcoxon <i>p</i> value	0.4583	0.1325
Panel H: Asset turnover ratio surrounding the going-public year						
Years	0	1	2	Period	(0,+1)	(0,+2)
Mean	65.24	80.45	91.94	Change	15.21	26.7
Median	41.29	62.1	67.84	<i>p</i> value	0.058*	0.004***
				Wilcoxon <i>p</i> value	0.007***	0.001***
Panel I: Altman's Z score surrounding the going-public year						
Years	0	1	2	Period	(0,+1)	(0,+2)
Mean	3.83	-52.31	-4.2	Change	-56.14	-8.03
Median	2.52	2.44	2.47	<i>p</i> value	0.347	0.082*
				Wilcoxon <i>p</i> value	0.54	0.357

The table reports the operating performance of the combined entities. *, ** and *** represent statistical significance at the 10, 5 and 1 percent levels, respectively.

Table 19: Changes in the operating performance of RTOs versus changes in the operating performance of matched IPOs.

Panel A: Full sample			
Period (0,+1)			
	Mean changes for RTOs (Median changes for RTOs)	Mean changes for matched IPOs (Median changes for matched IPOs)	<i>p</i> value for differences in means (<i>p</i> value for differences in medians)
ROA	16.99 (1.99)	-3.61 (0.12)	0.002*** (0.005)***
ROE	17.95 (2.75)	-4.94 (-2.79)	0.021** (0.001)***
Cash/total assets	-3.2 (-1.23)	-6.10 (-1.98)	0.07* (0.117)
Current ratio	-0.41 (-0.04)	-1.45 (-0.19)	0.01** (0.005)***
Quick ratio	-0.43 (-0.04)	-1.38 (-0.14)	0.016** (0.026)**
Cash ratio	-0.43 (-0.03)	-1.34 (-0.1)	0.017** (0.009)***
Debt/total assets	0.87 (0)	3.39 (0)	0.077* (0.171)
ATO	11.66 (5.48)	2.41 (1.18)	0.038** (0.023)**
Altman's Z score	-72.38 (0.12)	-4.62 (-1.03)	0.379 (0.012)**
Panel B: Full sample			
Period (0,+2)			

	Mean changes for RTOs (Median changes for RTOs)	Mean changes for matched IPOs (Median changes for matched IPOs)	<i>p</i> value for differences in means (<i>p</i> value for differences in medians)
ROA	18.31 (1.21)	-0.56 (0.01)	0.044** (0.09)*
ROE	11.18 (2.02)	-10.32 (-4.78)	0.07* (0.061)*
Cash/total assets	-2.38 (-1.16)	-8.04 (-3.86)	0.004*** (0.009)***
Current ratio	-0.39 (-0.04)	-1.39 (-0.29)	0.063* (0.004)***
Quick ratio	-0.42 (-0.1)	-1.34 (-0.23)	0.076* (0.005)***
Cash ratio	-0.42 (-0.04)	-1.24 (-0.22)	0.108 (0.001)***
Debt/total assets	2.84 (0)	8.05 (0)	0.083* (0.374)
ATO	25.56 (10.7)	8.2 (3.8)	0.017** (0.043)
Altman's Z score	-9.3 (-0.03)	-8.41 (-2.15)	0.89 (0.000)***

The table shows whether the (absolute) changes in the operating performance of RTOs are significantly different from the (absolute) changes in the operating performance of their matched IPOs. *, ** and *** represent statistical significance at the 10, 5 and 1 percent levels, respectively.

The aforementioned results remain qualitatively unchanged when we split the European RTO population into UK and non-UK samples, as presented in Table 20, Panels A, B, C, and D. This finding is in alignment with our previous inferences concerning the long-term price performance of RTOs and their matched IPOs. Thus, our empirical analysis so far

corroborates the argument that the RTO mechanism offers a viable alternative for specific types of firms (Appadu et al., 2014).

Table 20: Changes in the operating performance of RTOs versus changes in the operating performance of matched IPOs.

