



**Department of Economics and Finance**

**Chair in Equity Markets and Alternative Investments**

**IPOs as a Private Equity Exit Route: Empirical Evidence of Legends,  
Pitfalls and Drawbacks**

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Thank you,

A handwritten signature in black ink, appearing to be 'Andrea', with a stylized flourish at the end.

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# INTRODUCTION

Why private equity (“PE”) funds would represent a topic worth a master’s thesis? In this context, a bar chart can be very explicative.

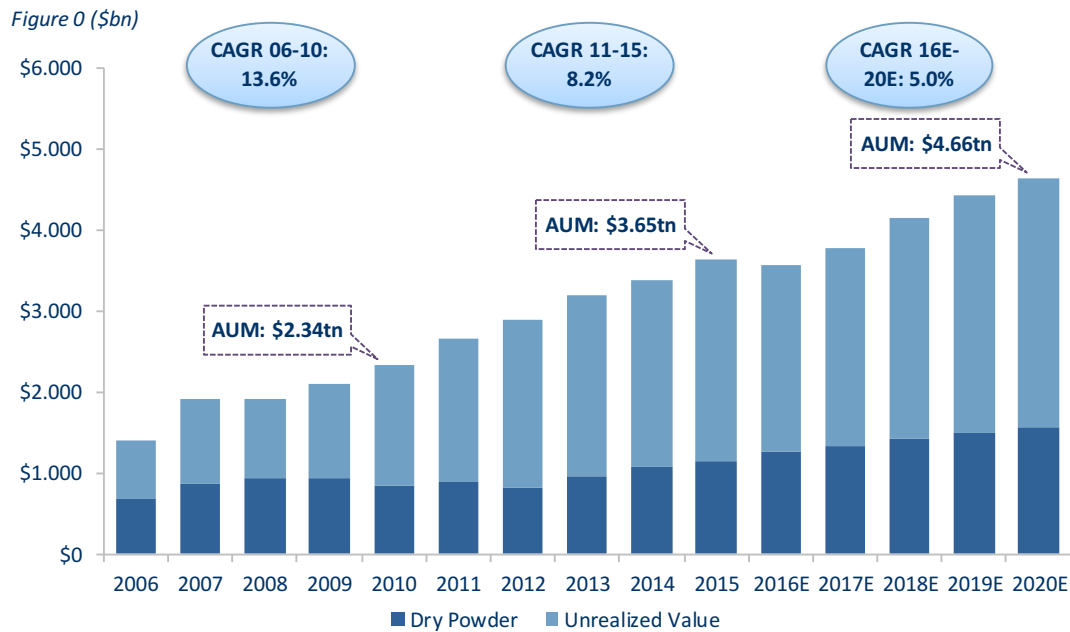


Figure 0: Private equities assets under management (AUM) evolution<sup>1</sup> (data excludes venture capital), including a forecast period (moderate scenario assumptions), (\$bn).  
Source: 2016 Preqin (2006–2015); Deloitte Center for Financial Services analysis (2016E–2020E).

Private equity industry manages over \$3.5tn as of 2015, which is well above the \$2.8tn held by hedge funds<sup>2</sup>, and it grew at a compounded annual growth rate (“CAGR”) of 11.2% in the period from 2006 to 2015 vs. a 7.5% CAGR over the same period of the

<sup>1</sup> Dry powder: the amount of capital that has been committed but remains uncalled to private equity funds. Unrealized value: the amount currently invested in companies not yet exited.

<sup>2</sup> Source: BarclayHedge Ltd.



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hedge fund industry. Moreover, it is estimated that the number of dollar millionaires will rise by 46.2% over the next five years, increasing to a record 49.3 million of millionaire adults<sup>3</sup>: sounds like a good news for General Partners (“GPs”).

Private equity broke-out after World War II, but its very boom dates back to the ‘80s, in a period characterized by the dramatic surge of leverage buyout activity financed through junk bonds, which led to legendary buyouts such as the RJR Nabisco’s one. Since then, they have demonstrated to be quite resilient to financial crisis, and therefore a reliable asset class also for governments looking after to diversify their portfolios.

Private equities’ professionals have deep industry knowledge that combined with their business expertise make them able to deliver high absolute return. The latter depends largely on the exit channel, with initial public offerings reported to deliver the highest returns on average (Schmidt, Steffen, & Szabó, 2009). Using data sourced from Dealogic and integrated with a proprietary database made available by Bank of America Merrill Lynch (containing only publicly available information), the following dissertation examines their performance with respect to both the market and non-sponsor IPOs, as well as its determinant.

Even though the aim of our analysis is not to show whether private equity funds are good or evils, we will show evidence of substantial overperformance, with respect to the market, in the periods of our analysis. We will also identify a breakpoint in their performance, which we identify with the end of the lock-up period and the likely

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<sup>3</sup> *Credit Suisse Global Wealth Report 2015*

## *Introduction*

subsequent block trade. We will give evidence of the anomalous nature of the so-called *overhang*, which will be also quantified.

The dissertation aims to deliver a precise analysis of the sponsor IPOs performance, showing empirical evidence of relevant impacting variables.

The outline is as follows. Firstly, we discuss the relevant literature and give an in-depth market overview of the European private equity industry. In the second section, we define our sample of analysis and we study sponsor-backed IPOs success rate with respect to non-sponsor; then, we analyze the performance at various maturity after the IPO. In the last section, we try to give quantitative evidence of the overhang, analyzing volumes and performance over a determined time period.

# CHAPTER 1

## **Related literature and European private equity market overview**

### **PE investment life-cycle**

The PE investment cycle can be divided into four different phases: fundraising, investment, value-adding, divestment. Even though each phase is crucial for the success of an investment, the exit phase is regarded as the most influential on all the other aspects of the cycle<sup>4</sup> (Gompers & Lerner, 2000).

The fundraising phase is the stage at which the basis of the GP's relationship with the Limited Partners ("LPs") is established. This relationship with the LPs should rest on the principles of the Code of Conduct whose adoption is mandatory for all EVCA (European Private Equity and Venture Capital Association) members and affiliates, together with the requirements of transparency and the fiduciary duties of due skill, care and diligence<sup>5</sup> (EVCA Handbook). Investments in private equity/venture capital funds are subject to restrictions in many jurisdictions on the types of LPs to whom it is permissible to promote funds because of their high-risk nature, making them primarily aimed at institutional or professional investors who are considered fully aware of the risks.

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<sup>4</sup> P.A.GOMPERS and J.LERNER, *Money chasing deals? The impact of fund inflows on private equity valuations*, *Journal of Financial Economics*, 2000

<sup>5</sup> *Professional standards for the private equity and venture capital industry*, EVCA Handbook

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Past studies have shown that investors base their criteria for selecting a fund mainly on its underlying strategy as well as the fund management's track record, the latter regarded as the key factor<sup>6</sup> (Yrkkö, Hyytinen, & Liukkonen, 2001). However, other relevant studies have shown that post-2000 the persistence of buyout fund performance over successive funds has fallen considerably. Difficulties encountered by investors in determining the ultimate current fund performance when choosing whether to commit to the next fund can be an explanation to why they fund buyout GPs whose past performance is below that of their peers. The results for VC funds are completely different. In fact, the persistence of persistence in VC suggests following the industry rule of thumb to invest with GPs that have previously performed well and to avoid those that have not<sup>7</sup> (Harris, Jenkinson, Kaplan, & Stucke, 2013).

The second phase deals with the investment screening, due diligence and valuation to select suitable investments. There are several factors affecting the PE investment process. Among these, the competitive environment facing fund managers plays a big role in how they manage their investments. Relevant studies have shown that during periods in which investment opportunities are good, existing funds invest their capital faster, taking advantage of the favorable business climate, leading to relatively higher returns. On the contrary, when facing greater competition from other private equity funds, fund managers invest their capital more slowly. Moreover, recalling the importance of a good track record, it has been shown that young fund managers'

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<sup>6</sup> J.YRKKO, A.HYYTINEN and J.LIUKKONEN, *Exiting Venture Capital Investments: Lessons from Finland, Discussion Papers No. 781*, 2001

<sup>7</sup> R.HARRIS, T.JENKINSON, S.KAPLAN and R.STUCKE, *Has Persistence Persisted in Private Equity? Evidence from Buyout and Venture Capital Funds, Fama-Miller Working Paper*, February 2014

investments are less responsive to market conditions and such managers invest in riskier targets in an effort to establish a track record, becoming more conservative following periods of good performance<sup>8</sup> (Ljungqvist, Richardson, & Wolfenzon, 2007). Another relevant factor deeply analyzed in PE literature is the fund investment horizon. In particular, scholars have shown how funds with contractually fixed horizon (generally ~10 years) tend not to invest in innovative companies. Long-horizon funds select young companies at an early stage of their development, that grow their patent stock significantly more than companies funded by short-horizon investors. The effect of horizon is the strongest for funds managed by experienced investors<sup>9</sup> (Barrot, 2013). In some cases, PE funds come together and form a “financial syndicate”. This will happen if the risks are high or if the amount of capital required in the operation is particularly substantial. One of the investment funds will represent the group in the syndicate’s dealing with the entrepreneur and will follow a mandate negotiated with his partners<sup>10</sup> (EVCA, 2007). As far as the exit considerations are concerned, empirical evidence shows that they are crucial starting from this phase, as they are key for the structure of the deal<sup>11</sup> (Schwienbacher, 2002).

During the value-adding phase, PE funds contribute to the success of the investment providing different source of value. As a result of a study that surveyed 79 private

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<sup>8</sup> A. LJUNGQVIST, M. RICHARDSON and D. WOLFENZON, *The Investment Behavior of Buyout Funds: Theory and Evidence*, European Corporate Governance Institute - Finance Working Paper No. 174, June 2007

<sup>9</sup> J.N.BARROT, *Investor Horizon and Innovation: Evidence from Private Equity Funds*, AFA 2013 San Diego Meetings Paper, 2013

<sup>10</sup> *Guide on Private Equity and Venture Capital for Entrepreneurs*, EVCA Special Paper, November 2007

<sup>11</sup> A.SCHWIENBACHER, *An Empirical Analysis of Venture Capital Exits in Europe and The United States*, EFA 2002 Berlin Meetings Discussion Paper, 2002

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equity investors with combined AUM of over \$750bn, PE investors say they place a heavy emphasis on adding value to their portfolio companies, both before and after they invest. The sources of that added value, in order of importance, are increasing revenue, improving incentives and governance, facilitating a high-value exit or sale, making additional acquisitions, replacing management and reducing costs. Consistent with adding operational value, the PE investors make meaningful investments in employees and advisors who provide advice and help in implementing operating improvements<sup>12</sup> (Gompers, Kaplan, & Mukharlyamov, 2015).

The divestment or exit phase is the last but not the least stage of the PE investment life cycle. There are many factors affecting the choice of one strategy over another, but these will be examined in depth in due course. For the time being, we limit ourselves to say that generally the exit is a gradual process and is not performed in block. A typical case is the “dual-track process”, in which a company chooses to go down the path of conducting an initial public offering while also pursuing a possible M&A exit. All these peculiarities will be treated in detail later.

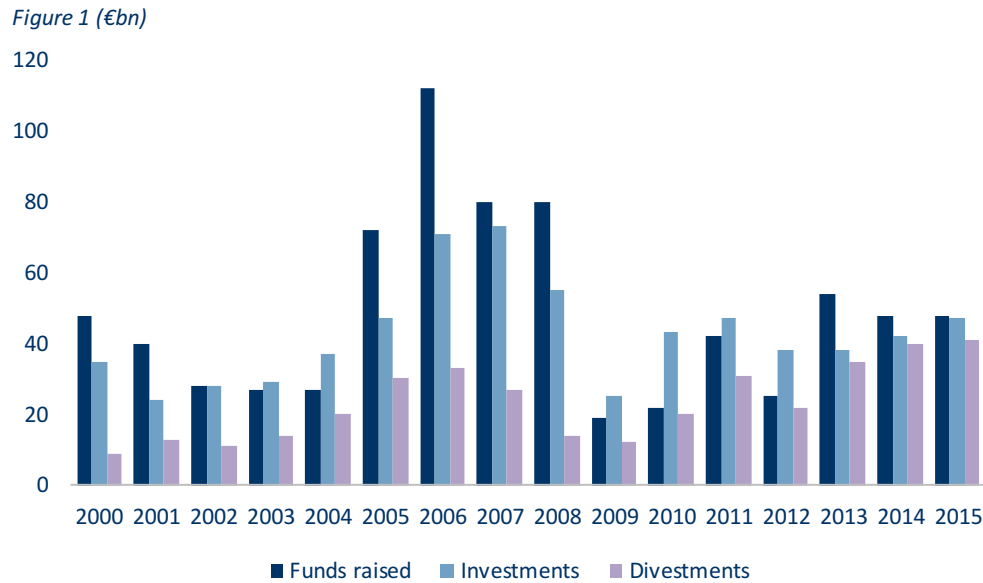
### **Market overview**

In this section, we investigate the historical trends for each of the aforementioned phases of the investment cycle, with the only exception that in this context the investment phase includes also the value-adding phase, reducing the number of phases to 3.

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<sup>12</sup> P.GOMPERS, S.N.KAPLAN and V.MUKHARLYAMOV, *What Do Private Equity Firms Say They Do?*, NBER Working Paper No. 21133, April 2015

Figure 1 shows the historical trends from 2000 to 2015 for both fundraising, investments and divestments, based on data on more than 1,200 European private equity firms accounting for €564bn in capital under management in 2015<sup>13</sup> (Invest Europe, 2016).



*Figure 1: Overview - All Private Equity - Fundraising, Investments & Divestments (amounts in €bn). Source: Invest Europe / Thomson Reuters (2000-2006) & Invest Europe / PEREP\_Analytics (2007-2015).*

From the chart above is easy to denote the huge impact of the 2008-2009 crisis on the industry, which has sharply recovered since then, especially in the last few years. Moreover, we can see that the cumulative value of funds raised exceeds by a wide margin that of investments, which is in line with the increase in the amount of dry

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<sup>13</sup> 2015 European Private Equity Activity, Invest Europe (formerly EVCA), 2016

powder already showed in Figure 0. This may testify a little inefficiency but also a high-selective investment screening process.

## Fundraising

In 2015, total fundraising reached €47.6bn, nearly matching the level of 2014. European private equity and venture capital raised in the past three years 70% more than between the years 2010 and 2012.

Figure 2 (€bn)

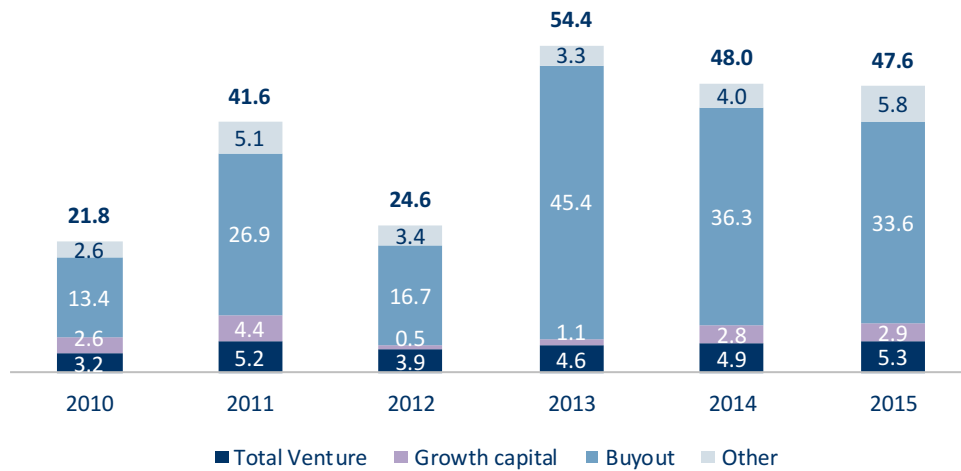


Figure 2: Incremental amounts raised during 2015 (€bn). Source: Invest Europe /PEREP\_Analytics.

