Stockholm School of Economics

Underpricing and Long-Run IPO Performance in Italy, Sweden and United Kingdom: a comparative study from 2006 to 2013

Tutor: Professor Bo Becker, Department of Finance

Stockholm School of Economics

Author: Davide Ramazzina[1]

ABSTRACT

In my thesis, I study two IPO anomalies, the underpricing and the long-run underperformance of new listings, from 2006 to 2013, on two peripheral (Sweden and Italy) and on the main European financial market (UK). I also examine the sector specific performances within each market to identify whether some particular industry performed better in one particular market rather than in others. Different approaches have been used to investigate the abnormal IPO returns: the event-time and the calendar-time approach. In my analysis, I used samples of 66 IPOs in Italy, 341 IPOs in UK and 37 IPOs in Sweden. My main contribution is to introduce the Fama-French three-factor model for analyzing long-run IPO performances on the Italian equity market as well as comparing, on a single research, both the short and long-run IPO performances between regional and central financial markets. My findings suggest that the first-day returns are consistently positive in Italy and UK, while they are not fully significantly positive in Sweden. However, the degree of underpricing is higher in UK than it is in Italy and Sweden even if the number of IPOs varies substantially. My results also suggest that when IPO portfolio returns are equally-weighted, new listings in UK statistically underperformed against their benchmarks while Italian and Swedish did not. On a value-weighted basis, instead, there is no strong evidence to support long-run IPO underperformances in all three markets.

Keywords: Underpricing, IPO Long-Run Underperformance, Fama-French three-factor model

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[1] 40665@student.hhs.se
Master of Science in Finance and Accounting, specialization in Corporate Finance.

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1 Introduction and Purpose of the Research

After a couple of years of few market listings, following a renewed optimistic spirit in Europe as well as a foreseeable exit from one of the worst recessions of the latest decades, the IPO market is showing strong signs of improvement both in UK, in Sweden and Italy. In addition, the announced privatization plans of the some Governments may additionally spur IPO activity. As a result, talking about IPO anomalies is more topical than in the previous years.

I am pursing the objective of analyzing these three markets: my thesis, although my results might be time-dependent, wants to give an insight about IPO underpricing and long-run IPO performance to firms which are facing the choice of where to be listed (a peripheral financial market or London)(other listing rationales will not be covered). In addition, it could be also useful from an investor's prospective for his/her investment decisions.

Furthermore, this paper expands the typical field of research that has characterized past academic studies by analyzing jointly two out of three anomalies in more than one financial market. The period I aim to study, from 2006 to 2013, has not been covered by past literature and my samples comprise of 66 IPOs in Italy, 341 in UK and 37 in Sweden. The study will perform different techniques to reach a high level of accuracy. From a methodological standpoint, great importance will be given to results obtained from the Fama-French three-factor model. This technique, to my knowledge, has not yet been used for measuring long-run performance in the Italian IPOs. As a conclusion, my findings will be compared in light of previous and similar studies to see if my research has brought substantial improvements into the field or not.

1.1 Previous Studies on the Italian Equity Market

A variety of studies have documented the phenomenon of underpricing in Italy: Chiabrera (1992) surveyed a sample of IPOs in Italy from 1981 to 1990 and found abnormal returns of +25.9% whereas Cherubini and Ratti (1992) found returns of +29.7% from a sample of IPOs taken from 1985 and 1991. Fabrizio et al (2001), by analyzing previous studies on Italian IPO underpricing, reported a possible downward trend of underpricing across time: they found an initial underpricing of +9.7% whose distribution was positively skewed and with positive excess kurtosis. More recently, in 2003, Ritter reported positive returns of +21.7% from Italian IPOs from 1985 to 2001. Some academic studies on underpricing have been listed in the Table I.

Several academic papers have reported and analyzed the long-run IPO performances of Italian IPOs. The totality of studies concentrated their analysis on the interpretation of CARs and

BHARs results (which will be outlined later). For instance, Arosio, Giudici, and Paleari (2001), on a sample of 150 IPOs during the period 1985-1999, found negative abnormal returns of -11.53% (BHAR) in the following three years. Fabrizio and Samà (2001) analyzed 41 IPOs registered in the Italian market during the period 1995-1998 and identified cumulative abnormal returns (CAR) in the 36 months (after issuance) ranging from -70.09% to -90.74%, depending on the benchmark (see Table II for BHAR data). In their paper, they claimed the existence of long-run IPO underperformance in Italy and they advocated the extent of such anomaly was more pronounced than in other countries. In a more recent study, Rossi (2012) surveyed 102 Italian IPOs from 1998 to 2005 and he compared venture-backed (VB) and non-venture-backed (NVB) IPOs. He found that IPOs in Italy underperformed by a varying extent: if VB, the BHARs amounted to -88.37% against -81.44% if NVB over a three-year horizon. For other information, see Table II.

1.2 Previous Studies on the British Equity Market

Different studies are present on IPO underpricing in UK: the first scholar who examined IPO performance was Dimson in 1979 and found robust evidence of underpricing in the UK market. Levis (1990 and 2001) exhibited the persistence of underpricing in UK on different sub-markets: the main market and AIM. Levis showed also that, on average, IPOs listed on AIM tend to be more underpriced than the ones listed on the main market.

Another study, in 1994, by Byrne and Rees, also found a significant positive return for five days after the IPOs are first traded. Moreover, the result identified significant relations between underpricing and sponsor reputation. The more the prestige of the sponsor the higher the underpricing on the flotation day. They also found a negative relation between the underpricing and the equity retained by old shareholders on the flotation day, in contrast with previous studies.

In 1997, Dewenter and Malatesta (1997) published a study on UK public offerings of state-owned enterprise and their difference to privately owned ones. If government announced purpose was to promote efficiency in the business and spread share ownership as widely as possible among the UK population (Bishop and Kay, 1989) the study showed that the privatizations were deliberately underpriced. Furthermore, they found that privatizations were significantly more underpriced than private company IPOs.

The IPO long-run performance is the subject of studies from 1993: Levis, when investigating the UK long-run performance from a sample of 712 UK IPOs floated during 1980-1988, recognized the importance of the size effect for UK stocks and compared long-run abnormal returns against three alternative benchmarks: an all-shares index (FTA), an index which considers

smaller companies (HGSC index), and a specially constructed all-shares equally-weighted index. His result confirmed that over 3 years after the flotation, IPOs suffer from underperformance of between -8% and -23% depending on the market benchmark. Using a similar method, but a longer time period, Khurshed et al. (1999) reported the UK IPO long-run performance during 1991-1995. They found an average of -17.8% abnormal returns over 5 years after the IPOs. Espenlaub (2000), using more up to date data (1985-1995), compared IPO long-run returns with diverse alternative methods: CAPM, Size control portfolio, a value weighted multi-index using HGSC index, Fama-French value-weighted three factor model. In line with other studies, long-run abnormal returns are found to vary when compared with various benchmarks. The result showed a range of negative and statistically significant abnormal returns over 60 months after the IPO dates for CAPM, Size Portfolio, Fama-French factor. Slightly negative and statistically insignificant abnormal returns are found when using the HGSC index.

1.3 Previous Studies on the Swedish Equity Market

Different but fewer studies have been focusing on underpricing of Swedish IPOs: Rydqvist (1993) surveyed a sample of initial listings from 1970 to 1991 and he found a first-day mean return of +39%. Later studies show a progressive shrinking of such underpricing phenomenon: Bodnaruk, Kandel, Massa and Simonov (2008) report the underpricing to be at +14.2% when considering a sample of IPOs from 1995 to 2001 (see Table I for evidence). More recently, Henricson (2012) calculated a first-day return, on average, of +11.49% on data gathered from 1994 to 2011, clearly following a downward trend. My further analysis will strengthen this idea.

The long-run IPO performance in Sweden has been studied on different but few studies: after surveying IPOs from 1980 to 1990, Loughran, Ritter and Rydqvist (1994) reported that IPOs slightly underperformed on a three-year horizon by -1.2% (BHAR market-adjusted). When expanding to other studies, two previous Master's Thesis from SSE are worth mentioning: Besser, Carlman & Mossberg (2001) studied the long-run underperformance of IPOs between 1980 and 2000 by calculating monthly abnormal returns on IPO portfolios, where the benchmark portfolios were formed based on book-to market ratios and size, and they reported no clear evidence of long-run abnormal performance. Björcke and Menzel (2006) instead, after introducing the study of the alphas from the Fama-French three-factor model, reported that Swedish IPOs (271 from 1992 to 2005) underperformed on a statistically significant basis when IPO portfolio returns were equally weighted.

2 Literature Review and Background

In this section, after having identified which anomalies are reported to characterize the IPO market and IPOs after their listings, I will discuss the current state of literature regarding the causes and the explanations scholars have suggested over the past years for such anomalies.

2.1 IPO Anomalies

The IPO market has been subject to a variety of studies from the 1960s onwards. The historical process of identifying the so called "IPO anomalies" was not straightforward.

The first anomaly was initially documented in the late 1960s in the US market by Reilly and Hatfield (1969) where they found that from 53 sample firms, that went public from 1963 to 1965, the initial (first-day) return ranged from 18.3% to 20.2%. The "*underpricing phenomenon*" represented the first and most researched IPO anomaly found by scholars, and it is referred to the statistically and economically significant positive initial returns characteristic of IPOs over the first few days (or just the first-day) after the initial listing of the shares. Given the large degree of uncertainty regarding the true value of the newly listed shares, some significant degree of mispricing is to be expected but large price increases of IPO shares in the immediate post-listing period might suggest that IPOs are underpriced on a systematic basis. In the years following the first paper, other scholars identified such phenomenon in different other financial markets (see Table I for a list of studies on underpricing).

The second anomaly being identified was the long-run IPO underperformance. Such phenomenon was first documented by Aggarwal and Rivoli (1990) who reported substantial negative abnormal returns over long-time horizons. They examined the IPO prices after the first 250 trading days and they found that on average, IPO prices underperformed the market index by 13.73%. As for the "underpricing phenomenon", such anomaly was then found in other markets: Lewis (1993) reported that in UK IPOs underperformed by -8% to -23% after a three-year period, depending on the benchmark used by using the CAR method. In Sweden, Loughran & Ljungqvist (1994) found that, over a three-year horizon, the Buy-and-Hold Abnormal Returns of Swedish IPOs were slightly negative by -1.2%. In Italy, Giudici and Paleari (2001), in a study conducted on 109 Italian IPOs from 1985 to 1999 found abnormal returns (BHARs) of -23.01%: in addition, they showed how different IPOs in different time sub-periods performed differently across time.

The third anomaly is the hot/cold market and it was first documented in the US by Ibbotson and Jaffe (1975). According to the efficient market hypothesis, the timing of a financing decision

should not matter since any offering will be fairly priced and so the IPOs should occur randomly over time. However, evidence shows that there are sustained periods where the number of offerings is really intense[2]. These periods are called `hot issue' markets. Conversely, evidence also records periods where only very few firms go public and the volume of trading was small. These periods are called `cold issue' markets. Although this phenomenon is very interesting, very few explanations have been suggested.

2.2 Theories Behind IPO Anomalies

The IPO anomalies I outlined above represent a departure from the market efficiency hypothesis that prompted many scholars to research such causes in the past decades.

In the following sections, I will review a range of significant IPO literature on the underpricing and long-run underperformance phenomena as well as the "hot and cold issue" market.

2.2.1 Underpricing

As discussed in the previous chapter, there have been many studies investigating the three well-known IPO anomalies. The first anomaly was found by Reilly and Hatfield in 1969. There have been other different studies with different time periods and sample size and countries covered (see Table I for a partial list of underpricing studies). Many explanations of IPO underpricing (most of them firstly hypothesized by Ibbotson in 1975) are centered on the concept of information asymmetry but also other reasons have come up in the subsequent academic papers.
Here below the main models are shown.

I The Winner's Curse Hypothesis

The first model was proposed by Rock (1986) in which he assumed that underpricing is the result of information asymmetry among market participants. Market participants are divided, according to his studies, into two categories: informed investors (II) and uniformed investors (UI) if they have superior information regarding the new issues or not. As a consequence of this asymmetry, II compete only for 'good' issues,, which will have an excess of demand, and UI for both 'good' and 'bad' issues, generating an excess of supply for 'bad' issues. Thus the UI receive disproportionate levels of `bad' issues. This condition is well known as *winner's curse*. Therefore issuers underprice their IPOs deliberately in order to induce UIs' participation in the market.