Panel A: UK sample			
Period (0,+1)			
	Mean changes for RTOs (Median changes for RTOs)	Mean changes for matched IPOs (Median changes for matched IPOs)	<i>p</i> value for differences in means (<i>p</i> value for differences in medians)
ROA	26.32 (1.7)	-5.13 (0.15)	0.007*** (0.064)*
ROE	11.7 (1.99)	-3.54 (-2.54)	0.164 (0.062)*
Cash/total assets	-2.19 (-1.55)	-7.14 (-2.43)	0.029** (0.116)
Current ratio	0.24 (-0.11)	-1.63 (-0.21)	0.084* (0.075)*
Quick ratio	0.33 (-0.08)	-1.53 (-0.16)	0.080* (0.24)
Cash ratio	0.33 (-0.06)	-1.58 (-0.11)	0.073* (0.12)
Debt/total assets	2.07 (0)	3.99 (0)	0.336 (0.5)
ATO	4.92 (6.08)	1.53 (0.99)	0.684 (0.011)**
Altman's Z score	-107.26 (-0.33)	-5.26 (-1.03)	0.313 (0.276)

Panel B: UK sample			
Period (0,+2)			
	Mean changes for RTOs (Median changes for RTOs)	Mean changes for matched IPOs (Median changes for matched IPOs)	<i>p</i> value for differences in means (<i>p</i> value for differences in medians)
ROA	25.22 (1.14)	5.14 (0.54)	0.13 (0.443)
ROE	6.07 (-0.64)	-2.84 (-1.3)	0.463 (0.727)
Cash/total assets	-0.47 (-1.08)	-9.24 (-5.7)	0.001*** (0.003)***
Current ratio	0.32 (-0.12)	-1.42 (-0.28)	0.147 (0.049)**
Quick ratio	0.35 (-0.12)	-1.36 (-0.23)	0.14 (0.091)*
Cash ratio	0.35 (-0.08)	-1.34 (-0.24)	0.145 (0.030)**
Debt/total assets	5.41 (0.14)	11.08 (0)	0.215 (0.947)
ATO	23.41 (13.22)	8.02 (3.99)	0.382 (0.055)*
Altman's Z score	-11.48 (-0.32)	-9.49 (-2.67)	0.808 (0.004)***
Panel C: non -UK sample			
Period (0,+1)			
	Mean changes for RTOs (Median changes for RTOs)	Mean changes for matched IPOs (Median changes for matched IPOs)	<i>p</i> value for differences in means

	RTOs)	matched IPOs)	(<i>p</i> value for differences in medians)
ROA	12.05 (3.01)	-2.29 (-0.7)	0.049** (0.005)***
ROE	30.18 (10.4)	-6.82 (-5.31)	0.056* (0.001)***
Cash/total assets	-2.85 (-0.56)	-3.22 (-0.99)	0.88 (0.593)
Current ratio	0.02 (0.11)	-0.96 (-0.06)	0.042** (0.021)**
Quick ratio	0.1 (0.01)	-0.95 (-0.1)	0.04** (0.017)**
Cash ratio	0.09 (0.03)	-0.67 (-0.03)	0.03** (0.014)**
Debt/total assets	-0.16 (-0.14)	1.77 (0.16)	0.612 (0.293)
ATO	18.93 (1.84)	5.02 (3.14)	0.157 (0.733)
Altman's Z score	0.15 (0.75)	-1.29 (0.01)	0.335 (0.085)*
Panel D: non -UK sample			
Period (0,+2)			
	Mean changes for RTOs (Median changes for RTOs)	Mean changes for matched IPOs (Median changes for matched IPOs)	<i>p</i> value for differences in means (<i>p</i> value for differences in medians)
ROA	4.41 (1.65)	-8.32 (-3.05)	0.14 (0.004)***