Figure 2 also provides a breakdown of the incremental amounts raised during 2015 by fund stage focus. Venture capital (€5.3bn) reached its highest level since 2008, showing an 8% increase over the previous year. Growth funds, funds whose strategy is to invest in relatively mature companies that are looking for capital to expand or restructure operations, slightly exceeded the 2014 level, the highest reported since



2011. Buyout fundraising fell shortly by 7%, but it still represents +70% of all fundraising in 2015. Other funds, including mezzanine<sup>14</sup> and generalist funds, continued their positive trend reaching the highest level since 2008.

Figure 3 below gives a great snapshot of the investor base for the main European regions in 2015. We can see how investors play substantially different roles according to the country/region of analysis. Roughly 50% of UK & Ireland funds are raised from pension funds and asset managers, the two players owning significant stakes throughout Europe with the only exception for DACH countries<sup>15</sup>, the latter largely funded by government agencies (68%), which own large market shares also in Central and Eastern Europe (48%). The Nordics<sup>16</sup> exhibit the highest participation of academic institutions, endowments and foundations to fundraising (7%) as well as insurance companies in France & Benelux (12%). With no surprises, Southern Europe (PIGS) based funds are largely funded by private individuals and family offices (39%) as well as small asset management firms (28%). At consolidated level, pension funds provided nearly a quarter of funds raised from institutional investors. Funds of funds contributed 18%, followed by government agencies (14%), sovereign wealth funds (13%), Family offices and private individuals (12%) and insurance companies (9%). Institutional investors outside Europe contributed 40% to the annual fundraising in Europe, matching 2014 level<sup>17</sup>.

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<sup>14</sup> A fund that provides (generally subordinated) debt to facilitate the financing of buyouts, frequently alongside a right to some of the equity upside

<sup>15</sup> DACH: Austria, Germany, Switzerland

<sup>16</sup> Nordics: Denmark, Finland, Norway, Sweden

<sup>17</sup> Source: *Preqin*

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Figure 3 (%)

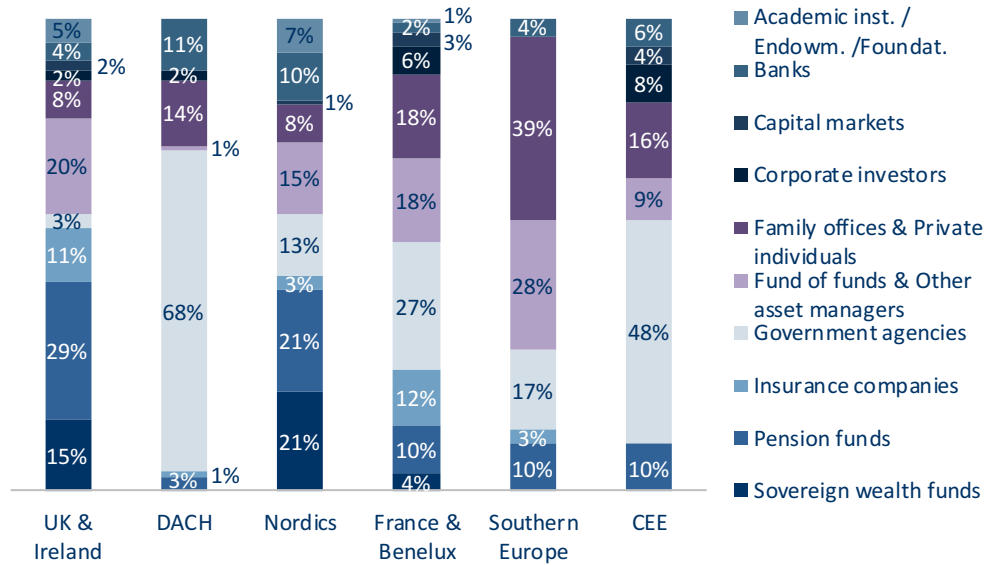


Figure 3: Incremental amounts raised by region of management and investor type during 2015 (%). Source: Invest Europe /PEREP\_Analytics.

Figure 4 (#)

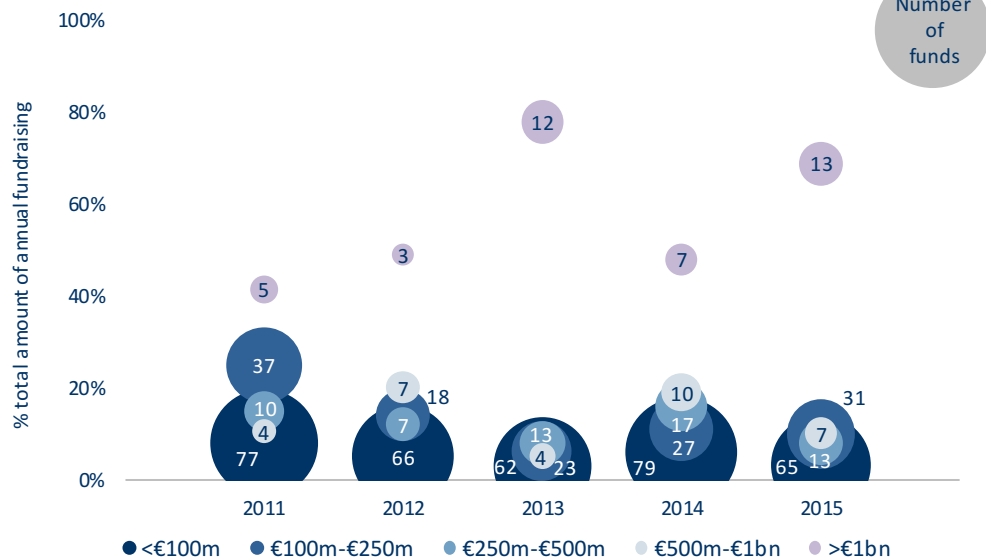


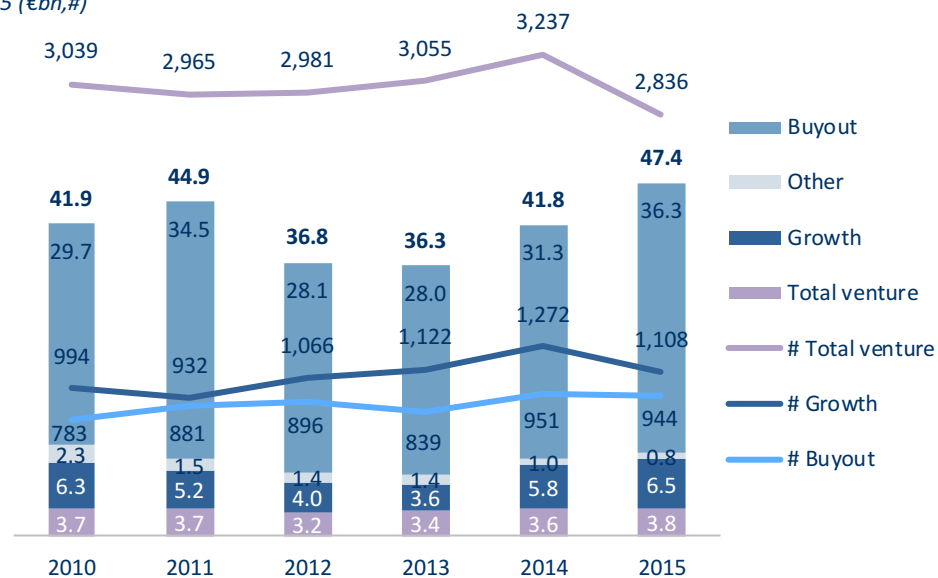
Figure 4: 2011–2015 - Final closing during the year - Amount & Number of funds (%), #). Source: Invest Europe /PEREP\_Analytics.

Figure 4 shows the total amount raised by funds and the number of funds that reached a final closing in the years. In 2015, 13 funds raised over €1bn, almost doubling the number of funds that did so in 2014. Much different the situation for small funds who raised less than €100m, decreasing in terms of number of funds closed and, more importantly, in terms of percentage of total annual fundraising that in 2015 is only 2.5%, far from the 8% performed in 2011. Also, funds who raised €500m-€1bn decreased by 30% with respect to 2014, halving their contribution to the total amount raised in the year (~10% vs ~19% in 2014).

## Investments

In 2015, the total amount of equity investments in European companies by PE funds increased by 14% to €47.4bn, reaching an all-time high since 2008 level, while the number of companies reduced by 11% to almost 5,000<sup>18</sup>.

Figure 5 (€bn,#)



<sup>18</sup> 2015 European Private Equity Activity, Invest Europe (formerly EVCA), 2016

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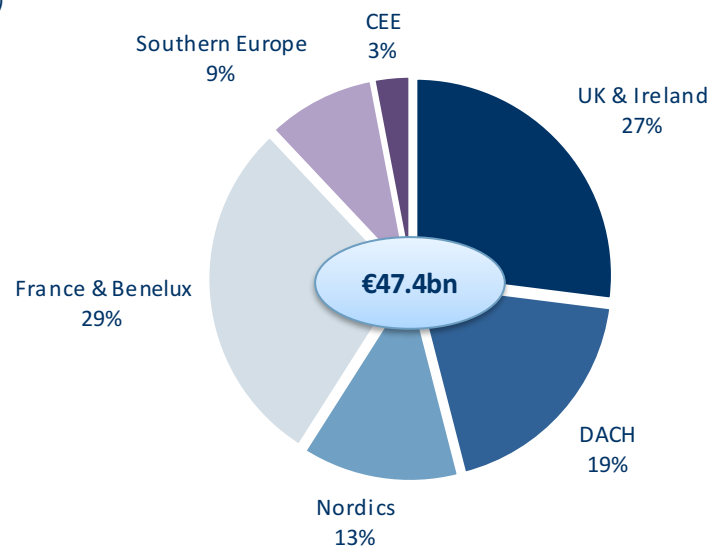
*Figure 5: Investments – Market statistics – Amount & No. of companies (€bn, #).*

*Source: Invest Europe /PEREP\_Analytics.*

Venture capital investments increased by 5% to €3.8bn, focusing on less companies with respect to 2014 (-12% yoy), meaning larger financing rounds across all stages. Buyout investments increased by 16% to €36.3bn, with no major changes in the number of companies. Last year was a great year also for growth investments, which recorded the highest level since 2008, increasing by 11% to €6.5bn. Other investments comprise rescue/turnaround, financing to a firm that has experienced trading difficulties, and replacement capital, meaning the purchase of a minority stake in a company from another PE fund or shareholder. Investments in this field decreased by 20% yoy, in line with the downward trend of past years.

Breaking down the investments made in 2015 in terms of location of the portfolio company, we see that roughly 60% of all European investments are clustered in the UK and France & Benelux region. The richest part of the continent is still the one considered by investors to have the highest potential growth, while Southern Europe and CEE countries total only 12% of the investments being made.

*Figure 6 (%)*



*Figure 6: Investments by location of the portfolio company in 2015 (%). Source: Invest Europe /PEREP\_Analytics.*

In particular, if we consider investments in terms of national GDPs, we see that for Luxembourg, PE investments account for 1.254% of 2015 national GDP, in the UK they equal 0.478%, in Italy only 0.155%, while the European 2011-2015 annual average is 0.302%<sup>19</sup>.

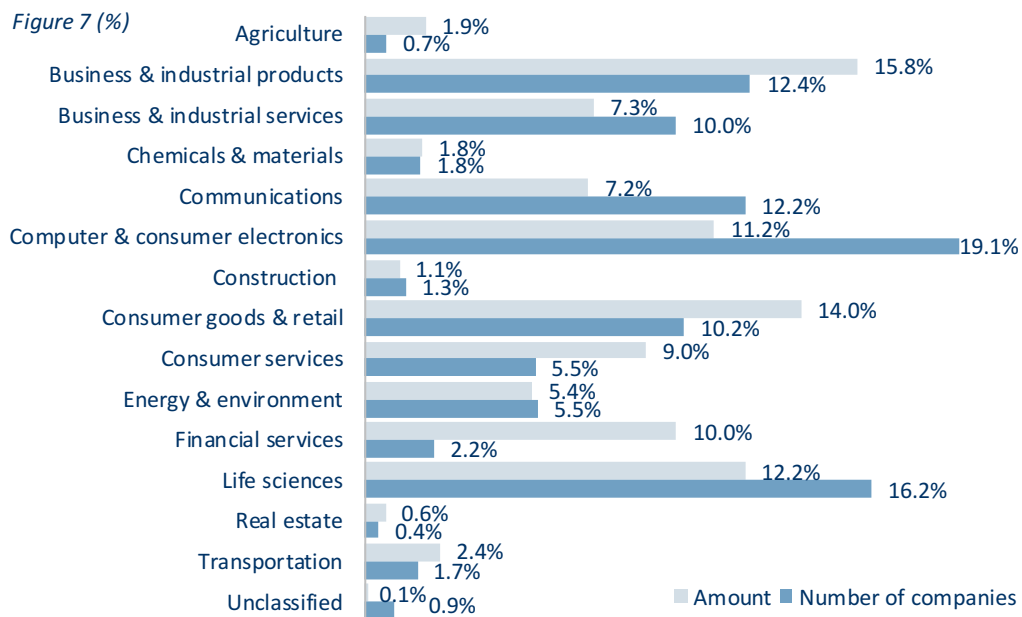
Figure 7 shows a breakdown of amounts invested and number of companies by sector. According to the data, companies in the business & industrial products sector receive the highest level of investments (15.8% of the total amount for 2015), while companies in the computer & consumer electronics sector are the most numerous among the PE investment target companies in 2015 (19.1% of the total number of invested companies).

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<sup>19</sup> Source: IMF, *World Economic Outlook Database (GDP)*

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A special case is the financial services sector, characterized by few companies invested (2.2% of the total number) but as much as 10% of the total invested amount dedicated, regulatory capital requirements as a potential explanation to this conundrum. Sectors such as transportation, agriculture, construction and real estate see very low capital invested in very few companies.



*Figure 7: Investments by sector - % of Amount & Number of companies in 2015.*

*Source: Invest Europe /PEREP\_Analytics.*

Moreover, from the analysis of the investments by sector made by different funds stage focus<sup>20</sup>, in 2015 venture capital concentrated most of their capital in life sciences (34%), computer & consumer electronics (20%) and communications (19%) sectors. Buyout funds rather invested roughly 60% of their capital in companies active in business & industrial products (18%), consumer goods & retail (15%), financial

<sup>20</sup> The following funds are excluded from the statistics: infrastructure funds, real estate funds, distressed debt funds, primary funds of funds, secondary funds of funds

services (12%) and life sciences (11%). Similar to venture capital investments, growth investments focused on communication (17%), energy & environment (14%), consumer goods & retail (13%) and computer & consumer electronics (12%).

## **Divestments**

During 2015, ~2,500 European companies were exited, totaling former equity investments (divestments at cost) of €40.5bn, reporting an increase by 4.5% with respect to 2014, representing the new highest reported exit volume for European private equity.

In 2015, the most common exit routes by amount were trade sale (29%), sale to another private equity firm (27%, “secondary buyout”), and public offering (23%), representing together roughly 80% of the total amount divested during the year and more than 40% of all the divested companies. Reasons why funds choose an exit strategy over another will be discussed in due course.

Another important trend of last year was the exponential growth by amount divested of exits from already listed companies in the form of sale of quoted equity on flotation (IPO) at cost, soaring as much as 80% yoy to €6.7bn.