[22] See graph 4.2 for the evolution of the number of IPOs in all three financial markets collapsed after 2007).

This model has clearly drawbacks, such as adverse selection problems, but many scholars attempted to extend the work. Beatty and Ritter (1986) proposed another explanation of IPO underpricing. In their model, they kept Rock's assumption on information asymmetry, which then was summarized in an ex ante uncertainty faced by investors. Ex ante uncertainty is the uncertainty about issue value before the offering. Beatty and Ritter argued that many issuers appeared to be reluctant to give highly detailed specification of what they will do with the proceeds because it may increase exposure to legal liabilities and disclosure of proprietary information to competitors. They concluded there was a robust relationship between ex ante uncertainty and the degree of underpricing: the greater the ex-ante uncertainty, the greater the underpricing.

Other studies, such as Keloharju's (1993), confirmed the presence of the winner's curse.

Some scholars however argue that the model suffers from conflicting assumptions and untestable proposition: Keasey and Short (1992) suggest that the underpricing is a simple reflection of the fact that the issuers are uncertain of the demand for IPOs and as a result they underprice to ensure sufficient demand.

II The Underwriter Reputation Hypothesis

Comparably with Rock's model, the "Underwriter reputation hypothesis", firstly suggested by Baron (1982), states that investment bankers have superior information about the market: since investment banks help companies go public then, their reputation is affected by the outcomes of the listing procedure and so they may affect underpricing.

Logue (1973), by using 250 IPOs in the US market during 1965-1969, found that there was a negative relation between underwriter reputation and the degree of underpricing. Beatty and Ritter (1986) argued that underpricing equilibrium was enforced by investment bankers: investment bankers are in a position to enforce the underpricing equilibrium. Furthermore, they found banks tried to enforce the underpricing equilibrium for three reasons: they were uncertain about the market price of the issue at flotation day, their reputation capital was in danger and finally the investment bankers could have lost their earnings if they deliberately underpriced too much or too little.

After Beatty and Ritter's study, there have been many studies on the relationship between the underwriter reputation and the degree of underpricing. Most of them show that there is a negative relationship between the prestige of investment bankers and the underpricing degree: the more prestigious the underwriters, the less the degree of underpricing (e. g., Johnson and Miller (1988), Carter and Manaseter (1990), Megginson and Weiss (1991), Carteret al. (1998)).

Johnson and Miller (1988) proposed however another hypothesis: once the ex-ante uncertainty has been taken into account, the level of investment banker prestige should not offer any incremental explanation of the degree of underpricing. If more information regarding the issue value is available to investors, then a smaller number of informed investors are seeking to invest in IPOs offered by prestigious underwriters. Indeed, they found, once initial returns were adjusted for risk, the negative relationship between level of investment bank prestige and the degree of underpricing became insignificant. As a result, both the investors and the issuers have no incentive to seek out high prestige investment banks, since the choice of underwriters does not appear to influence underwriter's total costs (Johannes and Miller (1988)).

More recently, Logue et al. (2002), by examining the interaction between underwriter reputation and market activities, found that underwriter reputation was a significant determinant of pre-market underwriter activities, however weakly related to after-market price stabilization activities, and unrelated to issuer returns. They also found that sequence of activities in the underwriting process could affect both short and long-run IPO results.

To summarize, the underwriter hypothesis suggests that the investment bankers have an important role in underpricing equilibrium even if some studies disagree: overall, the majority of studies indentify a negative relationship between the prestige of investment bank and the degree of underpricing. In addition, more recent studies may suggest that underwriters may affect not only short-run returns but also long-run IPO returns.

III The Signaling Hypothesis

Another model developed to explain the underpricing anomaly is the signaling model (Allen-Faulhaber (1989), Grinblatt and Hwang (1989), Welch (1989)). Similar to Rock's and Baron's models, the signaling model is also centered on information asymmetry among market participants. The model, also, assumes there are two types of firms, good firms and bad firms. Investors do not know about firm quality until it is revealed in the market. Therefore, it is important to the good firms to reveal their firm value to potential investors before the flotation date: they hence employ underpricing as a signal of their value to the market.

In the context of IPO, firms typically can signal their quality with several variables, such as the firm's choice of underwriters or auditors, quality of management, quality of bank loans, and others. However, in these particular signaling models, scholars argue that the offering price at IPO is a credible signal, since it requires no monitoring. If the signal works effectively, high quality firms, by leaving a good taste in ‘investors’ mouths’, may separate themselves from low quality

firms and so they will be able to accomplish subsequent seasoned offerings in the open market. Therefore, signaling true value is beneficial to high value firms as it allows a higher price to be fetched at the second-stage sale (seasoned equity offerings) if the signaling is achieved. Although underpricing is costly, the high quality firms can afford it because they can recover their losses in the subsequent seasoned equity offerings (SEOs), whereas low-quality firms are deterred from mimicking such behavior since they are not likely to recoup such costs in following SEOs.

There are a number of empirical studies regarding the signaling models in IPO market and the outcomes are mixed. Welch (1989) found that there was a significant positive relation between the degree of underpricing and the probability of firms to undergo the SEOs. Moreover, he also found that many IPO firms that were more underpriced indeed choose to issue a substantial amount of public SEOs. Indeed, Espenlaub and Tonks (1998), on UK data, reported that there was an incentive to the initial owners (including the directors) to deliberately underprice the IPOs to recoup the profits in the SEOs. Issuers, who deliberately underprice the issues at the IPO in expectation to get profits later from their selling at the subsequent SEOs, are expected, as a result, to have a higher percentage of equity retained at IPO.

An empirical implication relates to the relationship between underpricing and the project risk: the Grinblatt-Hwang (GH) model (1989) claims that the degree of underpricing is an increasing function of project risk (IPO risk). In other words, the riskier the firm, the greater the expected degree of underpricing. As under the “winner's curse hypothesis”, signaling models also suggest that the greater the ex ante uncertainty, the higher must be the expected underpricing.

Another implication of the signaling hypothesis is a positive relationship between the firm value and the underpricing. Keasey and McGuiness (1992), but using data in UK, found a positive relationship between the firm market and the underpricing as predicted by the signaling hypothesis. Using Australian data, How and Low (1993) also found support for the hypothesis.

Additional studies have demonstrated that the existence of bank debt and/or lines of credits lower the expected initial return associated with IPOs because it may constitute a signal to investors of the type of firm before the listing.

To summarize, according to the signaling hypothesis, issuer deliberately underprice the issue to signal they are not a low-quality firm and because they can then recoup on following SEOs. Although the model is theoretically convincing, the evidence shows mixed result.

IV The Insurance Hypotheses

Another underpricing explanation proposed by Ibbotson (1975) is that underpricing served as an insurance against legal liabilities. Later, this hypothesis was developed by Tinic (1988) and Hughes and Thakor (1992). According to such hypothesis, both issuers and underwriters underprice the IPOs deliberately in order to avoid the lawsuits from investors. Indeed, Tinic (1988) argued that the expected cost of legal liability would be particularly high for IPOs because performing the due-diligence investigations was fraught with difficulties and uncertainties. On the underwriters' side, Tinic (1988) argued that the most important part of their investigation centers forecasting future earning capacity of the firm which is based on subjective evaluation and judgment. Hence, since an insurance policy is not present, they suggested that underpricing served as efficient form of insurance against potential legal liabilities of issuers and their agents.

Tests have been performed but the outcomes are mixed: Ibbotson (1975), Tinic (1988) and Hughes and Thakor (1992) found results to support the hypothesis whereas Drake and Vetsuypens (1993) did not find sufficient evidence. Drake and Vetsuypens (1993), instead, found that purchasers of underpriced IPOs are just as likely to sue as purchasers of overpriced ones. Hence, they suggested, underpricing was not a convincing condition to avoid lawsuits.

2.2.2 Long-Run IPO Underperformance

In this section I will go over the literature regarding the second anomaly which is the long-run IPO underperformance. The first academic study to spot such anomaly was published by Aggarwal and Rivoli in 1990 where they found evidence of substantial negative abnormal returns. Aggarwal and Rivoli referred to the phenomenon as a fad: IPOs, which were systematically overvalued in early trading, underperformed the market index. The first study focusing formally on why IPO underperformed is by Ritter (1991). After Ritter's study, there have been many studies attempting to assess the IPO long-run performance (Loughran-Ritter (1995), Levis (1993), How (2000)) and a summary of those is included in Table II, where, in order to compare those more quickly, three-year Buy-and-Hold Abnormal Return results have been shown. Data in Table II demonstrates that the results are mixed. Here below the explanations given by the literature to the phenomenon.

I Fad Hypothesis

The fad hypothesis, as suggested by Aggarwal and Rivoli (1990), states that many firms go public near the peak of industry-specific fads and so underperform. Further, they reported a -17% performance if investing in IPOs at the end of the first day of public trading and holding them for 3

years if compared against the US market index. Moreover, younger firms and firm that went public in heavy volume years did even worse than average. They found also empirical evidence to support that firms went public when investors were overoptimistic about firms' prospects so that investors initially overpaid and then share prices were corrected over time when more information became available. Schultz (2001) found that groups of IPO's often follow successful IPO's: after some successful IPOs, companies were more inclined to issuing new shares and "jump on the IPO wave". This fad was usually associated with the financial markets reaching their peaks (Schultz (2001)).

Loughran and Ritter (1995) suggested that firms tend to make IPOs when they see firms in the same industry trading at high earnings and market-to-book value multiplies. This effect was reinforced by the positively biased marketing campaign, which accompanied the share offering.

Levis (1993) comparably reported similar pattern of return of UK IPOs to that of US issues. This phenomenon has been also documented in some other countries, such as Finland, Australia, Brazil, and Canada, (Jenkinson (1993), Lee et al. (1996)).

To summarize, as an implication of such studies on IPO underperformance, the cost of raising external equity capital is not very high since the transaction costs are partly offset by the supposedly low realized long-run returns for these firms, especially when going public if investment sentiment is optimistic.

II Heterogeneous Expectations Hypothesis

Heterogeneous and time-varying expectations of investors are shown by behavioral economists to violate Bayer's Rule as well as rational choices (Kahneman and Tversky (1982)).

"Heterogeneous expectation hypothesis" was firstly proposed by Miller (1977). He argued that in markets with restricted short selling, such as IPOs, share prices were determined by overoptimistic investors. Over time, as the restriction weakens and more information becomes available, share prices are corrected. Short run overvaluation and greater long run underperformance are therefore generated by the divergence of opinion. By using three proxies of divergence of opinions (the percentage opening bid-ask spread, the time of the first trade, and the flipping ratio), Houge et al. (2001), with a sample of 2,025 US IPOs during the 1993-1996 period, found that IPOs with a high proportion of flipping activity, wider opening spreads, or long opening delays, significantly underperform the market for up to three years after the offering. Therefore Houge et al. (2001) concluded that IPOs with greater uncertainty, will exhibit poor long run return.

In accordance with what said above, Rajan and Serveas (2002) suggested that two market conditions might help explaining IPO anomalies: investor sentiment (or price-insensitive demand)

and feedback trader risk of propensity of investors to chase trends. According to their model, over-optimism drives price above fundamentals and since prices are supposed to be reverting to fundamentals in the long run, returns are more negative for listings or issues that came to market during periods when sentiment was high.

III Agency Hypothesis

Carter et al. (1998) and other scholars (Carter and Manaster (1990), Johnson and Miller (1988) and Megginson and Weiss (1989)) studied the underwriter reputation effect both on short-run and long-run IPO performances. The primary method used to examine the explanatory power of underwriter reputation is the OLS regression with initial return as dependent variable in model 1 and long-run performance as dependent variable in model 2.

If, according to the Underwriting reputation hypothesis, prestige is significantly related to the initial return, they also found that on average, the long-run performances of IPOs were less negative for the IPOs that were brought to market by more prestigious underwriters.

Logue et al. (2002), conversely, found that regardless its reputation, underwriter activities after-market was significantly related to IPO long-run performance.