ROE	21.67 (8.65)	-24.94 (-9.58)	0.061 (0.002)***
Cash/total assets	-4.07 (-1.38)	-4.56 (-1.26)	0.868 (0.991)
Current ratio	-0.23 (0.07)	-1.3 (-0.29)	0.082* (0.023)**
Quick ratio	-0.11 (-0.07)	-1.28 (-0.3)	0.052* (0.004)***
Cash ratio	-0.13 (-0.03)	-0.92 (-0.14)	0.058* (0.004)***
Debt/total assets	-0.92 (-0.21)	3.85 (1.16)	0.08* (0.097)*
ATO	25.38 (8.25)	10.57 (3.62)	0.235 (0.372)
Altman's Z score	-2.26 (0.18)	-2.47 (-0.72)	0.96 (0.036)**

The table shows whether the (absolute) changes in the operating performance of RTOs are significantly different from the (absolute) changes in the operating performance of their matched IPOs. *, ** and *** represent statistical significance at the 10, 5 and 1 percent levels respectively.

In summary, RTO firms keep facing considerable challenges in the post-going public era in terms of profitability, liquidity, leverage, asset use efficiency and distress. Our results are in line with Dasilas et al. (2017) who attribute the anemic post-going public operating performance of RTOs to the inherent difficulties of private firms in restructuring their public counterparts along with the risk that they encounter by merging with financially distressed shell companies. Similarly, Gleason et al. (2005) argue that the new managers of the enlarged entities are not “turnaround specialists”.⁷³ Nevertheless, we show that RM firms exhibit significantly lower deterioration in their post-going public accounting performance than that of their matched IPOs. The results are in contrast to the findings of Gleason et al. (2006), who

⁷³ Examining Chinese reverse mergers in relation to a control sample of listed companies, Lee et al. (2003) provide evidence that CRMs do not exhibit worse financial performance than their matched firms. The authors argue that both RMs and their control firms reveal the risks inherent in investing in development-stage penny stocks that trade in the OTC markets.

report a significantly better financial performance for their control IPO sample relative to the RM sample. We conjecture that this disparity in the accounting performance between US and European samples can be ascribed to the fact that in Europe (and especially in the UK) the majority of RTO transactions involve synergistic mergers with going-concern public companies. More generally, Pagano et al. (1998) argue that in Europe companies seeking for a public status are usually more mature and consequently less risky than companies in the US.

Survival analysis

Table 21 presents the survival rates of RTOs versus their matched IPOs over 6, 12, 18 and 24 months after the going-public event.⁷⁴ The results show that the survival rates of RTO firms are high and almost identical to that of IPO firms. By the end of the 24-month period under examination, the survival rates of RTOs are 97.01% while those of IPOs are 97.5% (full sample). According to Panels B and C, both RTOs and IPOs exhibit equivalent survival rates even when we split the overall population into UK and non-UK sub-samples.

Table 21: Survival rates of RTOs and their matched IPOs.

Panel A: Full sample		
	RTOs	IPOs
6-month survival rate (in %)	100	100
12-month survival rate (in %)	99.5	99
18-month survival rate (in %)	99	99
24-month survival rate (in %)	97.01	97.5
Panel B: UK sample		
	RTOs	IPOs
6-month survival rate (in %)	100	100
12-month survival rate (in %)	100	99.34
18-month survival rate (in %)	99.34	99.34
24-month survival rate (in %)	97.35	98.01
Panel C: non-UK sample		
	RTOs	IPOs
6-month survival rate (in %)	100	100
12-month survival rate (in %)	98	98
18-month survival rate (in %)	98	98

⁷⁴ Due to data unavailability we report the survival rates of the final RTO and matched IPO samples.

24-month survival rate (in %)	96	96
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This table reports the survival rates of RTOs and their matched IPOs (as % of the full sample and the UK and non-UK sub-samples respectively). Each company is considered alive, if it has not been delisted or acquired by a third entity during the two years after the going-public event.

Our findings are in accordance with Appadu et al. (2014), who show that the 2-year survival rates of UK RTOs and their IPO peers are 90% and 95% respectively. Similarly, Floros and Sastri (2010) find that the survival rates of their US RTO sample are 90.20%. Moreover, Lee et al. (2013) display that over two years after the flotation the survival rates of RMs and a control sample of firms listed in the US stock markets are 98% and 91% respectively.⁷⁵ Overall, the results of our survival analysis are in line with the aforementioned long-term price performance and operating performance of RTOs versus their matched IPOs.