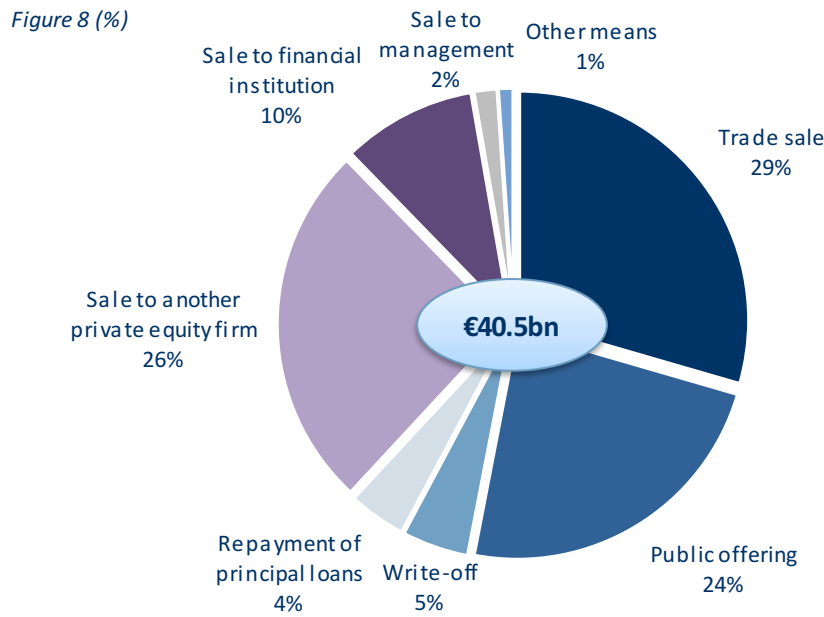


Figure 8: Divestments – Market statistics – % total amount divested at cost (%).

Source: Invest Europe /PEREP\_Analytics.

Breaking down divestments by different funds stage focus, buyout divestments represented 84% of the equity amount at cost (€34bn) and 32% by number of companies (800). Venture capital exits represented 40% of the total divested companies and ~8% of the equity amount at cost (€2.1bn), which grew by 10% with respect to 2014. Growth divestments amount increased by 40% to €3.2bn, representing 8% of the total equity amount at cost and 27% by number of companies (660)<sup>21</sup>.

<sup>21</sup> 2015 European Private Equity Activity, Invest Europe (formerly EVCA), 2016



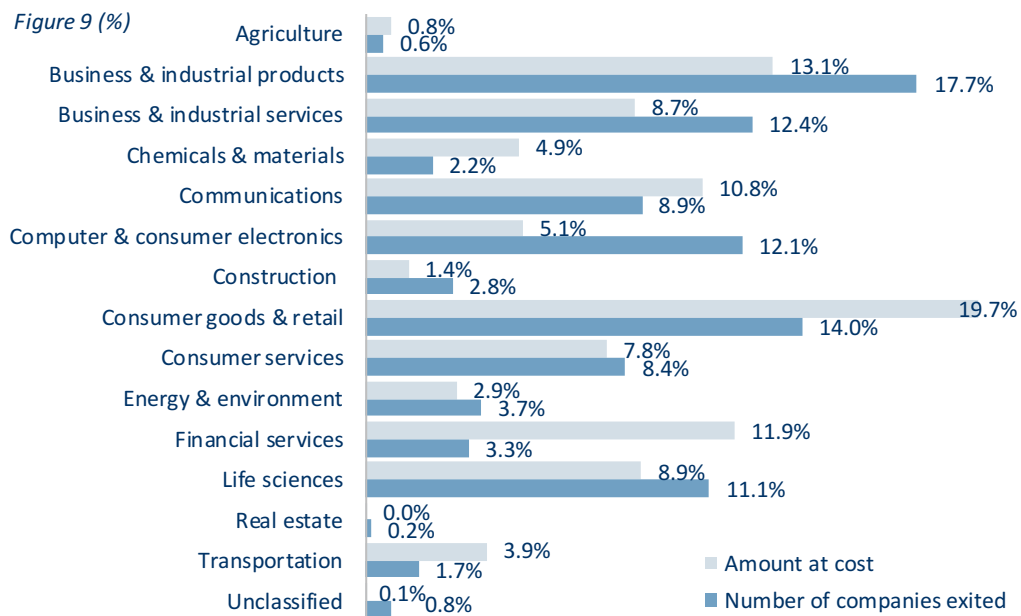


Figure 9: Divestments at cost by sector 2015 - Market statistics - Amount & Number of companies (excluding write-offs) (%). Source: Invest Europe /PEREP\_Analytics.

The bar chart above shows divestments at cost<sup>22</sup> by sector, excluding write-offs. According to the data, consumer goods & retail sector made ~20% of the total amount (€7.1bn) with 295 companies exited (14% of the total). The sector that earned the highest amount per company exited is the financial services sector, which totaled roughly €4.5bn (12%) from the exit of 81 companies (3.3%).

### Focus on the Italian market

Among the European countries, Italy ranked among the top countries that contributed most to the aggregate growth in 2015. In particular, fundraising almost doubled with respect to 2014, with many closing realized by domestic funds; investments grew significantly, reporting the second highest amount of all time, thanks to higher

<sup>22</sup> Meaning that the total amount divested is equal to the total amount invested before

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investments made by foreign investors; divestments increased both by amount and number, in line with the last 4-year trend (AIFI & PWC, 2016)<sup>23</sup>.

During 2015, private equity funds operating in Italy raised €2.83bn, an increase by 92% with respect to the year before (€1.47bn). The number of players who raised funds was 16, of which 11 were “SGR” managing closed-end funds that raised 83% of the total amount raised during the year. Concerning the geographical footprint, domestic funds raised 52% of the total amount while the remaining 48% was raised by foreign funds. More than half of the funds raised (56%) were used for buyout transactions, another 24% for growth investments, and the remaining 20% for other transactions, among which infrastructure investments.

Figure 10 (€bn)

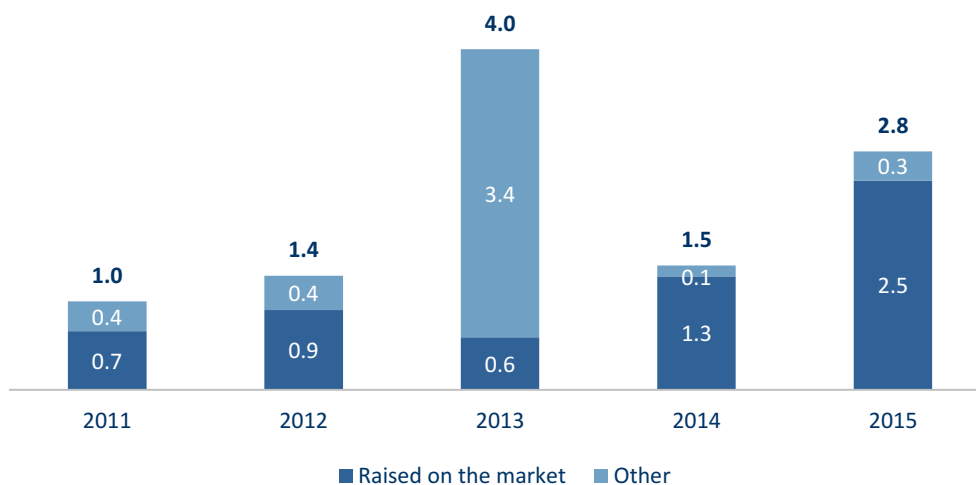


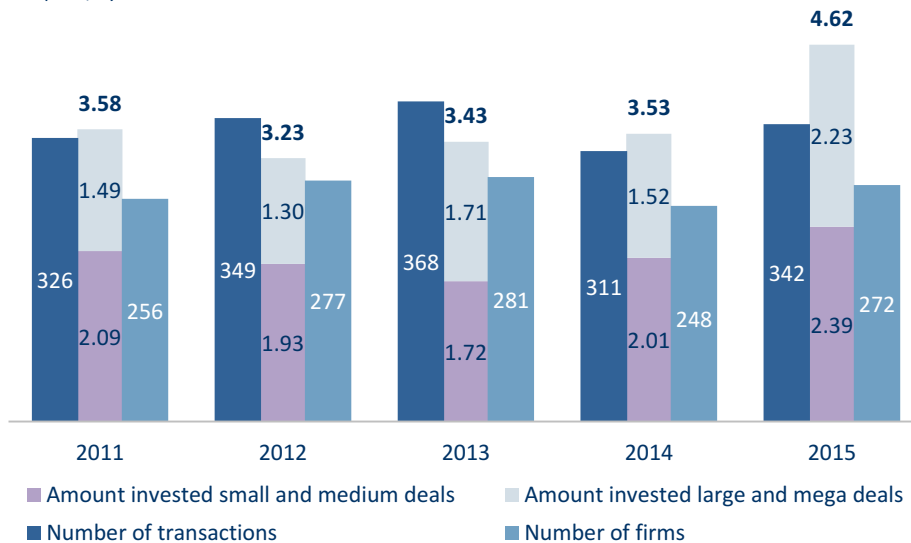
Figure 10: Fundraising breakdown and evolution<sup>24</sup> (€bn). Source: AIFI and PWC data, 2016

<sup>23</sup> AIFI and PWC, *Il mercato italiano del private equity, venture capital e private debt nel 2015*, 2016

<sup>24</sup> The years 2013 and 2014 include Fondo Strategico Italiano fundraising, captive in 2013 and on the market in 2014

Investments soared by 31% yoy, meaning €4.62bn invested in 272 firms through 342 PE/VC new transactions (+10%). The average amount invested per single transaction in 2015 was €13.5m (€11.3m in 2014). Moreover, during the year were reported three transactions with investments between €150m and €300m (“large deals”) and other three with investments over €300m (“mega deals”); large and mega deals together accounted for roughly 50% of the total amount invested during the year<sup>25</sup> (AIFI & KPMG, 2016). Considering only the investments made in Italy (97%), 74% of the total number of transactions concerned firms located in Northern Italy (72% in 2014), 17% in Central Italy (18% in 2014), while only 9% in Southern Italy (10% in 2014). In terms of amount, investments are even more concentrated: 94% in the North (39% in Lombardy), 5% in the Centre, and only 1% in the South.

*Figure 11 (€bn, #)*

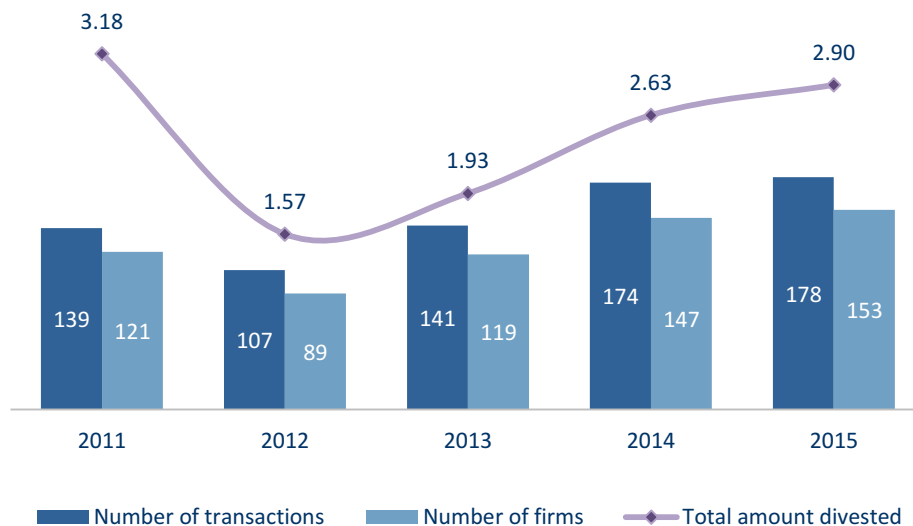


<sup>25</sup> AIFI and KPMG, 2015: *What's Next*, 2016

*Figure 11: Investment activity breakdown and evolution (€bn, #). Source: AIFI and PWC data, 2016*

In 2015, the total amount divested was €2.9bn, growing by 10% with respect to 2014, involving 153 firms in 178 transactions. The preferred exit channel in Italy was the sale to another financial investor, representing 33% of the number of exits and 48% of their value, followed by trade sale (respectively 31% and 23%) and public offerings (22% for €646m).

*Figure 12 (€bn, #)*



*Figure 12: Divestment activity evolution (€bn, #). Source: AIFI and PWC data, 2016*

### **Which factors most drive the exit strategy decision en route**

As mentioned above, the exit strategy receives special attention from the earliest stage of the deal. It is important because depending on its success or not PE investors will realize the return forecasted, never forgetting the importance of the track record for new potential investors. Often GPs will pursue several channels in parallel, continuing to ready initial public offerings (IPOs) even as they negotiate terms for a direct sale to

a corporate buyer or for a secondary sale to another PE fund. Over the past two decades, across channels, average internal rates of return (IRR) have begun to converge as GPs have learned to bob and weave across exit channels in order to optimize asset sales<sup>26</sup> (Bain & Company, 2016).

Many relevant studies have analyzed the determinants influencing the choice. Gompers (1996) developed his *grandstanding hypothesis*, according to which young venture capital firms take companies public earlier than older venture capital firms in order to establish a reputation and successfully raise capital for new funds<sup>27</sup> (Gompers, 1996). Giot and Schwienbacher (2005) showed that VC-backed firms first exhibit an increased likelihood of exiting to an IPO. However, after having reached a plateau, non-exited investments have fewer possibilities of IPO exits as time increases. This sharply contrasts with trade sale exits, where the hazard rate is less time varying. Therefore, according to their pecking order of exits, investors prefer an IPO, followed by a trade sale<sup>28</sup> (Giot & Schwienbacher, 2007). Nikoskelainen and Wright (2005), analyzing a sample of 321 UK buyouts between 1995 and 2004, showed the existence of a relation between the corporate governance structure and the likelihood of a positive return at exit date, with IPOs outperforming both trade sales and secondary buyouts<sup>29</sup> (Nikoskelainen & Wright, 2007).

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<sup>26</sup> BAIN & COMPANY, *Global Private Equity Report 2016*, 2016

<sup>27</sup> P.A.GOMPERS, *Grandstanding in the venture capital industry*, *Journal of Financial Economics*, September 1996

<sup>28</sup> P.GIOT and A. SCHWIENBACHER, *IPOs, trade sales and liquidations: Modelling venture capital exits using survival analysis*, *Journal of Banking & Finance*, March 2007

<sup>29</sup> M.WRIGHT and E.V.NIKOSKELAINEN, *The Impact of Corporate Governance Mechanisms on Value Increase in Leveraged Buyouts*, *Journal of Corporate Finance*, September 2007

## Chapter I

Arcot, Fluck, Gaspar and Hege (2014) investigated whether secondary buyouts are value maximizing, or reflect opportunistic behavior. They found out that pressured buyers and sellers are more likely to engage in SBOs, to use less leverage and to rely on smaller deal financing syndicates, all this leading to lower IRR and value creation<sup>30</sup> (Arcot, Fluck, Gaspar, & Hege, 2015). Wang (2010) studied a sample of 140 UK secondary buyouts with the aim to understand the rationale behind secondary buyouts. The two main motives he found out are market conditions and the sellers' need to demonstrate returns. In particular, Wang showed that sellers are more likely to exit through secondary buyouts i) when the equity market condition is 'cold', measured by industry IPO volume, ii) when the debt market condition is favorable, suggesting buyers' greater ability to borrow, and iii) when private equity firms need to raise new funds to demonstrate their ability to achieve returns<sup>31</sup> (Wang, 2012).

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<sup>30</sup> S.ARCOT, Z.FLUCK, J.M.GASPAR and U.HEGE, *Fund Managers under Pressure: Rationale and Determinants of Secondary Buyouts*, *Journal of Financial Economics*, January 2015

<sup>31</sup> Y.WANG, *Secondary Buyouts: Why Buy and at What Price?*, *Journal of Corporate Finance*, December 2012

## **CHAPTER 2**

### **Investors' skepticism towards sponsor IPOs**

In this section, we focus our analysis on the estimation of the IPOs success rate, investigating whether the success rate of sponsor-backed IPOs substantially differs from all other IPOs.