The role of another agent regarding the IPO long-run performance has been examined by Brav and Gompers (1997): they investigated the long-run underperformance of US IPO firms in a sample of 934 venture-backed IPOs, during 1972-1992, and 3407 non-venture-backed IPOs, from 1975-1992. Their results were that venture-backed IPOs outperformed non-venture-backed IPOs using equal weighted returns. In further tests, they included the Fama-French 3-factor model and they found that venture-backed companies did not significantly underperform, while the smallest non-venture-backed firms did. In more recent findings (Bjorcke et al. (2006)), Private-equity backed firms outperformed non-PE backed ones when returns were value-weighted.

To summarize, the agents seemingly have an important role in affecting the IPO valuing process: prestigious investment bankers and venture capital or private equity firms, who back IPOs, may affect IPO valuation in the long-term.

IV Problem with Long-Run returns Measurement

Several studies have expressed growing doubts on the long-run IPO performance evaluations: the previous literature mixed results may be attributable to a variety of factors. One, which is debated widely, is the proper measurement method for long run return. Firstly, the methodologies used (Cumulative Abnormal Return (CAR) and Buy and Hold Abnormal Return (BHAR)) are questioned: Barber and Lyon (1996) find that the CAR method suffers from measurement bias, as it

is a biased predictor for BHAR and so they prefer the usage of BHAR method in tests designed to detect long run abnormal stock returns. Secondly, the choice of the benchmarks are important: Barber and Lyon (1997) indentify some biases of using market indices (rebalancing bias, skewness bias, and new listing bias) but they propose the use of matching control firm as a benchmark, which may be selected on the basis of specified firm characteristics. Finally, Loughran and Ritter (1995), and Brav (2000) sustained that the test statistics (on YCTAR) suffer from failure of independence of observations, since the long-run performance of different firms may be correlated in calendar time (see, for instance, the internet companies during the bubble period in early 2000s).

In addition, there are scholars that advocate that new rational asset pricing models may potentially explain many pricing anomalies found in recent financial economic literature: Fama and French (1996) claim that anomalies are due to the absence of controls for risk factors. Indeed, when using their three factor model, and thereby adjusting for size and growth (book-to-market ratios), many of the anomalies disappear (Björcke and Menzel (2006)).

My tests will consider such problems when approaching the questions of how many tests to run to check for substantial long-run IPO performance: I will include the Fama-French three factor model regression analysis and the analysis of the alphas will represent a strong point for or against any long-run IPO underperformance.

2.2.3 Hot and Cold Market Anomaly

The last anomaly is the hot/cold market issue and it may be examined by looking both at the issuers' and at the investors' side. This phenomenon was first documented in the US by Ibbotson and Jaffe (1975). They examined the relationship between the number of offerings and IPO returns but they found insignificant regression coefficient between the number of offerings and the past level of returns. Ritter (1984) explained the `hot' issue by suggesting that if the risk composition through time of firms going public is correlated with the presence of 'hot' market condition then this would be a result of a higher-than-usual proportion of risky firms coming to market at a given period.

Another possible explanation for hot issue markets relies on irrationality of investors: hot issue markets may exist because there are periods in which investors are particularly receptive and optimistic about new issues. Firms, therefore, rush to the market to take advantages of both such periodic spot and investors' receptiveness to receive good prices for their equity offerings (Byrne and Rees, 1994).

3 Methodology

Since my analysis regards both the short and long-run IPO returns, I am going to analyze these two relatively different categories by using two different families of methodologies. For IPO underpricing, the methodology is quite simple.

Regarding the long-run performance evaluation, it is clear that, due to the "treacherous" nature of abnormal returns and how those are calculated, a single methodology cannot be used since otherwise my analysis would be biased. As Barber and Lyon (1997) have pointed out, no clear winner has emerged with a statistically strong optimal methodology for evaluating abnormal returns. Hence, I need to outline the methodologies adopted in my analysis that have been used and their pros and cons.

In order to perform the analysis of long-run IPO performances in UK, Italy and Sweden, I will build my results and conclusions based on two different approaches: the event-time approach and the calendar-time approach, and each of them has different methodologies.

Within the Event-time approach, I will outline pros and cons of the two main methodologies which are the cumulative abnormal return measure (CAR) and the Buy and Hold abnormal return measure (BHAR). However, only the latter will be adopted in my analysis since it is a more precise indicator for the long-run performances than the CAR (as Barber and Lyon (1996) pointed out).

Within the Calendar-time approach, I will outline both the pros and cons of the two main methodologies which are the mean yearly cumulative abnormal returns (YCTAR) and the studies on the alphas from Fama-French three-factor model regression analysis.

Initially, my purpose was to perform statistical tests on the measured abnormal returns (BHAR under event-time and YCTAR under calendar time approach). However, I decided not to pursue due to a variety of factors: firstly, such analysis would have required an oversimplification of the reality by stating the cross-sectional independence of returns over time. Moreover, as said before, the turbulent years, which constitute my time period do not tend to support such independence of returns: during the crisis, higher level of cross sectional correlations was found and many stock behaviors seemed to be following similar trends. As a result, my analysis has not predictive power but it just illustrates past IPO performances in different countries (Loughram and Ritter (1994) reached a similar conclusion).

Each methodology will be using different reference portfolios and each of them will equally and value weight abnormal returns. Two reference portfolios will be built as follows: the first will be the market reference index (always total return) and then a size and book-to-price ratio portfolios, calculated as Fama and French (1996) suggested (see section 3.2 for information).

3.1 Underpricing Calculation

Within the analysis of the first IPO anomalies, it is necessary to outline an approach to evaluate the underpricing of IPOs in all three financial markets. As the previous literature suggests (in specific, Chambers and Dimson (2009) they calculated the underpricing without any market adjustment), the IPO underpricing will be defined as the first-day of trade returns over the issue price of the IPOs:

$$IPO\ underpricing = \frac{(P_{close} - P_{issue})}{P_{issue}}$$

Some researches claim that the IPO underpricing should be evaluated on a longer period of time ranging from a week up to a month in case of underdeveloped financial markets and illiquid stocks. However, I set a threshold on the expected market capitalization of the IPOs on each market: I considered so to exclude all small and less liquid listings from my analysis. Furthermore, all three markets are considered to be well functioning, developed and assumingly quite efficient.

3.2 Reference Portfolios

In order to evaluate long-run IPO returns, a measure of comparison to evaluate abnormal returns is necessary to separate the market component from more specific performance components. Several papers have illustrated the importance of comparing returns of similar firms with respect to some risk characteristics such as size and price-to-book ratio (Fama and French (1993) and Brav and Gompers (1997)). In addition to such risk-alike reference portfolio, I will use more classical market portfolios: I will consider some of largest total return indexes for the countries I cover: FTSE 350 for UK, FTSE All-Share for Italy and OMX All-Share for Sweden as market benchmarks.

The prime reference portfolios are the Size and Book-to-Market ratio based (S/BtM) portfolios. Such portfolios are built as follows: firstly, I excluded from the lists of all stocks listed on a stock exchange the IPOs in order to have portfolios whose returns were not constructed with the IPO returns. Secondly, I ranked all stocks on each market in two groups (Small and Big), with identical number of elements, based on the total capitalization of each company at the beginning of each calendar month. Then, I ranked all stocks in three groups based on their price-to-book ratio at the beginning of each calendar month: the top 30^{th} percentile has been considered as L or Low group which collects all stocks with high market-to-book ratio. The central 40% of elements in the lists have been considered as M or Medium and finally the remaining bottom 30^{th} percentile has been called H or High Book-to-Market ratio which gathers all stocks with low market-to-book value

ratio. Such structure has been suggested in a paper by Fama and French (1996). Hence, I have six portfolios (H-S, H-B, M-S, M-B, L-S, L-B) with varying degrees of firm characteristic risk with respect to size and book-to-market ratio. Each breakpoint is recalculated and rebalanced each month adjusting for firms entering and leaving the market (and each portfolio) and for changes in the book-to-market ratio as well as total market capitalization. In each portfolio, the returns are calculated as value-weighted (Fama and French (1996)).

The reference portfolios are then used to compute the abnormal returns for IPOs: when comparing IPO returns to those reference portfolios, I firstly matched each IPO to a size and book-to-market portfolio which has similar characteristics at listing.

3.3 Event-Time Approach

According to the event-time approach, IPO returns, which need to be bundled in order to be analyzed, are calculated at each given time frame following an event (in my case an IPO issuance), regardless of their calendar time. I will take all returns from the day after the issuance (whose first day return is considered when analyzing the IPO underpricing) up to my target time period which is three years after the first-day return.

In the figure 3.3 below, the full point expresses the start of period taken into consideration and the dotted lines the way to bundle returns. In this example, firm 1 goes public the day before t=0 but its abnormal returns will be considered from 0 onwards. Assuming that each time period is expressed in years and I will consider only 3-year IPO performances in such sample, I will consider as event year 1, for firm 1, the return between time 0 and time 1 and for firm 4, for instance, the return between time 3 and time 4.

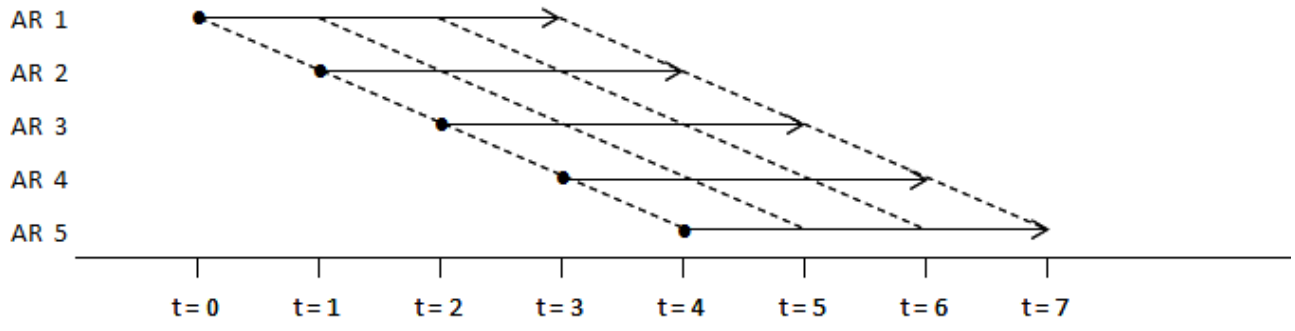


Figure 3.3 – Bundling returns under Event-time approach

3.3.1 Cumulative Abnormal Returns

The cumulative abnormal return measure is considered the first methodology which may be used when analyzing long run IPO performances with an event-time approach.

It is computed by summing up the mean benchmark-adjusted returns, AR_t, over T intervals, following the issuance day (period 1) until the end of the period (period T+1) and it can be shown as follows:

$$CAR_{\,1\,to\,T+1} = \sum_{1}^{T+1} AR_t \;\; where\; AR_t = \sum_{1}^{N} w * \; ar_{i,t} \;\; \begin{cases} w_i = \dfrac{MC_i}{\sum MC} \\ w_i = 1/N \end{cases}$$

As it can be seen, the abnormal returns can then be either equally weighted by N number of IPOs or value weighted by MC the market capitalization at IPO over the sum of all IPO MCs.

The benchmark adjusted returns $ar_{i,t}$ are computed then by comparing the actual IPO return with the correspondent benchmark return for every period of time.

The cumulative abnormal return (CAR) method has the pro of being useful for analyzing whether the IPO firms have statistically positive or negative abnormal returns compared to their benchmarks. As reported in section 3, Barber et al. (1996) suggest that BHAR be more accurate, as indicator, for the long-run performances than the CAR. Indeed, due to the turbulent years which constitute my time frame, I have considered not to perform such analysis even because not only it does not reflect accurately the effect of the compounding of returns from an investor prospective but also any test would require assuming cross-section independence of returns.

3.3.2 Buy-and-Hold Abnormal Returns

Even if the cumulative abnormal return measure is better for inferential purposes (Fama (1998) and Mitchell and Stafford (1998)) since it is less likely to lead to a spurious rejection of market efficiency if compared with the Buy-and-Hold methodology, however, CARs do not take into account the compounding of returns from an investors' viewpoint.