SECTION 7

Conclusion

During the last two decades many companies have entered the capital markets via reverse takeovers, instead of the traditional IPOs. Nevertheless, recent cases of fraudulent activities around RM deals have challenged the credibility of such transactions. As a response, regulators all over the world intervened in the RTO markets in an attempt to enhance transparency and investor protection.

Employing a sample of 224 RTOs and a matched sample of IPOs that listed on the European stock exchanges between 1996 and 2015, we provide evidence concerning alternative going-public mechanisms from a market, the European one, which is virtually under researched. First, we find statistically significant CARs surrounding the RTOs' announcement dates implying that these transactions have value effects for the shareholders of the public firms. In fact, the sample of RTO firms exhibits a 3-day announcement CAR of 7.1%. We then report first-day returns of the new combined entities vis-à-vis the first-day returns of their control IPO counterparts. We show that the latter experience significantly higher first day returns than the former, since a portion of RTOs' underpricing is captured in the initial returns to the public vehicle around the merger announcement dates. Second, we analyze the long-term

⁷⁵ The evidence from the US markets is conflicting. For instance, Gleason et al. (2005) find that only 46% of the RTOs under examination survive after two years. Adjei et al. (2007) report the 3-year survival rates of their RTO sample in the vicinity of 60%. We conjecture that this disparity is due to the different database that is used in each paper: Gleason et al. (2005) and Adjei et al. (2007) use the SDC database, which mainly contains RMs with regularly operating public companies. Floros & Sastri (2010) and Lee et al. (2013) also use the DFM database, which mostly consists of RMs with public shell companies.

price performance of RTOs and their control IPO firms by calculating BHARs for the periods 6, 12, 18 and 24 months after the going public event. At the end of the second year, RTOs display comparable losses (-21.48%) to that of their matched IPOs (-19.8%) and the difference is not statistically significant. The differences in BHARs between the two groups are not statistically significant even when we split the overall RTO and IPO population into UK and non-UK sub-samples.

Third, we focus on the post-going public operating performance of the two alternative listing methods by computing various financial ratios for the year of the event and the subsequent two years. We show that RTO firms incur in the long term significantly lower deterioration in their liquidity, financial leverage and likelihood of bankruptcy compared to that of the matched IPOs. The former also exhibit significantly better improvement than the latter in terms of profitability and asset use efficiency. These outcomes remain qualitatively unchanged when we examine UK and non-UK sub-samples separately. Last but not least, we report the survival rates of RTOs and their matched IPOs by examining whether each company of the two samples survived or not (as a result of delisting or acquisition by another company) over two years after the going-public event. We show that both RTOs and IPOs exhibit high and almost identical survival rates, in line with our previous analysis. These findings remain again unaltered when we study UK and non-UK companies separately. Overall, we conclude that within Europe reverse takeovers should offer a viable alternative to IPOs for certain types of firms; more importantly, this inference is not UK-driven but rather a wider phenomenon.⁷⁶

We trust that our results have managerial implications for managers, investors and policy makers. Particularly, managers of private firms can also consider the RTO option before they decide which going-public mechanism is tailored to their company's needs. Furthermore, investors could potentially include in their portfolios public shell companies which are about to merge with a private company. Moreover, policy makers could reassess their recent regulatory initiatives in the IPO markets by giving credit to the efficiency of RTO transactions.

Finally, our study could be further expanded by researchers who are interested in the ways of raising capital. For instance, a comparison of stock price and accounting performance of RTOs with a control sample of firms that used the "emerging growth company" (EGC) status

⁷⁶ Greene (2016) shows that when RMs are closely matched with IPOs, the wealth of private firm owners who "exit" their firm through the RM method is not significantly different from the wealth that could be gained via an IPO. The author contends that the RM mechanism itself is not detrimental to the wealth of private firm owners. We support this argument.

under JOBS Act would offer a clear view regarding the effectiveness of the new regulations applied to IPOs. Similarly, a comparative analysis between European RTOs and an up-to date sample of firms that listed on the ENTERNEXT would provide evidence from Europe.

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