#### **Sample construction**

We extract from Dealogic all completed and withdrawn initial public offerings with targets located in Europe, Middle East, and Africa (“EMEA”) for the period ranging from January 1<sup>st</sup>, 2000 to December 31<sup>st</sup>, 2015, integrating and adjusting the results using a proprietary database made available by Bank of America Merrill Lynch (which contains only publicly available information). Then we apply a set of filters: we exclude IPOs with no deal value reported or lower than €50m; for sponsor IPOs, we exclude the ones with no real involvement by a PE sponsor, meaning cases in which the PE only holds a minority stake and no special agreements for control exist.

The final sample contains 4,383 IPOs, of which 566 are sponsor backed.

#### **Descriptive statistics**

Table 1 reports a breakdown of the total and sponsor IPOs by country and by industry respectively, across the whole period of analysis (2000-2015).

United Kingdom is where most deals happened, and it represents roughly one third of the total number of IPOs. Following the UK, the German and French market showed

a good IPO activity during the years, while other countries such as Sweden, Italy and Poland have shown an upward trend also in terms of PE funds interest [Table 1, Panel A].

The industry that reported the highest number of IPOs is the computer & electronics with 736 public offerings over time, while consumer discretionary is the industry in which most PE funds exited through IPO, with 111 IPOs representing about 20% of the total number [Table 1, Panel B].



## Chapter II

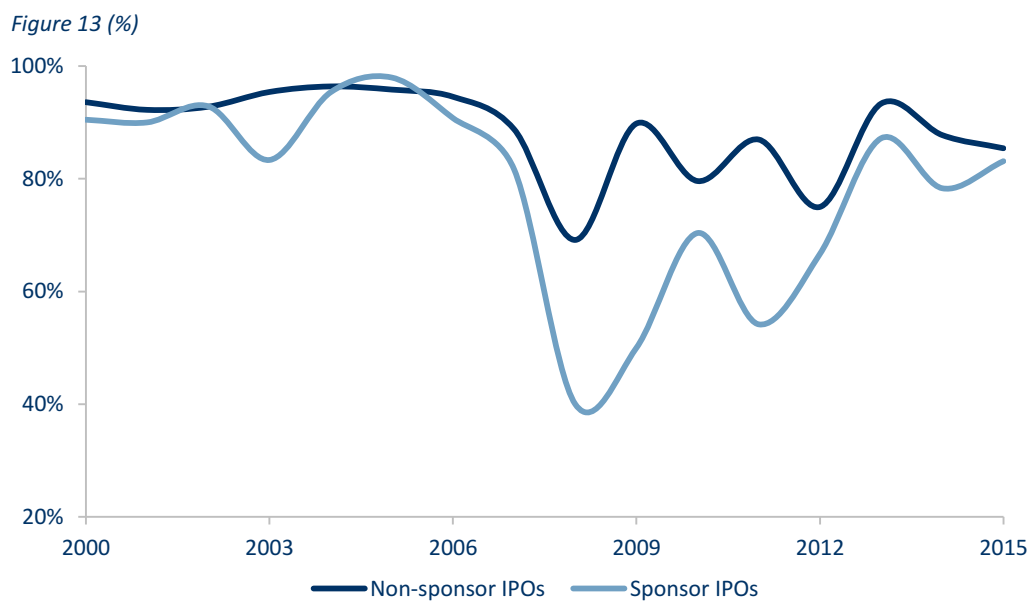
<i>Panel A</i>				
	IPO		Only sponsor	
	No.	%	No.	%
<b>Total</b>	4383		566	
<b>Country</b>				
Austria	50	1.1%	9	1.6%
Belgium	71	1.6%	11	1.9%
Bulgaria	27	0.6%	1	0.2%
Croatia	8	0.2%	0	0.0%
Cyprus	53	1.2%	0	0.0%
Czech Republic	21	0.5%	6	1.1%
Denmark	73	1.7%	13	2.3%
Estonia	9	0.2%	0	0.0%
Finland	57	1.3%	11	1.9%
France	405	9.2%	77	13.6%
Germany	466	10.6%	65	11.5%
Hungary	9	0.2%	2	0.4%
Greece	175	4.0%	2	0.4%
Ireland	58	1.3%	8	1.4%
Italy	315	7.2%	39	6.9%
Latvia	6	0.1%	0	0.0%
Lithuania	9	0.2%	0	0.0%
Luxembourg	15	0.3%	2	0.4%
Malta	4	0.1%	0	0.0%
Netherlands	95	2.2%	25	4.4%
Norway	1	0.0%	1	0.2%
Poland	481	11.0%	30	5.3%
Portugal	15	0.3%	1	0.2%
Romania	26	0.6%	0	0.0%
Slovak Republic	4	0.1%	0	0.0%
Slovenia	2	0.0%	0	0.0%
Spain	106	2.4%	20	3.5%
Sweden	210	4.8%	43	7.6%
Switzerland	1	0.0%	1	0.2%
Ukraine	1	0.0%	1	0.2%
United Kingdom	1610	36.7%	198	35.0%
<i>Panel B</i>				
<b>Industry segment</b>				
Computers & Electronics	736	16.8%	94	16.6%
Consumer Discretionary	531	12.1%	111	19.6%
Financial & Business Services	645	14.7%	46	8.1%
Healthcare & Other	517	11.8%	92	16.3%
Industrial	418	9.5%	85	15.0%
Other	115	2.6%	12	2.1%
Professional Services	391	8.9%	41	7.2%
Real Estate/Property	460	10.5%	39	6.9%
Telecommunications	190	4.3%	28	4.9%
Utility & Energy	380	8.7%	18	3.2%

*Table 1: Panel A, number of IPOs by country, with focus on sponsor only; Panel B, number of*

*IPOs by industry, with focus on sponsor only.*

## **Methodology**

We define the success rate as the ratio between completed IPOs and the total number of IPOs, the latter defined as the sum of completed and withdrawn IPOs<sup>32</sup>. We calculate it for each year of analysis, for both non-sponsor and sponsor-backed offerings. The figure below clearly shows the trend for the years between 2000 and 2015.



*Figure 13: Success rate 2000-2015, sponsor and non-sponsor IPOs (%). Source: Dealogic, 2016.*

The chart shows the existence of a substantial difference between the two success rates, with the non-sponsor one being constantly higher (with the only exception for the year

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<sup>32</sup> In the case in which the IPO is withdrawn and then eventually refiled, we consider it only if at least two years passed between the withdrawal and the refiling.

## Chapter II

2005) than the sponsor's. In particular, the following table better quantifies the difference:

	Non-sponsor IPOs	Sponsor IPOs
2000-2003	93.4%	90.2%
2004-2007	93.5%	90.7%
2008-2011***	79.2%	58.5%
2012-2015	86.3%	81.5%
2000-2007*	93.5%	90.6%
2008-2015**	83.0%	75.9%
<b>2000-2015***</b>	<b>90.2%</b>	<b>83.2%</b>

*Table 2: Average success rate, sponsor and non-sponsor IPOs (%). P-value with 2 degrees of freedom: \* = 20%, \*\* = 5%, \*\*\* = 0.1%; where it is not indicated, the above defined probability ranges between 30% and 20%.*

We test whether these probabilities are statistically different. To do this, we consider the two samples, non-sponsor (with size  $n_1$ ) and sponsor (with size  $n_2$ ) as one random sample of size  $n_1 + n_2$ . Using the maximum likelihood estimator, we then obtain:

$$\sum_{i=1}^2 \sum_{j=1}^{k+1} \frac{[N_{ij} - \frac{n_i(N_{1j} + N_{2j})}{n_1 + n_2}]^2}{n_i(N_{1j} + N_{2j})/(n_1 + n_2)}$$

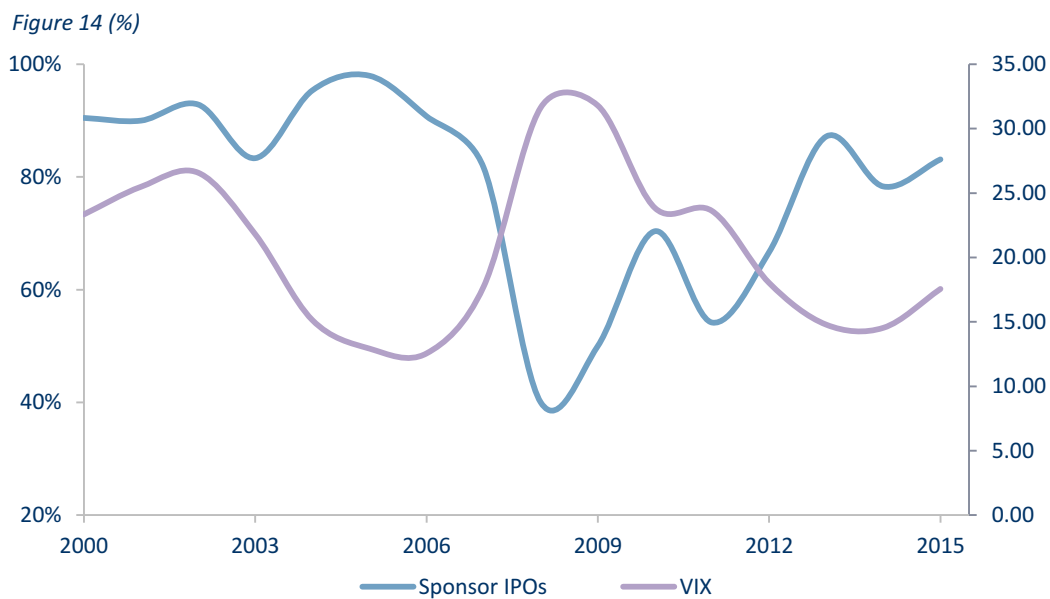
where  $N_{ij}$  denotes the number of outcomes in group  $j$  of a sample of size  $n_i$  (similarly for the others).

It can be shown that our statistic has a limiting chi-square distribution with  $k$  degrees of freedom<sup>33</sup> (Mood, Graybill, & Boes). Following the application of the test to our

<sup>33</sup> A.MOOD, F.GRAYBILL and D.BOES, *Introduction to the Theory of Statistics*, McGraw Hill, third edition.

analysis, we derive that there is some evidence of difference between sponsor and non-sponsor success rates over the whole period 2000-2015.

Generally speaking, the probability of successfully complete an IPO is a function of the volatility of the equity market. During a bullish equity market, it follows, with a short time lag, a wave of IPOs being filed; eventually, if the market volatility stays low, excluding the idiosyncratic risk relative to each company, the probability for the IPOs to be completed surges; conversely, if the market volatility increases, it becomes riskier for a company to go public, turning out in many IPOs being withdrawn. The figure below shows how the success rate for sponsor IPOs and the CBOE Market Volatility (VIX-UT)<sup>34</sup> have moved over time.



*Figure 14: Sponsor IPOs' success rate and CBOE Market Volatility (%). Source: Bloomberg (VIX).*

<sup>34</sup> A popular measure of the implied volatility of S&P 500 index options, calculated by the Chicago Board Options Exchange

## Chapter II

It is easy to denote from the quasi-symmetry of the chart above the existence of a certain level of negative correlation between the two variables, corresponding to a Pearson coefficient that is equal to -0.65. Moreover, running a simple univariate regression, i.e. with the VIX as the only independent variable, both the intercept and the (negative) coefficient of the VIX are statistically significant at 1% level, confirming the existence of a causal relationship between the two variables (Wooldridge, 2010).

Source	SS	df	MS	Number of obs = <b>16</b>		
Model	<b>.187424368</b>	<b>1</b>	<b>.187424368</b>	F( 1, 14) =	<b>9.97</b>	
Residual	<b>.263219363</b>	<b>14</b>	<b>.018801383</b>	Prob > F =	<b>0.0070</b>	
Total	<b>.450643732</b>	<b>15</b>	<b>.030042915</b>	R-squared =	<b>0.4159</b>	
				Adj R-squared =	<b>0.3742</b>	
				Root MSE =	<b>.13712</b>	

Sponsor_IPOs	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
VIX	<b>-.0179256</b>	<b>.0056775</b>	<b>-3.16</b>	<b>0.007</b>	<b>-.0301026</b>	<b>-.0057486</b>
_cons	<b>1.153103</b>	<b>.1224722</b>	<b>9.42</b>	<b>0.000</b>	<b>.8904261</b>	<b>1.41578</b>

Table 3: Stata output of the univariate regression (Sponsor IPOs, VIX).

## Results

In this section, we have showed the predominance of the non-sponsor IPOs success rate over the sponsor success rate, as well as the relationship between the volatility of the stock market and the IPO success rate, but nothing was said to explain the difference between the sponsor and non-sponsor success rates. According to the results obtained so far, we see two main possible explanations.

According to the first hypothesis, investors believe that PE investments are made for the sake of seeking short-term gains by taking control and utilizing the company's resources, i.e. not creating any value for the company, and they strive to maximize their returns pushing valuations up, supported by aggressive business plans<sup>35</sup> (Badunenko, Barasinska, & Schafer, 2009). For these reasons, the market would be willing to buy only at discount, driving valuations down and forcing some players, who don't find the exit channel advantageous anymore, to withdraw their offers.

According to the second hypothesis, PE funds tend to be historically more prudent and sensitive to the market volatility than other investors, always looking after their track record, and therefore more willing to withdraw the offer rather than accept a lower return when the uncertainty rises, as valuations tend to fluctuate significantly in times of uncertainty and investors tend to stay out of equities<sup>36</sup>.

To effectively test these two hypothesis, we need to analyze the post-exit performance in the first place, and then we will try to reconcile this conundrum.

### **IPOs performance in the aftermarket**

It is crucial for the aim of our analysis to understand how sponsor and non-sponsor IPOs are perceived in the aftermarket. Therefore, we investigate how they perform in relation to each other and to the market.

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<sup>35</sup> O.BADUNENKO, N.BARASINSKA and D.SCHAFER, *Are Private Equity Investors Good or Evil?*, Discussion Papers 901, June 2009

<sup>36</sup> PWC GCC IPO Market Watch 2016

## Sample construction

For a matter of consistency, we use the same panel as for the success rate analysis, of course filtering out withdrawn offers. Moreover, we set a new threshold for the deal value at €100m, to avoid the impact of illiquid stock performances over the sample. We use the relative performance rather than the absolute one, expressed as the difference between the absolute performance and the associated benchmark/index performance, which is the one identified by Bloomberg. Data on performance are downloaded using the Bloomberg Terminal.

## Methodology and results

We calculate the performance at different stage, in order to better understand how it changes as time passes by. We also check whether these values are significant larger than zero and run test of significance for the difference in the mean values. The start date is fixed at the first trading day of the stock, while the different end dates we use are 1 week, 3 months, 6 months and 1 year after.

In the very short term, i.e. over the first week of trading, sponsor-backed IPOs tend to perform, on average, slightly better than the market, however their performance is lower than non-sponsor's. Their performance is also much more volatile if analyzed year by year.

	Non-sponsor IPOs	Sponsor IPOs
2001-2004	0.3%	(0.2%)
2004-2008	0.7%**	0.2%
2008-2012	0.6%	(0.3%)
2012-2015	2.9%***	1.2%
2001-2008	0.8%**	0.4%
2008-2015	1.9%***	0.9%**
<b>2001-2015</b>	<b>1.2%***</b>	<b>0.6%**</b>

*Table 4: 1-Week Relative Performance Estimation. P-Value: \* = 10%; \*\* = 5%; \*\*\* = 1%; if not stated, it is in the range of 70%-90%. Source: Bloomberg.*

This first result is very significant for our proposed analysis. According to our data, on average PE funds leave some money on the table because of their positive returns over the market, meaning they tend to price at discount, but still their discount must be lower of non-sponsor offers, which shows a relatively higher return. Said that, it seems unlikely that PE funds are forced by the market to price at discount (first hypothesis), while it can be better defined as a general phenomenon of underpricing that affects both sponsor and non-sponsor. Theories behind this phenomenon are many; among these, some argue the importance to show a successful IPO rather than a drop in price, as well as its behavioral impact on retail investors<sup>37</sup> (Beatty & Ritter, 1986).