The BHAR for a firm *i* can be defined as the geometrically compounded return of the stock following the issuance day for the specified period of time T minus the geometrically compounded return of its benchmark during the same period. The BHAR will be calculated by using daily data: since I am covering three different financial markets with slightly different numbers of trading days per year, I will compute BHAR over a period of 756 days. The choice of this number will be

explained in section 4.2. In addition, the study of any implied distribution of BHARs does not constitute of interest for my analysis. The computation is as follows:

$$\overline{BHAR_{1\ to\ 756}} = \sum_{i=1}^{N} w_i * BHAR_{i,1\ to\ 756} \quad where\ BHAR_i = \prod_{t=1}^{756}(1 + r_{i,t}) - \prod_{t=1}^{756}(1 + r_{b,t})$$

As it can be seen, the day 1 is the second day of trade for each IPO. Since I filter out all IPOs whose lack of market liquidity would have impaired post-IPO returns, then I assume that just after the first day of trading, the market valuation of IPOs is aligned with their fundamentals and it does not need any additional days to reach its true "value". In addition, as for the CAR, the way to compare each BHAR may be equally or value-weighted depending on whether each BHAR is considered equally or proportionally to its market capitalization at IPO. Since the time frame is limited and the inflation in all three countries has been relatively low in the same period, I will not adjust for inflation the market capitalization of IPOs.

As for the distribution, I do not place any interest in studying it but, for clarity the cumulative returns, *per se*, would be skewed since they would be bound to -100% in the lower case but not bound upper. However, since dealing with abnormal returns, it is necessary to outline that a performance more negative than -100% is still possible and it can be not rarely seen when, besides tremendously negative stock performance, the benchmark performs in comparison really well on the selected time span.

3.4 Calendar-Time Approach

As stated by Mitchell and Strafford (2000), the event-time approach may indeed overstate the significance of the abnormal returns due to the presence of cross sectional dependence of observations (which is increased in times of market turmoil). In addition, as reported by Schultz (2001) on US data, the overall evaluation of IPO long-run performance, with IPOs clustering around peaks, may become negative according to an event-time methodology even if its expected return is around zero.

In order to enlarge the spectrum of my analysis, I will adopt the calendar-time approach to evaluate long-run IPO abnormal returns. This approach differs from the event-time: once a given stream of IPO returns has been selected, the abnormal returns are bundled in accordance to their calendar-time and so regardless of their age. The figure below illustrates the bundling process of abnormal returns.

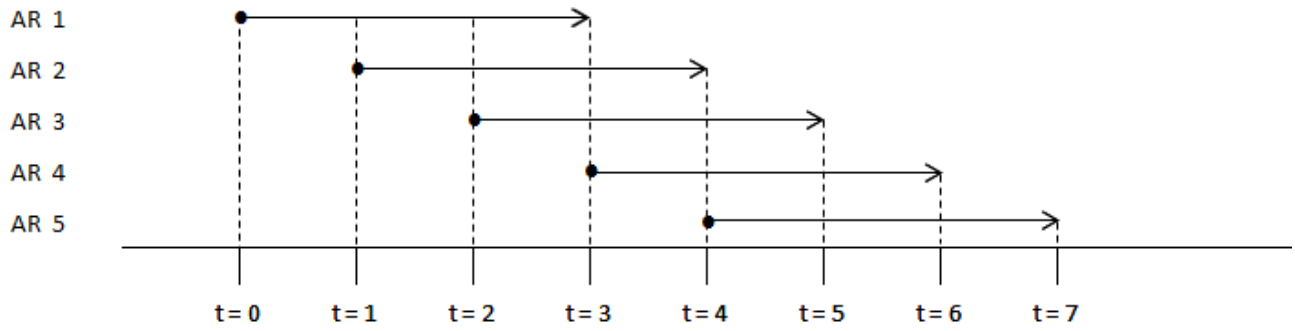


Figure 3.4 Bundling returns under Calendar-time approach

As you can imagine, the figure above can be interpreted as follows: the only abnormal return which will be considered in the period from t 0 to t 1 is the first one. Then, for the following period, only the AR 1 and AR 2 will be considered. The starting point for each stream of abnormal returns has already taken out the first day of listing. To clarify even further, the stream of abnormal returns for stock 1 would have continued after period 3 but, since in this example a threshold of three periods has been set, it has been truncated.

Intuitively, the calendar-time approach tends to simulate the investment strategy of an investment manager investing just after the listing of a company for a specified amount of time.

For the calendar-time approach, I have computed returns on a monthly basis to have more statistically significant results and lessen the autocorrelation problems.

3.4.1 Cumulative Abnormal Returns

The first methodology which can be used under the calendar-time approach is the cumulative abnormal returns equally or value-weighted. Here I outline the technicalities.

Firstly, you compute abnormal returns for each portfolio at the end of each calendar month as the difference between the monthly return of the stock $r_{i,t}$ and the monthly performance of the benchmark $r_{i,b}$. You get then:

$$CTAR_{i,t} = r_{i,t} - r_{i,b}$$

The calendar-time abnormal return for each IPO is then used to calculate the mean $CTAR_{i,t}$ as follows (for each calendar period t):

$$\overline{CTAR} = \sum_{i}^{n} CTAR_{\,i,t} * \; w_{i,t} \; and \begin{cases} w_i = \dfrac{MC_i}{\sum MC_i} \\ w_i = 1/N \end{cases}$$

Where the first is the value weighting approach with as weights the market capitalization at IPO of each company to be listed whereas the other is the equally-weighting approach. N is the number of the IPOs considered and *i* refers to a given IPO company.

Finally, the yearly calendar-time abnormal returns YCTARs can be constructed from 2006 up to 2013 by using the following formula:

$$YCTAR = \sum_{t=y}^{y+11} \overline{CTAR_t}$$

Where y refers to the first calendar month of each year and YCTAR implies summing up arithmetically all CTARs, previously found, for each calendar year. Such approach, as reported also in the event-time approach section, falls at not considering the compounding of returns from an investor's prospective. However, I will outline my results in the section 5.2.2.1.

3.4.2 Fama-French Three-Factor Regression Analysis

Another methodology which may be used to give additional insight in the long-run IPO performance analysis is the Fama-French three factor model test.

Such application of the Fama-French factor model does not represent a novelty in the literature of the analysis of the long-run IPO performances in Sweden and United Kingdom but it has never been deployed in an analysis for Italian IPOs.

As above, the previously outlined measures lack at recognizing the cross-sectional dependence of stocks returns whereas Fama and French (1993) showed that a three factor model may explain such relationships.

In order to use such measure, first, an explanation of the three factors is needed: the first factor is the excess return of the value-weighted market portfolio over the risk-free asset (EXMR). The second factor is SMB which represents the return on a zero investment portfolio which is created by subtracting the portfolio return of the large firm portfolio (B) from the portfolio return of the small firm portfolio (S) and finally HML which is the return of a zero investment portfolio

formed as the return on a portfolio of high book-to-market stocks minus the return on a portfolio of low book-to-market stocks.

The Fama-French model thus is an asset pricing model which adjust for risk "systematic", as in the case of Capital Asset Pricing Model with EXMR, but also goes even further by controlling for two additional factors: the firm size and the type of firm (depending of book-to-market ratio).

Since the scope of my analysis is then to check whether there are differences in the long-term IPO performances in the three financial markets, then the Fama-French three factor model is able to provide good insights in the statistical significance of each underperformance.
The formal equation of the Fama-French three factor model is the following:

$$r_p - r_f = \alpha + \beta_1 * EXMR + \beta_2 * SMB + \beta_3 * HML + \varepsilon$$

where SMB is calculated as follows

$$SMB = \frac{LS + MS + HS}{3} - \frac{LB + MB + HB}{3}$$

and HML is expressed as:

$$HML = \frac{HS + HB}{2} - \frac{LS + LB}{2}$$

In order for the model to be applied, it is necessary to calculate monthly returns on several portfolios: the market portfolio (for the EXMR factor), a large firm portfolio (B in the SMB calculation), a small firm portfolio (S in the SMB calculation), a high book-to-market- portfolio (H in the HML calculation), a low book-to-market portfolio (L in the HML calculation) as well as a middle book-to-market portfolio (M in the SMB calculation).

Then, the returns over the different IPOs need to be calculated. As proxy for the risk free rate, the one-month T-Bill interest rate has not been used for all three markets due to lack of data for the Italian market so to avoid heterogeneity of treatment, I have converged on adopting the three-month T-Bill interest rate instead for all markets. In addition, in the size and book-to-market specific portfolios, I have not considered all firms which have been then listed for avoiding double-counting: the exclusion prevents measuring the long-run IPO performances against themselves.

When then testing for long-run IPO underperformance, the null hypothesis is assumed to be that no long-run underperformance of IPOs exists in each financial market. The intercept is, under H0, is assumed to be "α >= 0". The alternative hypothesis, H1, is accordingly "α < 0". If α is

significantly below zero, then I must reject the hypothesis of no long-run underperformance accordingly. The confidence level that will be adopted is 5%, otherwise stated.

3.4.2.1 Heteroskedasticity and Autocorrelation of Returns

When using the ordinary least squares (OLS) regressions, you typically accept a number of assumptions. In my case, one of the most important ones is that the error terms have a constant variance. This assumption could be thought as valid if the observations of the error term are assumed to be drawn from identical distributions. Hence, heteroskedasticity is a violation since the error terms could vary across time and this could be the case when considering time series measurements. From 2006 onwards, due to financial crises and a subsequent quiet period on the financial markets, the volatility has not been constant.

The second important assumption regards the no autocorrelation of residuals. In regression analysis using time series, autocorrelation of the residuals is a problem, and may lead to an upward bias in estimates of the statistical significance of coefficient estimates, like the T-statistics or p-values. The autocorrelation is somehow related also to momentum or the presence of "hot" or "cold" markets.

In order to control for autocorrelation problem and heteroskedasticity, I will run the regressions with Newey-West standard errors. The Newey-West method, by starting from the OLS estimation, adjusts the standard errors of OLS estimations by correcting them for autocorrelation and heteroskedasticity: however, a judgment has to be made on the temporal lag L to be used. If L is 0, then the procedure, for instance, adjusts only for heteroschedasticity since it is assumed that today's returns are not be affected by previous returns (the Newey-West method is an extension of White's heteroskedasticity-consistent standard error method).

If the standard errors from the Newey-West regression do not largely differ from the standard errors in our OLS regressions, then you can interpret this as an indication of no heteroskedasticity or autocorrelations.

In my analysis, I will assume the temporal lag L to be equal to 0 so to take into consideration only the heteroskedasticity problem. Other tests have been conducted (but not shown) with varying temporal lags but the results have been inconclusive: no autocorrelation between IPO excess returns have been detected.

4 Data

Due to the nature of my multi analysis, an extensive data collection work has been done. This section, hence, elaborates which data has been used to perform my analysis, why I chose those data and such time period and which type of problems I faced during the process and which kinds of solutions have been adopted as a result.

4.1 Selection of Companies

Due to the data intensity of my analysis, the selection of the companies that went IPOs is crucial to proceed with a precise and accurate analysis of the underpricing and long-run IPO performances in all three markets. First, after having identified all companies that were public from 2006 to 2013 on Bloomberg and all the respective stock exchange websites, I decided to set a threshold on the prospective market capitalization at IPO for each market: 300 million SEK for the Swedish IPOs, 50 million € for Italian IPOs and 50 million £ for British IPOs. Such thresholds have been set to filter out the companies whose expected market capitalization at IPO was not sufficiently large enough to guarantee a good level of liquidity on those markets, guarantee price efficiency and therefore justify any price movement as relevant. In addition, IPO companies, whose expected market capitalizations were below such thresholds, are listed on less-liquid market segment where the bid-ask spread on quotation are quite large and where any correlation to market is sometimes quite distorted or insignificant.

To find the list of such companies I checked firstly on Bloomberg on its capital markets / IPO section and then I checked manually on each stock exchange's website all IPOs in Sweden and Italy and a large sample for British IPO to double check all data were correct and trustful.

In order to create the size and book-to-price ratio control portfolios, I needed to download the monthly composition of the largest total return indexes in each market (FTSE 350 for UK, FTSE All-Share for Italy and OMX All-Share for Sweden). However, in Italy, FTSE All-Share was created in mid-2009 and therefore I had to create my own list of stocks from January 2006 up to May 2009 which should have mimicked the composition of a comparable large index before that date. Unfortunately, I was not able to obtain the composition of any other large indexes that were used in Italy before due to proprietary reasons.

In addition, some further considerations are to be made: firstly, I made sure that all IPOs were excluded from the reference portfolios used to evaluate their performances. Then, I excluded all A-class shares from the list of companies on the Swedish equity exchange if there were B-class

shares listed at the same time. As rule of thumb, if multiples, I considered only B-shares. For UK, I excluded some A-class shares where duplicative (e.g. Royal Dutch Shell double share class). I then excluded all REITs, Closed-end funds, Special Purpose Entity and Special Purpose Acquisition from the IPO lists (and those shares have been taken out from reference portfolios as well if any).

4.2 Selection of Time Period

Another task was to identify the time period to analyze. Several factors were taken into account for this decision: firstly, I checked which data period was used by previous researches on the different markets to avoid excessive temporal overlaps between my research and the previous ones (see section 1.1, 1.2 and 1.3 for previous data sample). Then I took into account the trade-off between enlarging my dataset (and having, as a result, more consistent results) and trying to identify a past trend that could have lasted only for a limited number of years. As shown in the figure below, a large portion of companies, I considered, have been listed between 2006 and 2007. I could have narrowed my analysis only to include companies which decided to list after the financial crisis but I would have had a much smaller and less significant number of listings to analyze and that, I think, would have weakened my results.

At the same time, I did not want to enlarge the sample of my analysis any further by including companies listed in the IT boom era (before 2001) or during the post IT bullish market from 2003 up to 2007 to avoid overexposure of my data to certain market conditions.

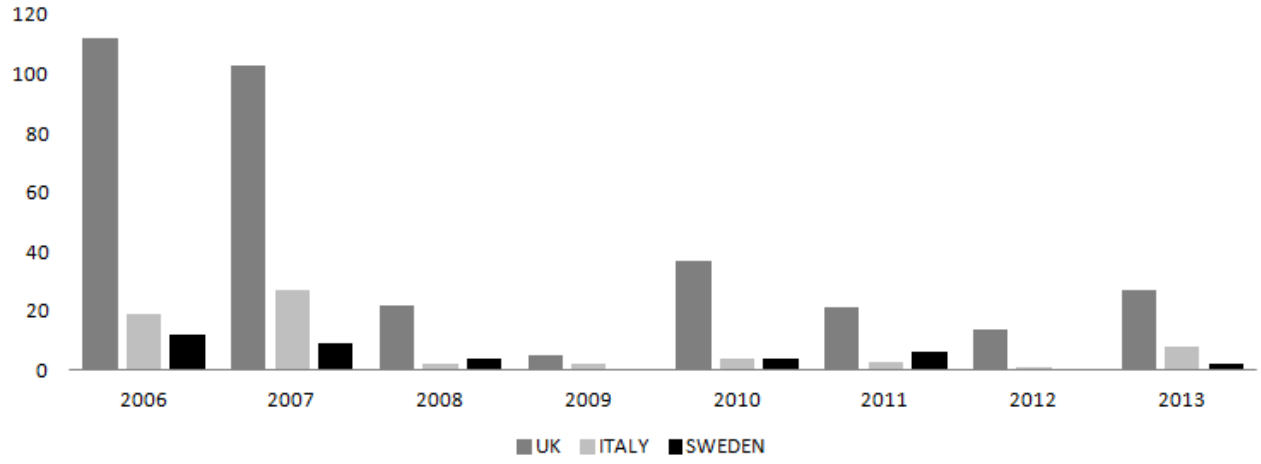


Figure 4.2 – Number of IPOs in UK, Italy and Sweden from 2006 to 2013.

4.3 Selection of Company Data

Given the type of analysis I performed, different data types were to be downloaded. Generally, I obtained all data from Bloomberg: all simple returns were calculated by using total return data which considers dividend reinvesting over time and represents a more suitable indicator of how a company performed against the market and its peers from an investor's viewpoint. In case of event-time approach, I used daily data to assess the overall long run performances of IPOs. Instead, in case of calendar-time approach, I bundled daily data on a monthly basis in order to have more stable parameters.

To be able to create my size and book-to-market portfolios as well as the three Fama-French factors, I downloaded the price to book ratio and the market capitalization figures from Bloomberg and where missing (which happened not rarely) I had to calculate myself those data by using as source always Bloomberg data to be consistent.

In addition, the classification of IPOs in different sectors has been based on the Bloomberg categorization itself: in the Table III, ten sectors have been identified and, for each of them, a list of sub-sectors (who have at least one IPO) has been added for clarification.

4.4 Obstacles and Simplifications

As previously reported, in order to create the size and book-to-price ratio portfolios, I used the stocks included in the largest market indexes whose compositions were available. Then, every month, each list was updated to consider for changes in the market capitalization, price-to-book ratio and the exclusion of some companies. However, such companies are not the only one traded on those exchanges: for the British equity market, I used the FTSE 350 index which does not represent all the stocks listed. However, FTSE 350's total market capitalization represents more than 95% of the total market capitalization of the British stock exchange and I think that using its composition and stocks is not an over simplification (at any rate, more than 300 stocks were taken into consideration in each market for constructing benchmark portfolios).

In the BHAR calculation, I considered a period of time of 756 days: 756 represents the average number of trading days for the three markets over a three-year horizon. Any deviation of the mean from 756, in each market, does not exceed 3 or 4 trading days: so, this simplification is admissible especially when considering the magnitude of BHARs found in my research.

5 Results

After having outlined the results from the previous literature and the methodologies adopted to carry out my analysis alongside with the data collection, in this section, I will report the results of my analysis. I will initially start by analyzing the first IPO anomaly in the three financial markets, the underpricing, in the period covered alongside with a breakdown of the underpricing for different sectors and years in each financial market.

5.1 Underpricing Results

As said in section 2, past evidences have shown positive first-day IPO returns are not generally associated with additional information provided to the market and so they may be only understood in the light of IPO underpricing. The purpose of my analysis would be also to highlight any differences in behavior between underpricing in UK versus in Italy and Sweden (the two observed peripheral financial markets).

As you may see from Table IV where all statistics are shown, the equally weighted averages of first-day IPO returns in each financial market were positive: in UK, surprisingly, the first-day returns averaged a +6.79% against a +5.34% in Italy and a smaller 1.76% in Sweden. Then, it is possible to detect also that such returns were quite substantially positive (see Appendix 1): the t-statistics for British and Italian IPO returns are way above the threshold of 2 (11.05 for the former and 3.78 for the latter), showing that the means of IPO first-day returns in those markets have been significantly positive in the period 2006-2013 (t-statistics vary from year to year). In Sweden, instead, not only the equally weighted mean is the lowest amongst the three markets but also it is less significantly different from 0 since its t-statistics is 1.15[3].

Moreover, a common characteristic between all three distributions is that they are quite positively skewed and with positive excess kurtosis: the Swedish distribution of first-day IPO returns instead is more similar to a Gaussian notwithstanding slightly fatter tails (Appendix 2).

In Appendix 2, there are the distributions of returns with frequency in each market and their comparison with Gaussian density plots with same means and standard deviations.

Returns which have been equally weighted will be taken more into consideration than value-weighted returns as well as "money left of the Table" (%) at IPO because any implication would be more useful ex-ante from an investor's prospective.

[3] I do not reckon as fully reliable the breakdown of t-test for underpricing: it is easy to understand that, indeed, when the number of observations is low, then, the standard errors are relatively large.

I Country Specific Analysis

Substantial differences are evident from country to country when considering how the post-listing returns changed over time (see Table IV). By looking into the Italian case, it is possible to detect how volatile the first-day IPO returns may be. In addition to the equally weighted returns, I calculated the IPO returns which have been weighted for the pre-IPO expected market values of the listings and the so called "money left on the table" which are weighted for the amount of money that has really been issued on the market at listing. As previously reported, signs of momentum in the amount of listings are evident in all three financial markets: the number of listings topped in 2007 and reached the bottom in 2009 with only few IPOs in all the three markets. It has to be noticed that all IPOs, here considered, have been filtered for the expected market capitalization at issuance so to exclude all listings below certain thresholds.

In Italy, the mean of first-day IPO returns (+5.34%) is much lower than previous studies': Ritter in 2003 identified an underpricing of +21.7% from 1985 to 2001 (including the IT bubble). Both Perrini (1998) and Fabrizio (1998) displayed higher levels of underpricing (+12.9% and +10% respectively). This pattern, although time-varying, as Fabrizio (1998) spotted, may suggest that the underpricing phenomenon is more limited than in the past.

In Sweden, the mean of first-day returns (+1.76%) is extremely lower than previous findings': the most recent studies have documented a progressive shrinking of the underpricing phenomenon: from an average of +39%, reported by Rydqvist (1993), with data from 1970 to 1991, to +6.6% displayed by Henricson (2012) on data from 1994 to 2011.

In UK, my analysis displays a lower degree of underpricing (+6.79%) if compared with a +14.3% by Levis (1993) on data from 1980 to 1988 and with a +19% on data from 1986 to 2007 by Chambers and Dimson (2009). Chambers et al. (2009) reported how the underpricing in UK has been very time-varying: +3.8% before the Second World War, +9.15% from 1946 to 1986 and +19% in the following twenty years.

A special mention has to be made regarding the first-day return outliers in Italy from 2011 up to 2013 and in UK in 2013. In UK, the listing of Royal Mail PLC in October 2011 has probably revised upward the sample return: many critics have suggested first-day return (+37.8% on the offer price) have been caused as a result of a political plan. From 2011 up to 2013, the number of listings in Italy has been quite restrained due to macro-economic reasons: three of the most important IPOs, which may be classified as within the luxury industry (Cyclical Consumer Sector) (Salvatore Ferragamo S.p.A. (2011), Brunello Cucinelli S.p.A. (2012) and Moncler S.p.A. (2013)), have had

incredible initial returns of respectively +10.55%, +49.67% and 46.76%, which helped raising the means across the sample.

II Industry Specific Analysis

As for the industry specification (see Table V), the significance of such returns has to be clearly weighted with the number of observations. I have decided to include this breakdown only for descriptive reasons and I do not intend to give significance to numbers whose values may depend on a variety of factors that I am not considering in my analysis. In addition, it is difficult to compare those numbers over time due to the lack of comparable literature.

As the data shows, one of the best initial sector performers in Italy is, as a result of what said before, is the Consumer-Cyclical sector (+11.05% equally-weighted) which include companies working in luxury (Apparel), retail, entertainment and furnishing sub-sectors (amongst others). Instead, the best initial sector performer in UK (as result of what said before regarding Royal Mail PLC) and Sweden is the Industrial sector (respectively +12.62% and +8.59% equally-weighted) (I consider as significant returns calculated over more-than-one listing).

5.2 Long-Run IPO Performances

After having analyzed the IPO underpricing, which is more significant in UK and Italy than in Sweden, my analysis goes on evaluating the long-term IPO performance. The approaches used are twofold: firstly, within the event-time approach, the Buy-and-Hold Abnormal Returns and, secondly, within the calendar-time approach, both the Cumulative Abnormal Returns and the examination of the alphas coming from the Fama-French three factor regressions.

5.2.1 Event-Time Approach

The methodology which will be adopted to evaluate the long-run IPO performances in all three financial markets is the Buy-and-Hold abnormal returns. Since the abnormal return distribution is not known, therefore, the tests for significance of long-run IPO performance will not be carried out. My analysis will only focus on describing the results obtained. The BHARs are calculated by using three-year IPO portfolios and two different types of benchmark: the size and book-to-market portfolio and the respective market total return benchmark.

I Country Specific Analysis

Table VI displays the calculation of long-run IPO performances for the two peripheral financial markets, Italian and Swedish and the British financial market.

IPOs in United Kingdom have clearly underperformed from 2006 to 2013: the BHARs are -35.48% and -53.91% with respect to their market and S/BtM benchmarks, if equally weighted, and -18.61% and -35.07% with respect to their market and S/BtM benchmarks if value-weighted. The previous findings, shown in Table II, where market indexes were usually used as benchmarks, display severe long-run UK IPO underperformance: -8.1% by Levis (1993) and -17.6% by Espenlaub (2000). It may be treacherous to try to detect any trend here since, as outlined by Fama et al. (1996), BHAR may not represent a good indicator for long-run underperformance (but still BHAR delivers a signal).