In the 3 months after the IPO, there is a big change in performance compared to the first week. In fact, on average sponsor IPOs outperform both the market and non-sponsor over time, as showed in the table below.

	Non-sponsor IPOs	Sponsor IPOs
2001-2004	3.4%**	6.9%***
2004-2008	3.0%***	3.5%***
2008-2012	3.2%**	4.1%**
2012-2015	8.6%***	5.3%**
2001-2008	2.9%***	4.0%***
2008-2015	6.2%***	5.0%***
<b>2001-2015</b>	<b>4.1%***</b>	<b>4.5%***</b>

*Table 5: 3-Month Relative Performance Estimation. P-Value: \* = 10%; \*\* = 5%; \*\*\* = 1%; if not stated, it is in the range of 70%-90%. Source: Bloomberg.*

<sup>37</sup> R.P.BEATTY and J.RITTER, *Investment banking, reputation, and the underpricing of initial public offerings*, *Journal of Financial Economics*, February 1986



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However, in the second 3 months after listing there is a drop in performance of sponsor-backed companies. This poor performance is partly offset by the good performance of the initial 3 months, ending up in a 6-month performance still higher than the market, but very close to the non-sponsor's one. In our interpretation, the causes of the sponsor's performance flattening can be found in the role of the overhang, which will be discussed and analyzed in due course.

	Non-sponsor IPOs	Sponsor IPOs
2001-2004	2.0%	0.4%
2004-2008	3.1%**	7.9%***
2008-2012	0.2%	11.1%**
2012-2015	14.1%***	7.1%*
2001-2008	2.1%	4.4%**
2008-2015	5.3%***	8.1%***
<b>2001-2015</b>	<b>4.2%***</b>	<b>4.4%***</b>

*Table 6: 6-Month Relative Performance Estimation. P-Value: \* = 10%; \*\* = 5%; \*\*\* = 1%; if not stated, it is in the range of 70%-90%. Source: Bloomberg.*

Last but not the least, we analyze the overall relative performance in the entire first year of trading. The situation definitely changes: sponsor-backed companies continue to perform better than the market, however they don't do better than non-sponsor's anymore. This is more evident for IPOs between 2008 and 2015, and in particular in the last years of observation, i.e. 2012-2015.

	Non-sponsor IPOs	Sponsor IPOs
2001-2004	8.1%**	11.1%
2004-2008	3.7%*	3.0%
2008-2012	2.8%	6.5%
2012-2015	18.5%***	6.6%
2001-2008	4.1%**	5.8%*
2008-2015	8.5%***	6.2%**
<b>2001-2015</b>	<b>7.2%***</b>	<b>6.9%***</b>

*Table 7: 1-Year Relative Performance Estimation. P-Value: \* = 10%; \*\* = 5%; \*\*\* = 1%; if not stated, it is in the range of 70%-90%. Source: Bloomberg.*

Then we run a test of significance for the difference in the mean values showed in the tables before. Assuming that non-sponsor and sponsor IPOs are normally distributed, with mean  $\mu_1$  and  $\mu_2$  respectively and random variables  $X_1$  and  $X_2$ , we wish to test the following null hypothesis:

$$H_0: \mu_1 = \mu_2 \quad \text{vs} \quad H_1: \mu_1 \neq \mu_2$$

We derive the following equation<sup>38</sup>:

$$T = \frac{(\bar{X}_1 - \bar{X}_2) \sqrt{\frac{n_1 n_2}{n_1 + n_2}}}{\sqrt{[\sum (X_{1i} - \bar{X}_1)^2 + \sum (X_{2j} - \bar{X}_2)^2] / (n_1 + n_2 - 2)}}$$

where  $n_1$  and  $n_2$  are the sample sizes and  $\bar{X}_1$  and  $\bar{X}_2$  are the sample averages, and it has the  $t$  distribution with  $n_1 + n_2 - 2$  degrees of freedom.

The table below summarizes the cumulative probabilities for  $T \leq t$  score.

	1-Week	3-Month	6-Month	1-Year
2001-2004	66.8%	86.3%	64.5%	67.3%
2004-2008	73.3%	60.0%	92.3%	54.9%
2008-2012	78.1%	62.1%	96.0%	66.2%
2012-2015	95.4%	92.6%	97.5%	98.5%
2001-2008	70.9%	72.9%	78.7%	64.9%
2008-2015	97.8%	81.1%	89.8%	76.0%
2001-2015	88.8%	60.6%	53.5%	53.6%

<sup>38</sup> A.MOOD, F.GRAYBILL and D.BOES, *Introduction to the Theory of Statistics*, McGraw Hill, third edition.

*Table 8: Test of equality of two means: cumulative probabilities.*

Even though some of the results may seem too low for the reader, however they can be still assumed as significant for the purpose of our analysis.

There can be multiple interpretations of these results. What we think is that, as it is usually the case, PE funds tend to sell only part of their stake in the company during the IPOs, thus they continue to exercise some kind of influence on the newly listed companies. Then, after the initial 90 to 180 days, i.e. the general length of the lock-up period, and the subsequent full or almost full exit of the sponsor from the company, there are some factors that may impact the firm's performance. Above all, as pointed out by Kraus and Burghof (2003), the termination of a blockholder's exercised corporate control can be a signal, because of his insider knowledge, of a possible downward sloping demand curve; this can provide an analytical framework that explains why the performance of sponsor-backed IPOs might show a significant breakpoint at the time when the sponsor exits from the company<sup>39</sup> (Kraus & Burghof, 2003).

### **Remarks**

The results derived from the analysis of the short and long-term performance of sponsor-backed IPOs suggest that PE-backed companies outperform non-PE backed in the 3 to 6 months following the initial public offerings. Then there is a breakpoint, mainly due to the effect of block trades on companies' performances, which are

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<sup>39</sup> T.KRAUS and H.P.BURGHOF, *Post-IPO Performance and the Exit of Venture Capitalists*, EFMA 2003 Helsinki Meetings, January 2003

identified as the main determinant of the long-term performance being slightly worse than non-sponsor companies.

In the next section, we focus our analysis on the phenomenon of the overhang, trying to show evidence, if any, of anomalous performances.

## CHAPTER 3

### **The role of the *overhang***

In this section, we try to give quantitative evidence of the role of the overhang, and to understand how this phenomenon affects a company's performance. To do so, we have to define an appropriate time window, along with controlling for other factors.

#### **Sample construction**

We use a proprietary database of accelerated bookbuildings ("ABBs") made available by Bank of America Merrill Lynch (which contains only publicly available information) and we cross it with the IPO database used before. We keep into consideration only the first ABB, if more for the same company, because as the liquidity of the stock increases, the effect of special events on the stock performance becomes less observable. In addition, we consider only relatively recent EMEA transactions, spanning from 2010 to 2016<sup>40</sup>, and we filter out for i) companies non-majority owned by a financial sponsor, ii) IPOs lower than \$350m in value (for liquidity reasons), iii) companies in which there has been no exit by a financial sponsor post-IPO, iv) block trades realized more than 4 months after the lock-up expiry date and v) block trades realized before the lock-up expiry date, i.e. through a waiving of the lock-up agreement. We download data from Bloomberg regarding the lock-up period length (if not available, from the prospectus) and the pricing date of the block, excluding transactions for which even only one of these fields was not available.

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<sup>40</sup> Note that the majority of observations spans from 2014 to 2016

The final sample contains 35 ABBs, on which we base our following analysis.

## **Methodology**

As already argued before, PE funds tend to sell only part of their stakes in the companies during the IPOs. In fact, generally only approximately 35-40%<sup>41</sup> of the shares are issued to the public. Even though it is not a legal requirement, it is a standard arrangement for the underwriters to claim the shares of the remaining shareholders to be restricted from sale for a certain period of time. This period is the so-called *lock-up* period, and it is one way of aligning the incentives of the current owners and new owners at least during the initial stages of the company being public. There are no rules regarding the length of the lock-up period, however the majority of lock-up periods last 180 days or approximately 6 months<sup>42</sup> (Ofek & Richardson, 2000). Therefore, it is common to see a sponsor selling a sizeable portion of its remaining stake in the company some time after 6 months post-IPO, generally not too far from the lock-up expiry date.

It is not easy for a sponsor to decide what the best moment to exit is. A number of variables have to be taken into account, such as the general market condition and its impact on the share price performance since the listing. In fact, market timing is crucial: according to the scenario, bearish market trends in the initial months of trading can lead to a delay in timing of the exit, while bullish market trends represent an optimal situation to exit or it can even lead to a waiving of the lock-up agreement and

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<sup>41</sup> Source: BofAML Database of EMEA IPOs since 2001 larger than €100m

<sup>42</sup> E.OFEK and M.RICHARDSON, *The IPO Lock Up Period: Implication for Market Efficiency and Downward Sloping Demand Curves*, NYU Working Paper No. FIN-99-054, January 2000

## Chapter III

to an early sale. The other decision the sponsor has to face deals with the exit procedure, i.e. whether it takes place in a single sell-down or in multiple steps. This has to do with both the absolute size of the stake and its relative size, i.e. in terms of share in the company, as well as with the liquidity of the shares.

We argue that there exists an anomalous trading activity during the period that goes from few weeks before the lock-up expiry date post-IPO to the sponsor's block trade. Even though the market does not know the exact day in which the block trade takes place, we argue that some factors can signal a potential block sale relatively soon after the lock-up expiration, among which a brilliant share price performance in the initial months of trading. To support our argumentation, we analyze trading volumes in the first place, and then we look at the share price performances reported over a precise time window for the 35 companies in the sample described above.

### **Trading volume analysis**

We download data on trading volumes for the companies in our sample and we try to understand whether there is evidence of any anomalous trading activity over time. When a block is sold, there is a permanent shift in volume due to the higher number of shares released on the secondary market. Therefore, we analyze volumes from 20 days before the lock-up expiry date to the day before the block trade, to neutralize the effect of the jump in volume on the block trade day, and then we compare it with the volumes reported from the second day of trading (to avoid distortions of the first day of trading) to the 20<sup>th</sup> day before the lock-up expiration.

As we can see from the table in Appendix A, on average volumes are higher during the period that ends one day before the block trade. In particular, our sample shows an average jump in volumes over this period of ca. 40%. Note that this result is not just the outcome of some outliers, since 80% of the companies in our sample report an increase in trading volumes over the period.

This is an important result for the aim of our analysis. This new volume likely reflects seller-motivated trades as shareholders diversify their asset price risk. While the effect on the performance of selling is an empirical question, there is very little doubt it takes place.

### **Overhang empirical analysis**

We define the overhang as the differential performance vs. the broader market over the period of time starting 20 days before the lock-up expiry date and ending on the exact day of the block trade. Using the Bloomberg Terminal, we calculate the relative performance for the aforementioned period of time. The table in Appendix B shows two separated trends: one refers to the absolute performance of the stocks in the sample, while the other represents the performance for their corresponding market indices.

The table shows the performances for each of the stocks in the sample. According to our data we derive an average relative return for the companies in our sample equals to ca. -1% over the period of time analyzed (for the full analysis and calculations see the Appendix). Note that approximately 60% of the stocks see their stock prices fall in



the analyzed period. Not only is this percentage highly significant, but also suggestive that the result is not being driven by a few outliers.

### **Results**

These results definitely support our thesis, i.e. the existence of a breakpoint in the sponsor-backed IPOs performance that is mainly imputable to the expiration of the lock-up period and to the consequent block trade.

We have shown how during this period of time there is an anomalous trading activity, with volumes increasing by 40% on average, meaning a higher sell-pressure. This finds evidence in the average negative performance of -1% reported over the period, which is how we quantify the role of the overhang.

But what makes this result even more interesting is that even though the event, i.e. the end of the lock-up period, is known at the time of the IPO since it is included in the underwriting section of the prospectus, it seems like markets don't incorporate the economic impact of price pressure, while it should be built into the IPO traded price long before the end of the lock-up period. Moreover, this event is characterized by a permanent increase on the supply side, caused by the higher number of shares available on the secondary market after the lock-up expiry date; therefore, a decrease in price would imply a downward sloping demand curve for shares, while according to many theories in finance it should be virtually flat as the price of every asset should not

### *The role of the overhang*

depend on the supply but only on its riskiness<sup>43</sup>. Again, if this is true, we would expect the effect to be incorporated long time before.

Is it correct to define this phenomenon as a market inefficiency? If we assume the inefficiency to exist, arbitrage opportunities should be exploitable for investors; but since in practice this does not happen, it follows that other difficulties may rise concerning other variables, such as bid-ask spreads and short interest on the stocks. Therefore, further research is warranted on these topics.

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<sup>43</sup> Flat demand curves for shares are assumed by most of the prominent theories in finance (e.g. CAPM, APT, Modigliani-Miller Theorem)

## CONCLUSION

Our work has moved from the analysis of sponsor IPOs success rate to the analysis of their performances, ending up finding quantitative evidence of overhang.

Through the analysis of completed and withdrawn IPOs from 2000 to 2015, we showed that the success rate<sup>44</sup> for sponsor-backed IPOs is substantially lower than the non-sponsor's one.

This result paved the way for two hypotheses: according to the first one, PE investments are made for the sake of seeking short-term gains by taking control and utilizing the company's resources, with sponsors striving to maximize their returns pushing valuations up, supported by aggressive business plans. For these reasons, the market would be willing to buy only at discount, driving valuations down and forcing some players, who do not find the exit channel advantageous anymore, to withdraw their offers.

According to the second hypothesis, PE funds tend to be historically more prudent and sensitive to the market volatility than other investors, always looking after their track record, and therefore more willing to withdraw the offer rather than accept a lower return when the uncertainty rises.

In order to believe in the first hypothesis, we would expect sponsor IPOs to strongly outperform in the period immediately after the IPO, to testify for the higher discount being asked by the market. Said that, the first hypothesis was soon put aside: in fact,

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<sup>44</sup> Defined as the ratio between completed IPOs and total IPOs (i.e. completed+withdrawn)

## *Conclusion*

from the analysis of the relative share price performances, we found out that on average sponsor IPOs underperform non-sponsor IPOs in the first week of trading, making us more in favor of the second hypothesis.

Then, further investigating the share price performance at different time horizons, we noticed that sponsor IPOs outperform non-sponsor both at 3 and 6 months, while at 1 year from the IPO on average non-sponsor prevails.

At this point, we ask ourselves the following question: what is the factor that negatively affects, during the second half of the first year, sponsor IPOs 1-year performance? We found our answer in the end of the lock-up period and in the subsequent block trade. This is based on the fact that generally the sponsor sells only part of its stake in the company during the IPO, therefore keeping a considerable stake also in the listed company.

There are no rules regarding the length of the lock-up period, however the majority of lock-up periods last 180 days or approximately 6 months. Therefore, it is common to see a sponsor selling a sizeable portion of its remaining stake in the company some time after 6 months post-IPO, generally not too far from the lock-up expiry date.

In our analysis, we investigated the trading volumes and the relative share price performances over the period that spans from 20 days before the lock-up expiry date to the effective date of the block trade, to support evidence of overhang. It turned out that volumes were, on average, 40% higher than the period before and the relative performance was equal to -1% on average.