IPOs in Sweden have also underperformed from 2006 to 2013 although slightly less if compared to the British ones: the BHARs are -3.46% and -10.72% with respect to their market and S/BtM benchmarks when equally weighted and -18.96% and -25.27%, market and S/BtM benchmark adjusted, when value weighted. The previous findings, as summarized in Table II, have found varying negative long-run performances (Loughran et al. (1994) and Ritter et al. (1994) and Björcke et al. (2006)), depending on the benchmark adopted.

Finally, on an equally weighted basis, Italian IPOs slightly underperformed if S/BtM adjusted (-0.91%) but at the same time they performed above parity if market adjusted (+0.75%) from 2006 to 2013. When value-weighting, Italian IPOs seem to have performed over their respective benchmarks: +1.25% when S/BtM adjusted and +8.88% when market adjusted. This result collides with previous researches: both Giudici et al. (2001) and Rossi (2012) reported strong and statistically significant negative BHARs over a three-year horizon (-23.01%, for firms listed from 1985 to 1999, and –88.37%/-81.44%, depending if respectively venture-backed or not, for firms listed from 1998 to 2005).

Thus, some generalization shall be made: firstly, IPOs on peripheral financial markets seemed to have performed, on a three year horizon, relatively better than the IPOs on the main European financial market in the period from 2006 to 2013 both equally and value weighted (with the exception of the market-adjusted Swedish IPO long-run performance). In addition, in one country (Italy), the long-run underperformance phenomenon does not seem to take place at full: indeed, three-years BHARs are quite positive when value-weighted. I do not mean however to give predictive power to my previous findings.

II Industry Specific Analysis

The Table VI displays the breakdown of the three-year BHARs for Italian, Swedish and British IPOs in the time frame from 2006 to 2013 for different sectors.

The previous results from a country level may translate into relative over-underperformances of some sectors in general and versus the same sectors in other countries. As before, my analysis has a descriptive purpose and it does not imply any significant and predictive over or underperformance which may be interpreted as a future prediction.

On a comparative basis, in UK, depending on the weighting procedure, the sector with the highest BHARs is Basic Materials sector (+5.78% and 17.13% respectively market and S/BtM adjusted) if value-weighted and Utility sector (+12.38% and 63.83% respectively market and S/BtM adjusted) if equally weighted. Instead on a comparative basis, in Italy, still depending on the weighting procedure, the sector which performed the best is Non-cyclical Consumer (+84.33% and +90.53% respectively market and S/BtM adjusted) if value-weighted and Communications (+29.36% and 37.20% respectively market and S/BtM adjusted) when equally weighted.

Finally, in Sweden, it is possible to say that the best performer has been the Industrial sector both equally (+31.90% and +28.10% respectively market and S/BtM adjusted) and value-weighted (+0.93% and -6.29% market and S/BtM adjusted).

On a country level, still by comparison it is possible to see that IPOs in Sweden and Italy over-performed British peers over a three-year horizon both market and S/BtM-adjusted, when both equally and value-weighted, in four sectors (Communications, Cyclical Consumer, Financials and Industrials) whereas Swedish and Italian IPOs lagged in the Technological Sector.

5.2.2 Calendar-Time Approach

Within the calendar-time approach, two methodologies will be adopted to perform my analysis: firstly, yearly cumulative abnormal returns will be shown relative to holding period of three years (or 36 months) and, finally, the analysis of Fama-French three factor alphas will be carried out.

Due to the limited number of data, I preferred not to show any breakdown of yearly CARs with respect to sectors and therefore only limiting myself summarize the findings on a country-aggregated level.

5.2.2.1 Cumulative Abnormal Returns

The Table VII displays the yearly cumulative abnormal returns for IPOs in all three countries. It has to be noticed that each IPOs is considered only for a 36-month horizon and therefore outliers from year to year may affect my results. As described in section 3.4.1., each monthly IPO return is compared with a market index or a size and book-to-market matched benchmark, then equally or value-weighted for each month and then bundled for each year to come up with a respective YCTAR. As reported above, the mean of yearly CTARs may be biased by the varying number of firms comprised in each month or year which may leave greater or smaller place for outliers to affect the results.

By narrowing my analysis only to a single country at a time, in UK, you may see that the YCTAR means and medians are negative both equally (-25.42% and -12.38% S/BtM and market adjusted respectively, as for means) and value-weighted (-13.40% and -5.67% S/BtM and market adjusted respectively, as for means). This may represent a strong indicator that, alongside with the previous findings, the British IPOs underperformed on three-year horizon. In Italy and Sweden, IPOs performed relatively better than in UK. Indeed, in Sweden, when equally weighted, the YCTAR mean totaled -3.10% and -0.68%, respectively S/BtM and market adjusted, which is way less than the corresponding returns on the British market but, stills, together with more negative medians, may give an indication of long-run underperformance. In Italy instead, we may have different and contradicting indicators for long-run IPO performances: when equally-weighted, with only one exception which, I think, does not affect the overall picture, YCTAR means and medians are negative (respectively market and S/BtM adjusted -0.92% and +0.22% for the means and -3.06% and -0.85% for the medians) and so suggesting an underperformance. On the contrary, when value-weighted, both means and medians (both market and S/BtM-adjusted) are positive, hence supporting the idea of a non-negative long-run performance as suggested also by BHARs.

5.2.2.2 Fama-French Three-Factor Regression Results

After having analyzed, within the calendar-time approach, the results for the yearly cumulative abnormal returns for each financial market, here I comment and summarize the results coming out of the Fama-French three factor regression analysis on a time horizon of three years.

As it can be clearly seen, in UK, IPO excess returns which have been equally weighted present a statistically significant negative intercept: both using the standard OLS procedure and the regression with Newey-West standard errors, the intercept (-0.0122631) has significant p-value (0.011 in the former and 0.015 in the latter case). The British IPOs, moreover, appear to be quite

correlated with the excess market return, showing the correlation with the market index as quite intense, since the coefficient is 0.9881538. Positive coefficients are found with SMB and HML portfolios: then IPO portfolio returns co-vary both with the returns of high book-to-market value, "value" stocks, and "small" stocks on a systematic basis under standard OLS. In case of regression with Newey-West standard errors, the positive coefficient with HML is not very statistically significant (p-value of 0.110). The adjusted R-squared is decent (0.5362) although lower than in previous IPO studies and Fama-French essays: this phenomenon may depend on weighting procedure as well as the presence of additional factors which might give more explanations about IPO returns in this financial market.

If value-weighted, instead, the fit of the model slightly decreases to an adjusted R-squared of 0.4775, showing that the model is potentially open for considering new variables. By taking a look at the coefficients, the market-factor coefficient, which may be interpreted as Beta in the CAPM-model, is statistically significant and it shows that IPOs are more volatile than the market portfolio. The coefficient for SMB factor is lower than in the equally-weighted case (+0.40844 against +0.66799) but it is statistically significant both in the standard OLS and Newey-West standard errors-adjusted regressions. Instead, the coefficient for HML factor is statistically significant under OLS standard assumptions (p-value of 0.027) but it is not very statistically significant under regressions with Newey-West standard-errors (p-value of 0.055) which suggest heteroskedasticity in the data.

The yearly factor premiums are displayed on appendix 8: SMB and HML show respectively yearly premium averages of +3.25% and -11.86%: on a yearly basis then small stocks outperformed big stocks as well as "value" stocks with high book-to-market ratio underperformed "growth" stocks in the same time frame. By looking more closely, periodical differences may be spotted in premiums if considering shock period (2007/08 in UK and Sweden but also 2011 in Italy) (on US data, Fama and French detected positive premiums in both factors in the period observed).

In the Swedish case, when equally-weighted, IPO portfolio returns show statistically insignificant intercepts with very high p-value: 0.430 and 0.654 respectively under OLS and Newey-West standard-errors. The market-factor and SMB factor coefficients show, on both measurements, statistically significant positive coefficients (+0.9795268 and +0.6879981 respectively) with a p-value of 0. The HML factor instead is not statistically significant in both cases even if positive as in the British case. The goodness of the model is related to the adjusted R-squared which is not very high (0.528) and it shows how the relevance may be enhanced by considering further variables.

When value-weighted, the factor coefficients as well as the standard-errors do not move substantially: in both cases, both the intercept and the HML factor coefficient are statistically not significant but the overall goodness of the model improves to an adj-R-squared of 0.6511.

In Italy, finally, equally-weighted IPO portfolio returns display, both under OLS and Newey-West standard errors, statistically not significant intercepts (p value of 0.836 and 0.845 respectively). On the contrary of what occurred in the other financial markets, the three-factor coefficients (which are both statistically significant with a 10% confidence level) are quite diverse: firstly, returns are less volatile than the market-index (+0.7439342) and its coefficient is the lowest within the three markets. Secondly, the HML-factor coefficient is negative: it then displays how IPO returns co-vary positively with low book-to-market or "growth" stocks. The overall fit of the model is modest (+0.6704 adjusted) but it is the highest amongst all run regressions.

When value-weighted, Italian IPO returns display statistically insignificant constant terms, in line with the previous case. As in the previous case, the market-factor and SMB-factor coefficients are statistically significant in both cases whereas the HML factor coefficient is not significant but it differs from the Swedish and British case: it is negative and so suggesting a co variation with "growth" stocks.

As shown in the appendix 8, the averages of HML and SMB factor premiums differ substantially from one country to another one. Apart from the magnitude, both averages are positive in Italy and negative in Sweden. This implies that, while in Sweden investing in small or "value" stocks gave negative returns on a yearly basis (if compared with investing in big and growth stocks), in Italy, on the contrary, investing in small firms clearly returned positive results. In UK, given the SMB factor premium as positive, the HML factor premium has been quite negative: the "value" stocks returned much less than the "growth" stocks.

Finally, to conclude, my Fama-French three-factor regression analysis shows that on a value-weighted basis, neither Italian or Swedish or British IPOs, over the time period from 2006 to 2013, underperformed on a statistically significant basis, in contrast to previous literature. Instead, when IPO portfolio returns are equally weighted, then there is statistically significant evidence to support that IPOs in UK underperformed during the time horizon whereas in Italy and in Sweden there is no evidence of such anomaly.

6 Conclusions

In my research, I have covered the analysis of two of the three main anomalies of IPO: underpricing and long-term IPO underperformances. In this section, I shall provide a summary of my findings and I shall tie back those to the theoretical concepts covered in section 2. I then shall include additional thoughts on the differences observed between different financial markets.

6.1 Underpricing in Italy, Sweden and United Kingdom

The first IPO anomaly is clearly displayed in data: the significance of the underpricing in UK is evident and its t-statistic is quite strong in accordance to previous studies and literature. The equally-weighted first-day returns of UK IPOs, which may be used clearly from a speculator's prospective, are both consistently significant and those are, by totaling 6.79%, larger than the Italian and Swedish ones. The underpricing still persists when first-day returns are either value-weighted (+3.51%) or by considering the "money left on the table" (+4.99%). By looking at the number of IPOs as well as the amount raised each year in the horizon I take, it does not seem that the stream of listings is completely random, unpredictable and not associated with stock market returns (possible drivers) (the analysis of such IPO momentum is not a subject of my analysis) as in accordance with the efficient market hypothesis.

Similarly, on the Italian equity market, even if the number of listings was clearly smaller, initial listings were clearly underpriced if considering as sample the time horizon covered. On an equally-weighted basis, the first-day returns averaged 5.34% which is smaller than previously reported underpricing. As in the previous case, the Italian IPOs clustered more in 2006 and 2007 than in every other year forward, giving a hint of differences in listing between "hot and cold issue period". In the Swedish case instead, the underpricing is positive on average but (on an equally-weighted basis) I ought to expand the confidence level from a standard 5% to slightly less than 15% in order to make it statistically significant. In comparison to past studies, the degree of underpricing may be seen as shrinking: except for mixed results in UK, both in Sweden and Italy, falling first-day IPO returns have been experienced (in Italy, such trend was initially discovered by Fabrizio et al.(2001)) across more recent listings.

To conclude, although underpricing may vary and swing from positive to negative on a yearly basis, IPOs in all three financial markets have been underpriced and so the "underpricing phenomenon" persists although there is partial evidence of reduction in Sweden and Italy.

6.2 Long-Run IPO Performances

From the analysis of the second IPO anomaly, my results are depending on the methodologies which have been adopted: by using the event-time approach, the three-year BHARs display mixed outcomes. IPO returns in UK underperformed both the market reference index as well as size and book-to-market matched portfolios when value and equally-weighting.

The BHARs in Sweden and in Italy tend to be higher than in UK: they are still negative both equally and value weighted and with both reference benchmarks in Sweden whereas in Italy the BHARs are slightly positive when returns have been value-weighted and they display different signs when equally-weighted depending on the benchmark used. The study of BHARs, in contrast with underpricing findings, does not provide evidence of decreasing long-run underperformances in Sweden whereas in Italy my study clearly hints a possible reversal in trend.

Under the calendar-time approach, results from applying the YCTAR method appear to be similar with the BHARs results: British IPOs underperformed and they did more than in Italy and Sweden (peripheral financial markets). In Italy at the same time, depending on how to weigh returns, yearly cumulative abnormal returns may be slightly positive (when value-weighted) or negative (equally-weighted). Results from analyzing the "alphas" from the three-factor Fama-French regressions display that if Italian and Swedish IPOs do not underperform after adjusting for the three factors, UK IPOs underperformed when equally weighted (but not when value-weighting). Such mixed outcomes do not allow for a clear cut-through statement about long-run IPO returns in UK but, together with calendar-time results and YCTAR results, they could give the reader a hint.

To summarize, my thesis shows that there is not strong evidence, in light of Fama-French 3-factor alphas analysis, to support the idea that Italian and Swedish IPOs underperformed during the time horizon 2006-2013. However, there is quite strong evidence instead to support that IPOs in UK did underperform at least when IPO returns have been equally-weighted.

The explanation of such differences in the long-run performances may be attributed to a variety of factors (other than the ones suggested by previous literature): firstly, the limited number of listings in peripheral financial markets may support the idea of a pre-selection of initial listings. Indeed, a possible explanation may be due to tougher and more selective investors' screenings in Stockholm and Milan than in London: the greater availability of capital in UK may attract more companies which could take advantages from market momentum. As a result, companies which decide to go public in regional financial markets might be categorized as "local market champions" who have strong profitability and growth prospective and so they are able to attract capitals notwithstanding a possible limited supply in regional markets.

7 Further Researches

Even if many studies have been carried out on underpricing (see Table I), a very limited amount of studies covered contemporaneously the analysis of underpricing in different markets with an eye to potential differences between peripheral and main financial markets. A similar stream could be followed for studies on how long-run IPO performances differ in different countries (within a larger sample) and which is the explanation for this phenomenon to happen.

A field of study would be then how IPO anomalies differ across financial markets: a full range of analysis on the three IPO anomalies might be carried out with the newest methodologies. Indeed, many studies on long-run IPO performances have been completed without the analysis of the alphas from the Fama-French three-factor regressions. In addition, the analysis of alphas has not been carried out with a Fama-French four-factor model (and a working paper of a five-factor asset pricing model has been released in May 2014).

Moreover, as in my case, since the overall goodness of fit of Fama-French three-factor models is not close to 1, new studies may consider also additional factors to increase the adjusted R-squared such as momentum (or profitability and investment propensity as in the new five-factor Fama-French asset pricing model). In this thesis I decided to approach the method with size and book-to-market ratios, but authors such as Eckbo and Norli (2000) discussed factors such as liquidity and leverage as being crucial when creating a suitable benchmark. An IPO is thought to have a lower degree of leverage and a higher degree of liquidity than the typical public firm and is exposed to less systematic risk than the latter. It can therefore be argued that IPOs are matched against riskier firms, creating a perceived underperformance. All these factors, and new ones, may be incorporated on a new analysis of Italian, Swedish and British data.

Another field of research might constitute the study of the differences in operating performances between IPOs in different financial markets: as hypothesized, the greater the availability of capital the greater the number of IPOs and the lower the quality of the IPOs. Another field might be the study of whether such differences in long-run IPO performances, from market to market, might occur due to diverse exposure to sectors: a portfolio of IPOs might be performing better than others in other markets due to over or under exposure to a particularly-well performing sector (and such happening has not been factored inside the model).

8 Bibliography

Published and Unpublished Papers

Aggarwal R., Krigman L., Womack K., 2001, "Strategic IPO Underpricing, Information Momentum, and Lockup Expiration Selling", *Working Paper*

Arosio R., Giudici G., Paleari S., 2000, "Underpricing and Money "Left on the Table" in Italian IPOs", *USI Finance Seminar*

Barber, B., Lyon, J., 1997, "Detecting long-run abnormal stock returns: the empirical power and specification of test statistics". *Journal of financial Economics 22, 303-324*

Besser, F., Carlman, F. & Mossberg, F., 2001, "The long-run performance of Swedish IPOs 1980-2000", Master's Thesis, Stockholm School of Economics

Björcke G., Menzel M., 2006, "Long-Run IPO Underperformance on the Swedish Equity Market", Master's Thesis, Stockholm School of Economics

Brav, A., Geczy, C., Gompers, P.A., 2000, "Is the abnormal return following equity issuances anomalous?" *Journal of Financial Economics*

Brighi P., d'Addona S., Della Bina A.C.F., 2012, "The determinants of risk premia on the Italian Stock Market: empirical evidence on common factors in asset pricing models", *Working Paper*, University of Bologna and University of Rome 3

Brighi P., d'Addona S., Della Bina A.C.F., 2010, "Too small or too low? New evidence on the 4-factor model", *Working Paper*, University of Bologna and University of Rome 3

Chamber D., Dimson E., March 2009, "IPO Underpricing over the very long-run", *Journal of Finance*

Dong M., Michel J.S., 2009, "Does investor heterogeneity lead to IPO overvaluation?", Working P*aper*, York University - Schulich School of Business and HEC Montreal

Eckbo B.E., and Norli O., 2000, "Leverage, Liquidity and Long-Run IPO Returns", Dartmouth College, *Working Paper*

Espenlaub S., Alan G., Tonks I., Gregory A., 1999, “Re-Assessing the Long-Term Under-Performance of UK Initial Public Offerings”, *Working Paper*

Fabrizio S., Samà M., 2001, “IPOs in the Italian market between 1995-1998: a valuation of underpricing and long-run performance” (translated from Italian), *CONSOB Research Paper*

Fama, E.F., French, K.R., 1993, “Common risk factors in the returns on stocks and bonds.” *Journal of Financial Economics 43, 3-56*

Fama, E.F., French, K.R., 1996, Multifactor explanations of asset pricing anomalies, *Journal of Finance 51, 55-84*

Fama E.F., 1998, “Market efficiency, long-term returns, and behavioral finance.” *Journal of Financial Economics 49, 283-306.*

Foerster S.R., Karolyi G.A., 1997, “The long-run Performance of Global Equity Offerings”, *Working Paper,* Cornell University and University of Western Ontario

Giudici G., Paleari S., 2001, “The market performance of Italian IPOs in the long-run”, 2001, *Working Paper,* Polytechnic of Milano and University of Bergamo

Gompers, Lerner L., 2000. “The really long-run performance of initial public offerings: the pre-NASDAQ evidence”, *Working Paper*, Harvard Business School

Helwege J., Liang N., 1996, “Initial Public Offerings in Hot and Cold Markets”, Federal Reserve Bank of New York

Hutagaol Y., 2005, “IPO valuation and performance: evidence from the UK main market”. *PhD thesis,* University of Glasgow

Ibbotson R., Jaffe J., 1975, "Hot issue markets", *Journal of Finance*

Ibbotson R, Sindelar J., Ritter J., 1988, "Initial public offerings", *Journal of Applied Corporate Finance*

Ibbotson R., 1975, "Price performance and common stock issue", *Journal of Financial Economics*

Jenkinson T., Ljungqvist A., 2001, “Going Public: The Theory and Evidence on How Companies Raise Equity Finance”, *Oxford University Press*

Jensen M. C., Meckling W. H., 1976, "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure", *Journal of Financial Economics, 3, 305-360*

Kahneman, D., Tversky, A., 1982, "Intuitive prediction: Biases and corrective procedures", (in Daniel Kahneman, Paul Slovic, and Amos Tversky, "Judgement under Uncertainty: Heuristics and Biases", London, *Cambridge University Press*)

Kothari, S., Warner, J., 1995, "Measuring long-horizon security price performance", *Journal of Financial Economics, 43, 301-339*

Levis M., 1993, "The Long-Run Performance of Initial Public Offerings: The UK Experience 1980-1988", *Financial Management, 22, 28-41*

Levis M., 2001, "The UK IPO Market 2000", City University Business School, *Working Paper*

Levis M., 1995, "Seasoned equity offerings and the short- and long-run performance of initial public offerings in the UK", *European Financial Management*.

Lewis C.M., Seward J.K., Foster-Johnson L., 2000, "Busted IPOs and Windows of Misopportunity", Dartmouth College, *Working Paper*

Ljungqvist A.P., 1999, "IPO Underpricing, Wealth Losses and the Curious Role of Venture Capitalists in the Creation of Public Companies", *Working paper*, Said School of Business

Loughran T., Ritter J. R., Rydqvist K., 1994, "Initial Public Offerings: International Insights", *Pacific-Basin Finance Journal*

Loughran T., Ritter J., 2004, "Why Has IPO Underpricing Changed Over Time?", *Financial Management, 5-37*

Loughran T., Ritter J.R., 1995, "The new issues puzzle". *Journal of Finance 50, 23-51*

Lyon J., Barber B., Tsai C., 1999, "Improved Methods for Tests of Long-Run Abnormal Returns", *Journal of Finance, 54, 1, 165-201*

Miller E.M., 1977, "Risk, uncertainty and divergence of opinion", *Journal of Finance 32, 1151-1168*

Plyhakha Y., Uppal R., Vilkov G., 2012, "Why does an equal-weighted Portfolio Outperform Value- and Price-Weighted Portfolios", EDHEC Business School, *Working Paper*

Rajan R., Servaes H., 2002, "The Effect of Market Conditions on Initial Public Offerings", *Working Paper*, NBER

Ritter, Jay, 1991, "The long-run performance of initial public offerings". *Journal of Finance 42,365-394*

Rossi F., 2012, "The Long-Run Performance of IPOs in Italy: A Comparison of Venture and Non-Venture-Backed Companies", *Business Chinese Review, 691-705*

Schultz, P.H., 2001, "Pseudo market timing and the long-run performance of IPOs", *Working Paper*, University of Notre Dame

Schuster J.A., 2000, "IPOs: Insights from Seven European Countries", *Working Paper*, London School of Economics

Spiess K., Affeck-Graves J., 1995, "The long-run performance following seasoned equity issues", *Journal of Financial Economics 38, 243-267*

Wen K., 1999, "Residual Risk, Investor Heterogeneity, and Participation Restriction: Explaining Long-Run Underperformance of Initial Public Offerings", *Working paper*

Data Sources

Bloomberg (*Terminal*)

Nasdaq OMX (*www.nasdaqomx.com*)

Italian Stock Exchange (www.borsaitaliana.it)

London Stock Exchange (*www.londonstockexchange.com*)

Bloomberg Investing (*www. investing.businessweek.com*)

Datastream

K. French Data Library *(www.mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html)*

9 TABLES

Table I

Comparative evidence of IPO underpricing studies

The list below includes a summary of some of the main analysis carried out on IPO underpricing in different financial markets. The list has been gathered both by independent researches and by pooling together other previous researches (equally-weighted returns are displayed).