## *Conclusion*

These results definitely supported our thesis, i.e. the existence of a breakpoint in the sponsor-backed IPOs performance that is mainly imputable to the effect of the overhang. But what makes this result even more interesting is that even though the end of the lock-up period is already known at the time of the IPO, it seems like markets don't incorporate the economic impact of price pressure, while it should be built into the IPO traded price long before the end of the lock-up period.

It would be too hazardous to define this phenomenon as a market inefficiency, since the arbitrage opportunity that would consequently derive is actually not exploited in practice. Therefore, we suggest that further studies are warranted, in particular to assess the impact on the potential arbitrage opportunity of bid-ask spreads and short interest on the stocks.

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## APPENDIX

### A. Volume analysis

Issuer	Average Daily Volume from Lockup -20D to Pricing Date -1D	Average Daily Volume from IPO +1D to Lock- up -20D	Delta %
Brenntag	596,526	366,452	62.8%
Amadeus	325,725	220,776	47.5%
GSW Immobilien	314,460	254,462	23.6%
HellermannTyton Group	418,559	407,875	2.6%
Matas A/S	564,563	354,454	59.3%
Deutsche Annington Imr	1,225,058	675,171	81.4%
Arrow Global Group plc	24,510	46,756	(47.6%)
Stock Spirits Group	7,782,884	6,618,990	17.6%
Merlin Entertainments p	223,355	106,907	108.9%
Moncler SpA	695,681	432,564	60.8%
ISS A/S	815,185	941,601	(13.4%)
Al Noor Hospitals Group	143,205	143,623	(0.3%)
Just Eat plc	569,135	306,516	85.7%
Ontex Group NV	324,229	1,061,690	(69.5%)
Card Factory plc	1,135,468	1,179,903	(3.8%)
Spire Healthcare Group	671,438	487,894	37.6%
SSP Group plc	1,693,829	506,719	234.3%
Saga plc	2,370,887	1,071,776	121.2%
Inwido AB	276,118	207,206	33.3%
XXL ASA	802,109	956,537	(16.1%)
B&M European Value Re	504,120	1,449,827	(65.2%)
Aldermore Group plc	786,138	620,894	26.6%
Shawbrook Group plc	93,504	50,563	84.9%
Sophos Group plc	367,279	240,959	52.4%
Refresco Gerber NV	569,801	325,041	75.3%
Auto Trader Group plc	105,033	63,661	65.0%
Worldpay Group plc	279,343	160,733	73.8%
Scout24 AG	2,978,441	2,808,863	6.0%
McCarthy & Stone	105,585	70,480	49.8%
Bravida Holding AB	1,475,337	908,617	62.4%
Dometic Group AB	93,757	68,551	36.8%
Attendo AB	710,359	557,931	27.3%
VAT Group AG	2,943,738	1,501,545	96.0%
Scandic Hotels Group Al	933,776	713,258	30.9%
Ascential plc	46,385	79,294	(41.5%)
		<b>Average</b>	<b>40.2%</b>

## B. Overhang analysis and calculations

Issuer	Pricing Date	IPO date	Lockup -20D	Lock-up period/date	Ticker	Absolute Performance from Lockup -20D to Pricing Date	RELATIVE INDEX	Market Performance from Lockup -20D to Pricing Date	OVERHANG
Brenntag	02-Oct-10	31/03/2010	07-Sep-10	180	BNR GR EQUITY	(0.2%)	DAX INDEX	1.5%	(1.8%)
Amadeus	09-Oct-10	30/04/2010	07-Oct-10	180	AMS SM EQUITY	(2.8%)	IBEX INDEX	(0.2%)	(2.7%)
GSW Immobilien	14-Oct-11	15/04/2011	22-Sep-11	180	GIB gy equity	(1.8%)	DAX INDEX	15.5%	(17.3%)
HellermannTyton Group plc	27-Sep-13	26/03/2013	02-Sep-13	180	HTY LN Equity	(1.1%)	UKX INDEX	0.2%	(1.3%)
Matas A/S	11-Jan-14	28/06/2013	05-Dec-13	180	MATAS DC Equity	9.3%	KFX INDEX	9.1%	0.2%
Deutsche Annington Immobilien SE	06-Mar-14	11/07/2013	18-Dec-13	180	VNA GR Equity	7.3%	DAX INDEX	3.9%	3.4%
Arrow Global Group plc	20-Mar-14	08/10/2013	17-Mar-14	180	ARW LN Equity	(4.1%)	UKX INDEX	(0.4%)	(3.7%)
Stock Spirits Group	09-Apr-14	22/10/2013	31-Mar-14	180	STCK LN Equity	(5.0%)	UKX INDEX	0.6%	(5.6%)
Merlin Entertainments plc	14-Jun-14	08/11/2013	17-Apr-14	180	MERLN LN Equity	0.8%	UKX INDEX	3.1%	(2.4%)
Moncler SpA	21-Jun-14	16/12/2013	25-May-14	180	MONC IM Equity	(6.0%)	FTSEMIB INDEX	6.0%	(12.0%)
ISS A/S	10-Sep-14	13/03/2014	20-Aug-14	180	ISS DC Equity	(5.4%)	KFX INDEX	1.8%	(7.3%)
Al Noor Hospitals Group plc	12-Sep-14	21/06/2013	01-Jun-14	365	MDC LN Equity	3.0%	UKX INDEX	0.6%	2.4%
Just Eat plc	04-Dec-14	03/04/2014	10-Sep-14	180	JE/ LN Equity	5.7%	UKX INDEX	(1.6%)	7.3%
Ontex Group NV	05-Dec-14	25/06/2014	02-Dec-14	180	ONTEX BB Equity	0.4%	BEL20 INDEX	1.6%	(1.1%)
Card Factory plc	11-Dec-14	15/05/2014	22-Oct-14	180	CARD LN Equity	19.1%	UKX INDEX	1.5%	17.6%
Spire Healthcare Group plc	15-Jan-15	18/07/2014	25-Dec-14	180	SPH LN Equity	(9.9%)	UKX INDEX	(1.6%)	(8.4%)
SSP Group plc	24-Jan-15	10/07/2014	17-Dec-14	180	SSPG LN Equity	(0.5%)	UKX INDEX	8.0%	(8.5%)
Saga plc	28-Feb-15	23/05/2014	30-Oct-14	180	SAGA LN Equity	12.5%	UKX INDEX	8.5%	4.0%
Inwido AB	30-Apr-15	26/09/2014	05-Mar-15	180	INWI SS Equity	4.0%	OMX INDEX	0.2%	3.8%
XXL ASA	06-May-15	03/10/2014	12-Mar-15	180	XXL NO Equity	10.9%	OBX INDEX	5.2%	5.7%
B&M European Value Retail SA	24-Jul-15	12/06/2014	23-May-15	365	BME LN Equity	4.7%	UKX INDEX	(6.1%)	10.8%
Aldermore Group plc	12-Sep-15	10/03/2015	17-Aug-15	180	ALD LN Equity	(0.6%)	UKX INDEX	(6.4%)	5.8%
Shawbrook Group plc	12-Nov-15	01/04/2015	08-Sep-15	180	SHAW LN Equity	2.8%	UKX INDEX	1.1%	1.6%
Sophos Group plc	02-Dec-15	26/06/2015	28-Nov-15	180	SOPH LN Equity	(10.7%)	UKX INDEX	0.7%	(11.4%)
Refresco Gerber NV	04-Dec-15	27/03/2015	03-Sep-15	180	RFRG NA Equity	12.5%	AEX INDEX	1.0%	11.6%
Auto Trader Group plc	25-Feb-16	19/03/2015	22-Feb-16	360	AUTO LN Equity	(2.3%)	UKX INDEX	(0.3%)	(2.0%)
Worldpay Group plc	08-Apr-16	13/10/2015	21-Mar-16	180	WPG LN Equity	(0.1%)	UKX INDEX	0.5%	(0.6%)
Scout24 AG	15-Apr-16	01/10/2015	09-Mar-16	180	G24 GR Equity	3.2%	DAX INDEX	3.4%	(0.2%)
McCarthy & Stone	27-Apr-16	06/11/2015	14-Apr-16	180	MCS LN Equity	(12.0%)	UKX INDEX	(0.7%)	(11.4%)
Bravida Holding AB	19-May-16	16/10/2015	24-Mar-16	180	BRAV SS Equity	(10.2%)	OMX INDEX	0.6%	(10.9%)
Dometic Group AB	27-May-16	25/11/2015	03-May-16	180	DOM SS Equity	(1.4%)	OMX INDEX	3.9%	(5.2%)
Attendo AB	04-Jun-16	30/11/2015	08-May-16	180	ATT SS Equity	1.0%	OMX INDEX	3.0%	(2.0%)
VAT Group AG	02-Sep-16	14/04/2016	11-Aug-16	139	VACN SW Equity	5.6%	SMI INDEX	(0.0%)	5.6%
Scandic Hotels Group AB	02-Sep-16	02/12/2015	10-May-16	180	SHOT SS Equity	13.5%	OMX INDEX	8.2%	5.3%
Ascential plc	02-Sep-16	09/02/2016	18-Jul-16	180	ASCL LN Equity	3.3%	UKX INDEX	3.9%	(0.5%)

# Summary



**Department of Economics and Finance**

**Chair in Equity Markets and Alternative Investments**

**IPOs as a Private Equity Exit Route: Empirical Evidence of Legends,  
Pitfalls and Drawbacks**

**Supervisor**

**Prof. Marco Morelli**

**Candidate**

**Antonio Perrotta**

**Co-Supervisor**

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**Academic Year 2015-2016**

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## INTRODUCTION

Why private equity (“PE”) funds would represent a topic worth a master’s thesis? In this context, a bar chart can be very explicative.

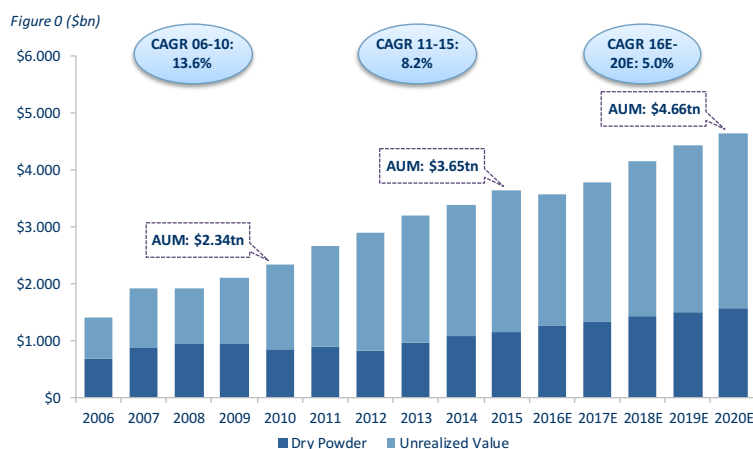


Figure 0: Private equities assets under management (AUM) evolution<sup>1</sup> (excluding venture capital), including a moderate forecast period, (\$bn). Source: 2016 Preqin (2006–2015); Deloitte Center for Financial Services analysis (2016E–2020E).

PE industry manages over \$3.5tn as of 2015, which is well above the \$2.8tn held by hedge funds<sup>2</sup>, and it grew at a compounded annual growth rate (“CAGR”) of 11.2% in the period from 2006 to 2015 vs. a 7.5% CAGR over the same period of the hedge fund industry. Moreover, it is estimated that the number of dollar millionaires will rise by 46.2% over the next five years, increasing to a record 49.3 million of millionaire adults<sup>3</sup>: it sounds like a good news for General Partners (“GPs”). Private equity broke-out after World War II, but its very boom dates back to the ‘80s, in a period characterized by a dramatic surge of leverage buyout activity financed through junk bonds, which led to legendary buyouts such as the RJR Nabisco’s one. PE have demonstrated to be quite resilient to financial crisis, therefore a reliable asset class also for governments looking after to diversify their portfolios.

Private equities’ professionals have deep industry knowledge that combined with their business expertise make them able to deliver high absolute return. The latter depends largely on the exit channel, with initial public offerings reported to deliver the highest returns on average (Schmidt, Steffen, & Szabó, 2009). Using data sourced from Dealogic and integrated with a proprietary database made available by Bank of America Merrill Lynch (containing only publicly available information), the following dissertation examines their performance with respect to both the market and non-sponsor IPOs, as well as its determinant. Even though the aim of our analysis is not to show whether private equity funds are good or evils, we will show evidence of substantial overperformance, with respect to the market, in the periods of our analysis. We will also identify a breakpoint in their performance, which we identify with the end of the lock-up period and the likely subsequent block trade. We will give evidence of the anomalous nature of the so-called *overhang*, which will be also quantified.

The dissertation aims to deliver a precise analysis of the sponsor IPOs performance, showing empirical evidence of relevant impacting variables.

The outline is as follows. Firstly, we discuss the relevant literature and give an in-depth market overview of the European private equity industry. In the second section, we define our sample of analysis and we study sponsor-backed IPOs success rate with respect to non-sponsor; then, we analyze the performance at various maturity after the IPO. In the last section, we try to give quantitative evidence of the overhang, analyzing volumes and performance over a determined time period.

<sup>1</sup> Dry powder: the amount of capital that has been committed but remains uncalled to private equity funds.

Unrealized value: the amount currently invested in companies not yet exited.

<sup>2</sup> Source: BarclayHedge Ltd.

<sup>3</sup> Credit Suisse Global Wealth Report 2015

## CHAPTER 1

### Related literature and European private equity market overview

#### PE investment life-cycle

The PE investment cycle can be divided into four different phases: fundraising, investment, value-adding, divestment. Even though each phase is crucial for the success of an investment, the exit phase is regarded as the most influential on all the other aspects of the cycle<sup>4</sup> (Gompers & Lerner, 2000).

The fundraising phase is the stage at which the basis of the GP's relationship with the Limited Partners ("LPs") is established. This relationship with the LPs should rest on the principles of the Code of Conduct whose adoption is mandatory for all EVCA (European Private Equity and Venture Capital Association) members and affiliates, together with the requirements of transparency and the fiduciary duties of due skill, care and diligence<sup>5</sup> (EVCA Handbook). Investments in private equity/venture capital funds are subject to restrictions in many jurisdictions on the types of LPs to whom it is permissible to promote funds because of their high-risk nature, making them primarily aimed at institutional or professional investors who are considered fully aware of the risks.

Past studies have shown that investors base their criteria for selecting a fund mainly on its underlying strategy as well as the fund management's track record, the latter regarded as the key factor<sup>6</sup> (Yrkkö, Hyytinen, & Liukkonen, 2001). However, other relevant studies have shown that post-2000 the persistence of buyout fund performance over successive funds has fallen considerably. Difficulties encountered by investors in determining the ultimate current fund performance when choosing whether to commit to the next fund can be an explanation to why they fund buyout GPs whose past performance is below that of their peers. The results for VC funds are completely different. In fact, the persistence of persistence in VC suggests following the industry rule of thumb to invest with GPs that have previously performed well and to avoid those that have not<sup>7</sup> (Harris, Jenkinson, Kaplan, & Stucke, 2013).

The second phase deals with the investment screening, due diligence and valuation to select suitable investments. There are several factors affecting the PE investment process. Among these, the competitive environment facing fund managers plays a big role in how they manage their investments. Relevant studies have shown that during periods in which investment opportunities are good, existing funds invest their capital faster, taking advantage of the favorable business climate, leading to relatively higher returns. On the contrary, when facing greater competition from other private equity funds, fund managers invest their capital more slowly. Moreover, recalling the importance of a good track record, it has been shown that young fund managers' investments are less responsive to market conditions and such managers invest in riskier targets in an effort to establish a track record, becoming more conservative following periods of good performance<sup>8</sup> (Ljungqvist, Richardson, & Wolfenzon, 2007). Another relevant factor deeply analyzed in PE literature is the fund investment horizon. In particular, scholars have shown how funds with contractually fixed horizon (generally ~10 years) tend not to invest in innovative companies. Long-horizon funds select young companies at an early stage of their development, that grow their patent stock significantly more than companies funded by short-horizon investors. The effect of horizon is the strongest for funds managed by experienced investors<sup>9</sup> (Barrot, 2013). In some cases, PE funds come together and form a "financial syndicate". This will happen if the risks are high or if the amount of capital required in the operation is particularly substantial. One of the investment funds will represent the group in the syndicate's dealing with the

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<sup>4</sup> P.A.GOMPERS and J.LERNER, *Money chasing deals? The impact of fund inflows on private equity valuations*, *Journal of Financial Economics*, 2000

<sup>5</sup> *Professional standards for the private equity and venture capital industry*, EVCA Handbook

<sup>6</sup> J.YRKKÖ, A.HYYTINEN and J.LIUKKONEN, *Exiting Venture Capital Investments: Lessons from Finland*, *Discussion Papers No. 781*, 2001

<sup>7</sup> R.HARRIS, T.JENKINSON, S.KAPLAN and R.STUCKE, *Has Persistence Persisted in Private Equity? Evidence from Buyout and Venture Capital Funds*, *Fama-Miller Working Paper*, February 2014

<sup>8</sup> A. LJUNGQVIST, M. RICHARDSON and D. WOLFENZON, *The Investment Behavior of Buyout Funds: Theory and Evidence*, *European Corporate Governance Institute - Finance Working Paper No. 174*, June 2007

<sup>9</sup> J.N.BARROT, *Investor Horizon and Innovation: Evidence from Private Equity Funds*, *AFA 2013 San Diego Meetings Paper*, 2013

entrepreneur and will follow a mandate negotiated with his partners<sup>10</sup> (EVCA, 2007). As far as the exit considerations are concerned, empirical evidence shows that they are crucial starting from this phase, as they are key for the structure of the deal<sup>11</sup> (Schwienbacher, 2002).

During the value-adding phase, PE funds contribute to the success of the investment providing different source of value. As a result of a study that surveyed 79 private equity investors with combined AUM of over \$750bn, PE investors say they place a heavy emphasis on adding value to their portfolio companies, both before and after they invest. The sources of that added value, in order of importance, are increasing revenue, improving incentives and governance, facilitating a high-value exit or sale, making additional acquisitions, replacing management and reducing costs. Consistent with adding operational value, the PE investors make meaningful investments in employees and advisors who provide advice and help in implementing operating improvements<sup>12</sup> (Gompers, Kaplan, & Mukharlyamov, 2015).

The divestment or exit phase is the last but not the least stage of the PE investment life cycle. There are many factors affecting the choice of one strategy over another, but these will be examined in depth in due course. For the time being, we limit ourselves to say that generally the exit is a gradual process and is not performed in block. A typical case is the “dual-track process”, in which a company chooses to go down the path of conducting an initial public offering while also pursuing a possible M&A exit. All these peculiarities will be treated in detail later.

### **Which factors most drive the exit strategy decision en route**

As mentioned above, the exit strategy receives special attention from the earliest stage of the deal. It is important because depending on its success or not PE investors will realize the return forecasted, never forgetting the importance of the track record for new potential investors. Often GPs will pursue several channels in parallel, continuing to ready initial public offerings (IPOs) even as they negotiate terms for a direct sale to a corporate buyer or for a secondary sale to another PE fund. Over the past two decades, across channels, average internal rates of return (IRR) have begun to converge as GPs have learned to bob and weave across exit channels in order to optimize asset sales<sup>13</sup> (Bain & Company, 2016).

Many relevant studies have analyzed the determinants influencing the choice. Gompers (1996) developed his *grandstanding hypothesis*, according to which young venture capital firms take companies public earlier than older venture capital firms in order to establish a reputation and successfully raise capital for new funds<sup>14</sup> (Gompers, 1996). Giot and Schwienbacher (2005) showed that VC-backed firms first exhibit an increased likelihood of exiting to an IPO. However, after having reached a plateau, non-exited investments have fewer possibilities of IPO exits as time increases. This sharply contrasts with trade sale exits, where the hazard rate is less time varying. Therefore, according to their pecking order of exits, investors prefer an IPO, followed by a trade sale<sup>15</sup> (Giot & Schwienbacher, 2007). Nikoskelainen and Wright (2005), analyzing a sample of 321 UK buyouts between 1995 and 2004, showed the existence of a relation between the corporate governance structure and the likelihood of a positive return at exit date, with IPOs outperforming both trade sales and secondary buyouts<sup>16</sup> (Nikoskelainen & Wright, 2007).

Arcot, Fluck, Gaspar and Hege (2014) investigated whether secondary buyouts are value maximizing, or reflect opportunistic behavior. They found out that pressured buyers and sellers are more likely to

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<sup>10</sup> *Guide on Private Equity and Venture Capital for Entrepreneurs, EVCA Special Paper*, November 2007

<sup>11</sup> A.SCHWIENBACHER, *An Empirical Analysis of Venture Capital Exits in Europe and The United States, EFA 2002 Berlin Meetings Discussion Paper*, 2002

<sup>12</sup> P.GOMPERS, S.N.KAPLAN and V.MUKHARLYAMOV, *What Do Private Equity Firms Say They Do?*, NBER Working Paper No. 21133, April 2015

<sup>13</sup> BAIN & COMPANY, *Global Private Equity Report 2016*, 2016

<sup>14</sup> P.A.GOMPERS, *Grandstanding in the venture capital industry*, *Journal of Financial Economics*, September 1996

<sup>15</sup> P.GIOT and A. SCHWIENBACHER, *IPOs, trade sales and liquidations: Modelling venture capital exits using survival analysis*, *Journal of Banking & Finance*, March 2007

<sup>16</sup> M.WRIGHT and E.V.NIKOSKELAINEN, *The Impact of Corporate Governance Mechanisms on Value Increase in Leveraged Buyouts*, *Journal of Corporate Finance*, September 2007



## Chapter I

engage in SBOs, to use less leverage and to rely on smaller deal financing syndicates, all this leading to lower IRR and value creation<sup>17</sup> (Arcot, Fluck, Gaspar, & Hege, 2015). Wang (2010) studied a sample of 140 UK secondary buyouts with the aim to understand the rationale behind secondary buyouts. The two main motives he found out are market conditions and the sellers' need to demonstrate returns. In particular, Wang showed that sellers are more likely to exit through secondary buyouts i) when the equity market condition is 'cold', measured by industry IPO volume, ii) when the debt market condition is favorable, suggesting buyers' greater ability to borrow, and iii) when private equity firms need to raise new funds to demonstrate their ability to achieve returns<sup>18</sup> (Wang, 2012).

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<sup>17</sup> S.ARCOT, Z.FLUCK, J.M.GASPAR and U.HEGE, *Fund Managers under Pressure: Rationale and Determinants of Secondary Buyouts*, *Journal of Financial Economics*, January 2015

<sup>18</sup> Y.WANG, *Secondary Buyouts: Why Buy and at What Price?*, *Journal of Corporate Finance*, December 2012

## CHAPTER 2

### Investors' skepticism towards sponsor IPOs

In this section, we focus our analysis on the estimation of the IPOs success rate, investigating whether the success rate of sponsor-backed IPOs substantially differs from all other IPOs.

#### Sample construction

We extract from Dealogic all completed and withdrawn initial public offerings with targets located in Europe, Middle East, and Africa (“EMEA”) for the period ranging from January 1<sup>st</sup>, 2000 to December 31<sup>st</sup>, 2015, integrating and adjusting the results using a proprietary database made available by Bank of America Merrill Lynch (which contains only publicly available information). Then we apply a set of filters: we exclude IPOs with no deal value reported or lower than €50m; for sponsor IPOs, we exclude the ones with no real involvement by a PE sponsor, meaning cases in which the PE only holds a minority stake and no special agreements for control exist.

The final sample contains 4,383 IPOs, of which 566 are sponsor backed.

#### Methodology

We define the success rate as the ratio between completed IPOs and the total number of IPOs, the latter defined as the sum of completed and withdrawn IPOs<sup>19</sup>. We calculate it for each year of analysis, for both non-sponsor and sponsor-backed offerings. The figure below clearly shows the trend for the years between 2000 and 2015.

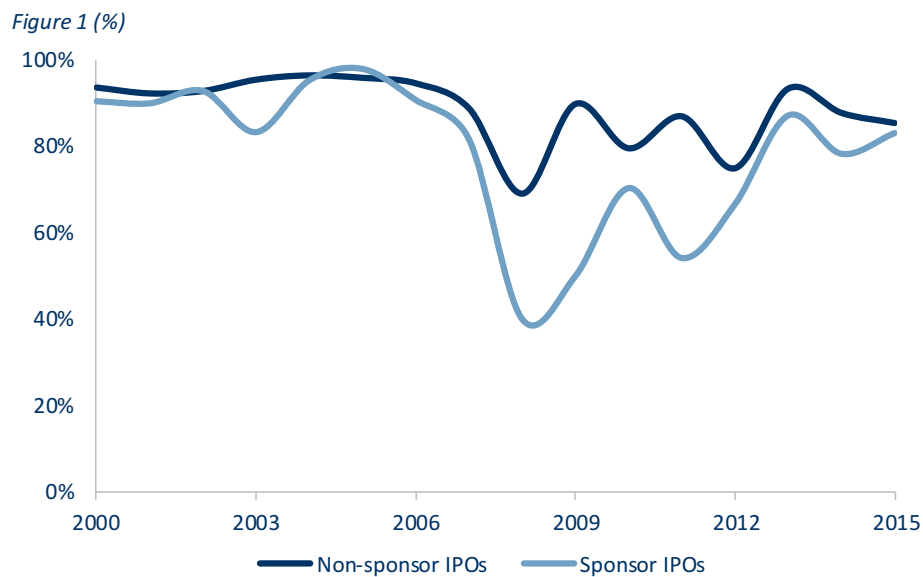


Figure 1: Success rate 2000-2015, sponsor and non-sponsor IPOs (%). Source: Dealogic, 2016.

The chart shows the existence of a substantial difference between the two success rates, with the non-sponsor one being constantly higher (with the only exception for the year 2005) than the sponsor's. In particular, the following table better quantifies the difference:

<sup>19</sup> In the case in which the IPO is withdrawn and then eventually refiled, we consider it only if at least two years passed between the withdrawal and the refiling.

	Non-sponsor IPOs	Sponsor IPOs
2000-2003	93.4%	90.2%
2004-2007	93.5%	90.7%
2008-2011***	79.2%	58.5%
2012-2015	86.3%	81.5%
2000-2007*	93.5%	90.6%
2008-2015**	83.0%	75.9%
<b>2000-2015***</b>	<b>90.2%</b>	<b>83.2%</b>

Table 1: Average success rate, sponsor and non-sponsor IPOs (%). P-value with 2 degrees of freedom: \* = 20%, \*\* = 5%, \*\*\* = 0.1%; where it is not indicated, the above defined probability ranges between 30% and 20%.

We test whether these probabilities are statistically different. To do this, we consider the two samples, non-sponsor (with size  $n_1$ ) and sponsor (with size  $n_2$ ) as one random sample of size  $n_1 + n_2$ . Using the maximum likelihood estimator, we then obtain:

$$\sum_{i=1}^2 \sum_{j=1}^{k+1} \frac{[N_{ij} - \frac{n_i(N_{1j} + N_{2j})}{n_1 + n_2}]^2}{n_i(N_{1j} + N_{2j})/(n_1 + n_2)}$$

where  $N_{ij}$  denotes the number of outcomes in group  $j$  of a sample of size  $n_i$  (similarly for the others).

It can be shown that our statistic has a limiting chi-square distribution with  $k$  degrees of freedom<sup>20</sup> (Mood, Graybill, & Boes). Following the application of the test to our analysis, we derive that there is some evidence of difference between sponsor and non-sponsor success rates over the whole period 2000-2015.

Generally speaking, the probability of successfully complete an IPO is a function of the volatility of the equity market. During a bullish equity market, it follows, with a short time lag, a wave of IPOs being filed; eventually, if the market volatility stays low, excluding the idiosyncratic risk relative to each company, the probability for the IPOs to be completed surges; conversely, if the market volatility increases, it becomes riskier for a company to go public, turning out in many IPOs being withdrawn.

## Results

In this section, we have showed the predominance of the non-sponsor IPOs success rate over the sponsor success rate, as well as the relationship between the volatility of the stock market and the IPO success rate, but nothing was said to explain the difference between the sponsor and non-sponsor success rates. According to the results obtained so far, we see two main possible explanations.

According to the first hypothesis, investors believe that PE investments are made for the sake of seeking short-term gains by taking control and utilizing the company's resources, i.e. not creating any value for the company, and they strive to maximize their returns pushing valuations up, supported by aggressive business plans<sup>21</sup> (Badunenko, Barasinska, & Schafer, 2009). For these reasons, the market would be willing to buy only at discount, driving valuations down and forcing some players, who don't find the exit channel advantageous anymore, to withdraw their offers.

According to the second hypothesis, PE funds tend to be historically more prudent and sensitive to the market volatility than other investors, always looking after their track record, and therefore more willing to withdraw the offer rather than accept a lower return when the uncertainty rises, as valuations tend to fluctuate significantly in times of uncertainty and investors tend to stay out of equities<sup>22</sup>.

To effectively test these two hypothesis, we need to analyze the post-exit performance in the first place, and then we will try to reconcile this conundrum.

<sup>20</sup> A.MOOD, F.GRAYBILL and D.BOES, *Introduction to the Theory of Statistics*, McGraw Hill, third edition.

<sup>21</sup> O.BADUNENKO, N.BARASINSKA and D.SCHAFER, *Are Private Equity Investors Good or Evil?*, *Discussion Papers* 901, June 2009

<sup>22</sup> PWC GCC IPO Market Watch 2016

## Chapter II

### IPOs performance in the aftermarket

It is crucial for the aim of our analysis to understand how sponsor and non-sponsor IPOs are perceived in the aftermarket. Therefore, we investigate how they perform in relation to each other and to the market.

### Sample construction

For a matter of consistency, we use the same panel as for the success rate analysis, of course filtering out withdrawn offers. Moreover, we set a new threshold for the deal value at €100m, to avoid the impact of illiquid stock performances over the sample. We use the relative performance rather than the absolute one, expressed as the difference between the absolute performance and the associated benchmark/index performance, which is the one identified by Bloomberg. Data on performance are downloaded using the Bloomberg Terminal.

### Methodology and results

We calculate the performance at different stage, in order to better understand how it changes as time passes by. We also check whether these values are significant larger than zero and run test of significance for the difference in the mean values. The start date is fixed at the first trading day of the stock, while the different end dates we use are 1 week, 3 months, 6 months and 1 year after.

In the very short term, i.e. over the first week of trading, sponsor-backed IPOs tend to perform, on average, slightly better than the market, however their performance is lower than non-sponsor's. Their performance is also much more volatile if analyzed year by year.

	Non-sponsor IPOs	Sponsor IPOs
2001-2004	0.3%	(0.2%)
2004-2008	0.7%**	0.2%
2008-2012	0.6%	(0.3%)
2012-2015	2.9%***	1.2%
2001-2008	0.8%**	0.4%
2008-2015	1.9%***	0.9%**
<b>2001-2015</b>	<b>1.2%***</b>	<b>0.6%**</b>

Table 2: 1-Week Relative Performance Estimation. P-Value: \* = 10%; \*\* = 5%; \*\*\* = 1%; if not stated, it is in the range of 70%-90%. Source: Bloomberg.

This first result is very significant for our proposed analysis. According to our data, on average PE funds leave some money on the table because of their positive returns over the market, meaning they tend to price at discount, but still their discount must be lower of non-sponsor offers, which shows a relatively higher return. Said that, it seems unlikely that PE funds are forced by the market to price at discount (first hypothesis), while it can be better defined as a general phenomenon of underpricing that affects both sponsor and non-sponsor. Theories behind this phenomenon are many; among these, some argue the importance to show a successful IPO rather than a drop in price, as well as its behavioral impact on retail investors<sup>23</sup> (Beatty & Ritter, 1986).

In the 3 months after the IPO, there is a big change in performance compared to the first week. In fact, on average sponsor IPOs outperform both the market and non-sponsor over time, as showed in the table below.

<sup>23</sup> R.P.BEATTY and J.RITTER, *Investment banking, reputation, and the underpricing of initial public offerings*, *Journal of Financial Economics*, February 1986

## Investors' skepticism towards sponsor IPOs

	Non-sponsor IPOs	Sponsor IPOs
2001-2004	3.4%**	6.9%***
2004-2008	3.0%***	3.5%***
2008-2012	3.2%**	4.1%**
2012-2015	8.6%***	5.3%**
2001-2008	2.9%***	4.0%***
2008-2015	6.2%***	5.0%***
<b>2001-2015</b>	<b>4.1%***</b>	<b>4.5%***</b>

Table 3: 3-Month Relative Performance Estimation. P-Value: \* = 10%; \*\* = 5%; \*\*\* = 1%; if not stated, it is in the range of 70%-90%. Source: Bloomberg.

However, in the second 3 months after listing there is a drop in performance of sponsor-backed companies. This poor performance is partly offset by the good performance of the initial 3 months, ending up in a 6-month performance still higher than the market, but very close to the non-sponsor's one. In our interpretation, the causes of the sponsor's performance flattening can be found in the role of the overhang, which will be discussed and analyzed in due course.

	Non-sponsor IPOs	Sponsor IPOs
2001-2004	2.0%	0.4%
2004-2008	3.1%**	7.9%***
2008-2012	0.2%	11.1%**
2012-2015	14.1%***	7.1%*
2001-2008	2.1%	4.4%**
2008-2015	5.3%***	8.1%***
<b>2001-2015</b>	<b>4.2%***</b>	<b>4.4%***</b>

Table 4: 6-Month Relative Performance Estimation. P-Value: \* = 10%; \*\* = 5%; \*\*\* = 1%; if not stated, it is in the range of 70%-90%. Source: Bloomberg.

Last but not the least, we analyze the overall relative performance in the entire first year of trading. The situation definitely changes: sponsor-backed companies continue to perform better than the market, however they don't do better than non-sponsor's anymore. This is more evident for IPOs between 2008 and 2015, and in particular in the last years of observation, i.e. 2012-2015.

	Non-sponsor IPOs	Sponsor IPOs
2001-2004	8.1%**	11.1%
2004-2008	3.7%*	3.0%
2008-2012	2.8%	6.5%
2012-2015	18.5%***	6.6%
2001-2008	4.1%**	5.8%*
2008-2015	8.5%***	6.2%**
<b>2001-2015</b>	<b>7.2%***</b>	<b>6.9%***</b>

Table 5: 1-Year Relative Performance Estimation. P-Value: \* = 10%; \*\* = 5%; \*\*\* = 1%; if not stated, it is in the range of 70%-90%. Source: Bloomberg.

Then we run a test of significance for the difference in the mean values showed in the tables before. Assuming that non-sponsor and sponsor IPOs are normally distributed, with mean  $\mu_1$  and  $\mu_2$  respectively and random variables  $X_1$  and  $X_2$ , we wish to test the following null hypothesis:

$$H_0: \mu_1 = \mu_2 \quad \text{vs} \quad H_1: \mu_1 \neq \mu_2$$

We derive the following equation<sup>24</sup>:

<sup>24</sup> A.MOOD, F.GRAYBILL and D.BOES, *Introduction to the Theory of Statistics*, McGraw Hill, third edition.

## Chapter II

$$T = \frac{(\bar{X}_1 - \bar{X}_2) \sqrt{\frac{n_1 n_2}{n_1 + n_2}}}{\sqrt{[\sum (X_{1i} - \bar{X}_1)^2 + \sum (X_{2j} - \bar{X}_2)^2] / (n_1 + n_2 - 2)}}$$

where  $n_1$  and  $n_2$  are the sample sizes and  $\bar{X}_1$  and  $\bar{X}_2$  are the sample averages, and it has the  $t$  distribution with  $n_1 + n_2 - 2$  degrees of freedom.

The table below summarizes the cumulative probabilities for  $T \leq t$  score.

	1-Week	3-Month	6-Month	1-Year
2001-2004	66.8%	86.3%	64.5%	67.3%
2004-2008	73.3%	60.0%	92.3%	54.9%
2008-2012	78.1%	62.1%	96.0%	66.2%
2012-2015	95.4%	92.6%	97.5%	98.5%
2001-2008	70.9%	72.9%	78.7%	64.9%
2008-2015	97.8%	81.1%	89.8%	76.0%
2001-2015	88.8%	60.6%	53.5%	53.6%

Table 6: Test of equality of two means: cumulative probabilities.

Even though some of the results may seem too low for the reader, however they can be still assumed as significant for the purpose of our analysis.

There can be multiple interpretations of these results. What we think is that, as it is usually the case, PE funds tend to sell only part of their stake in the company during the IPOs, thus they continue to exercise some kind of influence on the newly listed companies. Then, after the initial 90 to 180 days, i.e. the general length of the lock-up period, and the subsequent full or almost full exit of the sponsor from the company, there are some factors that may impact the firm's performance. Above all, as pointed out by Kraus and Burghof (2003), the termination of a blockholder's exercised corporate control can be a signal, because of his insider knowledge, of a possible downward sloping demand curve; this can provide an analytical framework that explains why the performance of sponsor-backed IPOs might show a significant breakpoint at the time when the sponsor exits from the company<sup>25</sup> (Kraus & Burghof, 2003).

### Remarks

The results derived from the analysis of the short and long-term performance of sponsor-backed IPOs suggest that PE-backed companies outperform non-PE backed in the 3 to 6 months following the initial public offerings. Then there is a breakpoint, mainly due to the effect of block trades on companies' performances, which are identified as the main determinant of the long-term performance being slightly worse than non-sponsor companies.

In the next section, we focus our analysis on the phenomenon of the overhang, trying to show evidence, if any, of anomalous performances.

<sup>25</sup> T.KRAUS and H.P.BURGHOF, *Post-IPO Performance and the Exit of Venture Capitalists*, EFMA 2003 Helsinki Meetings, January 2003

## CHAPTER 3

### The role of the *overhang*

In this section, we try to give quantitative evidence of the role of the overhang, and to understand how this phenomenon affects a company's performance. To do so, we have to define an appropriate time window, along with controlling for other factors.

#### Sample construction

We use a proprietary database of accelerated bookbuildings ("ABBs") made available by Bank of America Merrill Lynch (which contains only publicly available information) and we cross it with the IPO database used before. We keep into consideration only the first ABB, if more for the same company, because as the liquidity of the stock increases, the effect of special events on the stock performance becomes less observable. In addition, we consider only relatively recent EMEA transactions, spanning from 2010 to 2016<sup>26</sup>, and we filter out for i) companies non-majority owned by a financial sponsor, ii) IPOs lower than \$350m in value (for liquidity reasons), iii) companies in which there has been no exit by a financial sponsor post-IPO, iv) block trades realized more than 4 months after the lock-up expiry date and v) block trades realized before the lock-up expiry date, i.e. through a waiving of the lock-up agreement. We download data from Bloomberg regarding the lock-up period length (if not available, from the prospectus) and the pricing date of the block, excluding transactions for which even only one of these fields was not available. The final sample contains 35 ABBs, on which we base our following analysis.

#### Methodology

As already argued before, PE funds tend to sell only part of their stakes in the companies during the IPOs. In fact, generally only approximately 35-40%<sup>27</sup> of the shares are issued to the public. Even though it is not a legal requirement, it is a standard arrangement for the underwriters to claim the shares of the remaining shareholders to be restricted from sale for a certain period of time. This period is the so-called *lock-up* period, and it is one way of aligning the incentives of the current owners and new owners at least during the initial stages of the company being public. There are no rules regarding the length of the lock-up period, however the majority of lock-up periods last 180 days or approximately 6 months<sup>28</sup> (Ofek & Richardson, 2000). Therefore, it is common to see a sponsor selling a sizeable portion of its remaining stake in the company some time after 6 months post-IPO, generally not too far from the lock-up expiry date.

It is not easy for a sponsor to decide what the best moment to exit is. A number of variables have to be taken into account, such as the general market condition and its impact on the share price performance since the listing. In fact, market timing is crucial: according to the scenario, bearish market trends in the initial months of trading can lead to a delay in timing of the exit, while bullish market trends represent an optimal situation to exit or it can even lead to a waiving of the lock-up agreement and to an early sale. The other decision the sponsor has to face deals with the exit procedure, i.e. whether it takes place in a single sell-down or in multiple steps. This has to do with both the absolute size of the stake and its relative size, i.e. in terms of share in the company, as well as with the liquidity of the shares. We argue that there exists an anomalous trading activity during the period that goes from few weeks before the lock-up expiry date post-IPO to the sponsor's block trade. Even though the market does not know the exact day in which the block trade takes place, we argue that some factors can signal a potential block sale relatively soon after the lock-up expiration, among which a brilliant share price performance in the initial months of trading. To support our argumentation, we analyze trading volumes in the first place, and then we look at the share price performances reported over a precise time window for the 35 companies in the sample described above.

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<sup>26</sup> Note that the majority of observations spans from 2014 to 2016

<sup>27</sup> Source: BofAML Database of EMEA IPOs since 2001 larger than €100m

<sup>28</sup> E.OFEK and M.RICHARDSON, *The IPO Lock Up Period: Implication for Market Efficiency and Downward Sloping Demand Curves*, NYU Working Paper No. FIN-99-054, January 2000

### Trading volume analysis

We download data on trading volumes for the companies in our sample and we try to understand whether there is evidence of any anomalous trading activity over time. When a block is sold, there is a permanent shift in volume due to the higher number of shares released on the secondary market. Therefore, we analyze volumes from 20 days before the lock-up expiry date to the day before the block trade, to neutralize the effect of the jump in volume on the block trade day, and then we compare it with the volumes reported from the second day of trading (to avoid distortions of the first day of trading) to the 20<sup>th</sup> day before the lock-up expiration. Our sample shows an average jump in volumes over this period of ca. 40%. Note that this result is not just the outcome of some outliers, since 80% of the companies in our sample report an increase in trading volumes over the period. This is an important result for the aim of our analysis. This new volume likely reflects seller-motivated trades as shareholders diversify their asset price risk. While the effect on the performance of selling is an empirical question, there is very little doubt it takes place.

### Overhang empirical analysis

We define the overhang as the differential performance vs. the broader market over the period of time starting 20 days before the lock-up expiry date and ending on the exact day of the block trade. Using the Bloomberg Terminal, we calculate the relative performance for the aforementioned period of time.

According to our data we derive an average relative return for the companies in our sample equals to ca. -1% over the period of time analyzed. Note that approximately 60% of the stocks see their stock prices fall in the analyzed period. Not only is this percentage highly significant, but also suggestive that the result is not being driven by a few outliers.

### Results

These results definitely support our thesis, i.e. the existence of a breakpoint in the sponsor-backed IPOs performance that is mainly imputable to the expiration of the lock-up period and to the consequent block trade. We have shown how during this period of time there is an anomalous trading activity, with volumes increasing by 40% on average, meaning a higher sell-pressure. This finds evidence in the average negative performance of -1% reported over the period, which is how we quantify the role of the overhang.

But what makes this result even more interesting is that even though the event, i.e. the end of the lock-up period, is known at the time of the IPO since it is included in the underwriting section of the prospectus, it seems like markets don't incorporate the economic impact of price pressure, while it should be built into the IPO traded price long before the end of the lock-up period. Moreover, this event is characterized by a permanent increase on the supply side, caused by the higher number of shares available on the secondary market after the lock-up expiry date; therefore, a decrease in price would imply a downward sloping demand curve for shares, while according to many theories in finance it should be virtually flat as the price of every asset should not depend on the supply but only on its riskiness<sup>29</sup>. Again, if this is true, we would expect the effect to be incorporated long time before.

Is it correct to define this phenomenon as a market inefficiency? If we assume the inefficiency to exist, arbitrage opportunities should be exploitable for investors; but since in practice this does not happen, it follows that other difficulties may rise concerning other variables, such as bid-ask spreads and short interest on the stocks. Therefore, further research is warranted on these topics.

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<sup>29</sup> Flat demand curves for shares are assumed by most of the prominent theories in finance (e.g. CAPM, APT, Modigliani-Miller Theorem)



## CONCLUSION

Our work has moved from the analysis of sponsor IPOs success rate to the analysis of their performances, ending up finding quantitative evidence of overhang.

Through the analysis of completed and withdrawn IPOs from 2000 to 2015, we showed that the success rate<sup>30</sup> for sponsor-backed IPOs is substantially lower than the non-sponsor's one.

This result paved the way for two hypotheses: according to the first one, PE investments are made for the sake of seeking short-term gains by taking control and utilizing the company's resources, with sponsors striving to maximize their returns pushing valuations up, supported by aggressive business plans. For these reasons, the market would be willing to buy only at discount, driving valuations down and forcing some players, who do not find the exit channel advantageous anymore, to withdraw their offers.

According to the second hypothesis, PE funds tend to be historically more prudent and sensitive to the market volatility than other investors, always looking after their track record, and therefore more willing to withdraw the offer rather than accept a lower return when the uncertainty rises.

In order to believe in the first hypothesis, we would expect sponsor IPOs to strongly outperform in the period immediately after the IPO, to testify for the higher discount being asked by the market. Said that, the first hypothesis was soon put aside: in fact, from the analysis of the relative share price performances, we found out that on average sponsor IPOs underperform non-sponsor IPOs in the first week of trading, making us more in favor of the second hypothesis.

Then, further investigating the share price performance at different time horizons, we noticed that sponsor IPOs outperform non-sponsor both at 3 and 6 months, while at 1 year from the IPO on average non-sponsor prevails.

At this point, we ask ourselves the following question: what is the factor that negatively affects, during the second half of the first year, sponsor IPOs 1-year performance? We found our answer in the end of the lock-up period and in the subsequent block trade. This is based on the fact that generally the sponsor sells only part of its stake in the company during the IPO, therefore keeping a considerable stake also in the listed company.

There are no rules regarding the length of the lock-up period, however the majority of lock-up periods last 180 days or approximately 6 months. Therefore, it is common to see a sponsor selling a sizeable portion of its remaining stake in the company some time after 6 months post-IPO, generally not too far from the lock-up expiry date.

In our analysis, we investigated the trading volumes and the relative share price performances over the period that spans from 20 days before the lock-up expiry date to the effective date of the block trade, to support evidence of overhang. It turned out that volumes were, on average, 40% higher than the period before and the relative performance was equal to -1% on average.

These results definitely supported our thesis, i.e. the existence of a breakpoint in the sponsor-backed IPOs performance that is mainly imputable to the effect of the overhang. But what makes this result even more interesting is that even though the end of the lock-up period is already known at the time of the IPO, it seems like markets don't incorporate the economic impact of price pressure, while it should be built into the IPO traded price long before the end of the lock-up period.

It would be too hazardous to define this phenomenon as a market inefficiency, since the arbitrage opportunity that would consequently derive is actually not exploited in practice. Therefore, we suggest that further studies are warranted, in particular to assess the impact on the potential arbitrage opportunity of bid-ask spreads and short interest on the stocks.

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<sup>30</sup> Defined as the ratio between completed IPOs and total IPOs (i.e. completed + withdrawn)

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