Country	Study	Sample Period	Initial Return %
Australia	Lee et al (1994)	1976-1989	11,9
Brazil	Aggarwal et al (1993)	1979-1990	78,5
Canada	Manigart & Rogiers (1992)	1984-1990	13,7
Finland	Keloharju (1993)	1984-1992	14,4
Germany	Ljungqvist (1996)	1970-1993	9,2
Hong Kong	McGuiness (1992)	1980-1990	17,6
Italy	Cherubini and Ratti (1992)	1985-1991	29,7
Italy	Chiabrera (1992)	1981-1990	25,9
Italy	Basile and De Sury (1997)	1983-1994	26,0
Italy	Perrini (1998)	1995-1997	10,0
Italy	Fabrizio (1998)	1988-1998	12,9
Italy	Fabrizio and Samà (2001)	1995-1998	9.77
Italy	Ritter (2003)	1985-2001	21,7
Japan	Kaneko and Pettway (1994)	1989-1993	12,0
Malaysia	Dawson (1987)	1978-1983	166,6
New Zealand	Ritter (2003)	1982-1999	23,0
Nigeria	Ikoku (1995)	1989-1993	19,1
Singapore	Koh and Walter (1989)	1973-1987	27,0
Sweden	Rydqvist (1993)	1970-1991	39,0
Sweden	Loughran, Ritter and Rydqvist (1994)	1980-1990	38,2
Sweden	Bodnaruk, Kandel, Massa and Simonov (2008)	1995-2001	14,2
Sweden	Henricson (2012)	1994-2011	11,5
UK	Jenkinson and Mayer (1988)	1983-1986	10,7
UK	Levis (1993)	1980-1988	14,3
UK	Chambers and Dimson (2009)	1917-2007	3.8 / 9.15 / 19*
USA	Reilly and Hatfield, 1969	1963-1965	20,2
USA	Ibbotson et al (1994)	1960-1992	15,3
USA	Ritter and Welch (2002)	1999-2000	65,0
USA	Ritter (1991)	1980-1988	14,1
USA	Loughranand Ritter (2004)	1980-2003	18,7

* 3.8% from 1917 to 1945, +9.15% from 1946 to 1986 and +19% from 1987 to 2007

Table II

Comparative evidence on long-run IPO performances in different countries

Three-year equally-weighted BHARs are shown below.

Country	Study	Sample Period	Three-year BHARs %
Australia	Lee et all (1996)	1976-1989	-51
Austria	Aussenegg (1997)	1984-1996	-47,4
Brazil	Aggarwal (1994)	1980-1990	-47
Brazil	Leal (1998)	1976-1992	-58,8
Chile	Aggarwal (1993)	1982-1990	-23,7
China	Wong and Xie (1999)	1992-1996	+18,8 A shares and +7,16 B shares
Denmark	Jakobsen and Sorensen (1999)	1984-1992	-21,6
Finland	Keloharju (1993)	1984-1989	-26,4
France	Leleux (1993)	1985-1991	-11,2
Germany	Loughran & Ljungqvist (1994)	1974-1989	-12,8
Germany	Stehle et al (2000)	1960-1992	-5
Hong Kong	McGuiness (1992)	1980-1990	-18,3
Italy	Giudici and Paleari (2001)	1985-1999	-23,01
Italy	Fabrizio and Samà (2001)	1995-1998	From -28.43 to -49.45*
Italy	Rossi (2012)	1998-2005	-88,37%**
Japan	Cai and Wei (1997)	1971-1992	-18,4
Korea	Kim et al (1995)	1985-1988	80,6
Malaysia	Wong and Uddin (2000)	1989-1997	54
Mexico	Aggarwal et al (1993)	1987-1990	-19,6
Netherlands	Van Fredriklust and van der Geest (2000)	1985-1998	-10
Poland	Aussenegg (2000)	1991-1997	11,5
Singapore	Hin and Mahmood (1993)	1976-1984	-9,2
South Africa	Page and Reyneke (1997)	1980-1991	-50,6
Spain	Alvarez Otero and Gonzales (2001)	1987-1997	5,6
Sweden	Loughran, Ritter and Rydqvist (1994)	1980-1990	-1,2
Sweden	Besser, Carlman & Mossberg (2001)	1980-2000	No evidence
Sweden	Björcke and Menzel (2006)	1992-2005	-26.08*** / -33.28***
Switzerland	Ogna et al (1999)	1985-1994	-9,3
Taiwan	Chen and Pan (1998)	1992-1994	-7,22
Thailand	Allen et al (1999)	1985-1992	10
Tunisia	Ben Naceur (2000)	1992-1997	5,7
Turkey	Kiymaz (1997)	1990-1995	44,1
UK	Levis (1993)	1980-1988	-8,1
UK	Khurshed et al. (1999)	1991-1995	-17.8 (over 5yr)
UK	Espenlaub et al (2000)	1985-1992	-17,6
USA	Loughran & Ritter (1995)	1970-1990	-17,1
USA	Ritter (1991)	1975-1984	-16,9
USA	Loughran and Ritter (2000)	1970-1997	-15,9

* depending on market reference index used, **if Venture-Backed or not; *** if S/BtM or Market adjusted

Table III

Sub-classification and categorization of Sectors

As part of my analysis of BHARs, I adopted the classification used by Bloomberg for dividing each IPO in a particular sector. For clarity, only sub-sectors with at least an IPO (in the entire sample) have been included in the list (otherwise the list would have become much longer).

Basic Materials	Mining
	Iron/Steel
	Forest Products & Paper
	Chemicals
Industrial	Electronics
	Aerospace & Defense
	Building Materials
	Electrical Components & Equipment
	Machinery-Diversified
	Environmental Control
	Engineering & Construction
	Machinery-Construction & Mining
	Metal Fabricate & Hardware
	Miscellaneous Manufacturing
	Transportation
	Packaging & Containers
Utilities	Electric
	Gas
Consumer, Non-	Commercial Services
	Biotechnology
	Agriculture
	Biotechnology
	Healthcare-Products
	Pharmaceuticals
	Healthcare-Services
	Food
Technology	Computers
	Software
	Semiconductors
	Technology Services
Communications	Internet
	Media
	Advertising
	Telecommunications
Consumer,	Entertainment
	Retail
	Leisure Time
	Airlines
	Storage & Warehousing
	Distribution & Wholesale
	Lodging
	Home Builders
	Apparel
	Home Furnishings
	House-wares
	Auto Parts & Equipment
	Consumer Discretionary
	Automotive
Diversified	Holding Companies-Divers
Energy	Energy-Alternate Sources
	Oil & Gas
	Coal
	Oil & Gas Services
Financial	Investment Companies
	Div. Financial Services
	Banks
	Real Estate
	Insurance
	Private Equity
	Specialty Finance

Table IV

Underpricing in Italy, Sweden and UK

The statistics regarding the underpricing, expressed as the first-day IPO returns, are shown divided first globally in the entire sample analyzed and then per year. The amount raised is not inflation-adjusted due to the brevity of the time horizon and the low inflation rates in those years. The measure called "Money left on the table" is a value-weighted return whose values are the amount of money effectively sold or issued on the market (it does not necessarily coincide with the capitalization-weighted returns since the % of capital issued on the market do change). Standard Errors are calculated from equally-weighted returns only.

ITALIAN IPOs	**Entire Sample Size**	2006	2007	2008	2009	2010	2011	2012	2013
Equally Weighted Returns	**5,3398%**	7,19%	3,22%	3,59%	14,39%	-6,34%	5,24%	49,68%	6,62%
Capitalization Weighted Returns	**5,3220%**	0,24%	3,64%	1,34%	12,04%	-0,23%	9,26%	49,68%	33,44%
Money left on the table %	**4,4803%**	-0,18%	3,63%	3,23%	9,05%	-0,34%	7,13%	49,68%	26,26%
N of IPOs	**66**	19	27	2	2	4	3	1	8
Amount of Money raised (mln €)	**12.908,13**	4.543,85	3.908,69	105,85	110,872	2314,6749	540,975	158,1	1.225,13
St.Err	**1,41%**	2,49%	1,17%	5,91%	6,01%	4,73%	3,11%	Na	6,17%
T-test	**3,78**	2,88	2,75	0,61	2,39	-1,34	1,69	Na	1,07
BRITISH IPOs	**Entire Sample Size**	2006	2007	2008	2009	2010	2011	2012	2013
Equally Weighted Returns	**6,7886%**	7,44%	6,19%	11,04%	8,12%	6,87%	4,35%	2,64%	6,60%
Capitalization Weighted Returns	**3,5126%**	4,98%	6,47%	0,96%	4,80%	1,30%	-0,03%	4,46%	13,51%
Money left on the table %	**4,9872%**	4,75%	6,59%	0,03%	7,90%	1,34%	-0,17%	3,62%	14,85%
N of IPOs	**341**	112	103	22	5	37	21	14	27
Amount of Money raised (mln £)	**45.636,95**	10.676,69	8.590,01	2.142,21	792,09	5.510,20	9.583,74	1.398,12	6.943,90
St.Err	**0,61%**	1,27%	0,90%	3,44%	5,05%	1,38%	2,27%	2,39%	1,89%
T-test	**11,05**	5,86	6,85	3,21	1,61	4,98	1,91	1,10	3,49
SWEDISH IPOs	**Entire Sample Size**	2006	2007	2008	2009	2010	2011	2012	2013
Equally Weighted Returns	**1,7597%**	-0,15%	2,38%	11,40%	-	-2,80%	-0,06%	-	5,72%
Capitalization Weighted Returns	**4,0673%**	4,61%	1,98%	15,92%	-	0,06%	-0,47%	-	5,93%
Money left on the table %	**3,1974%**	1,76%	1,12%	24,53%	-	1,53%	0,43%	-	6,01%
N of IPOs	**37**	12	9	4	0	4	6	0	2
Amount of Money raised (mln SEK)	**31.813,69**	14.003,30	8.276,44	1.658,26	Na	2.379,95	1.730,14	Na	3.765,61
St.Err	**1,53%**	2,06%	1,69%	6,20%	Na	4,00%	6,16%	Na	0,43%
T-test	**1,15**	-0,07	1,41	1,84	Na	-0,70	-0,01	Na	13,22

Table V

Underpricing per country per sector

ITALIAN IPOs	Basic Materials	Communications	CC*	CNC*	Energy	Financial	Industrial	Technology	Utilities
Equally Weighted Returns	5,39%	4,65%	11,05%	2,16%	-2,69%	2,05%	3,59%	11,46%	7,08%
Capitalization Weighted Returns	5,39%	2,50%	18,38%	1,52%	-4,54%	6,91%	6,98%	15,97%	6,93%
Money left on the table %	5,39%	3,03%	16,88%	0,44%	-5,25%	3,90%	6,77%	14,46%	6,82%
Number of IPOs	1	5	18	7	4	11	15	2	3
Amount of Money raised (mln €)	111,46	562,36	3.161,37	452,57	4.610,46	842,14	2.374,22	183,57	609,99
St.error (t-test)	Na (Na)	0,022 (2,11)	0,04 (2,74)	0,033 (0,65)	0,031 (0,88)	0,025 (0,79)	0,021 (1,71)	0,06 (1,88)	0,007 (9,29)

*CC and CNC stand respectively for Consumer Cyclical and Consumer Non-Cyclical

BRITISH IPOs	Basic Materials	Communications	CC*	CNC*	Energy	Financial	Industrial	Technology	Utilities
Equally Weighted Returns	5,97%	11,67%	3,56%	5,42%	6,19%	5,60%	12,62%	10,89%	6,44%
Capitalization Weighted Returns	1,39%	6,85%	4,67%	4,03%	0,31%	5,56%	22,57%	7,15%	3,03%
Money Left on the table %	2,29%	2,19%	3,61%	4,70%	-0,16%	5,47%	24,96%	7,60%	2,01%
Number of IPOs	44	18	35	42	60	87	35	15	4
Amount of Money raised (mln £)	11.836,98	755,47	5.033,08	3.921,93	6.177,95	13.066,81	3.357,91	906,96	506,49
St.error (t-test)	0,013 (4,58)	0,054 (2,15)	0,015 (2,4)	0,013 (4,02)	0,011 (5,77)	0,01 (5,38)	0,026 (4,69)	0,033 (3,32)	0,049 (1,31)

*CC and CNC stand respectively for Consumer Cyclical and Consumer Non-Cyclical

SWEDISH IPOs	Basic Materials	Communications	CC*	CNC*	Energy	Financial	Industrial	Technology	Utilities
Equally Weighted Returns	0,84%	-1,80%	0,77%	0,05%	-2,27%	0,33%	8,59%	12,00%	-
Capitalization Weighted Returns	2,35%	-4,62%	0,48%	7,30%	-2,27%	1,52%	5,81%	12,00%	-
Money left on the table %	3,38%	0,58%	0,32%	6,09%	-2,27%	0,78%	6,94%	12,00%	-
Number of IPOs	3	4	8	8	1	6	6	1	0
Amount of Money raised (mln SEK)	2.168,94	1.374,85	9.387,97	1.060,62	590,15	5.718,69	11.287,48	225,00	Na
St.error (t-test)	0,021 (0,40)	0,036 (0,50)	0,01 (0,77)	0,057 (0,01)	Na (Na)	0,02 (0,17)	0,04 (2,58)	Na (Na)	Na (Na)

*CC and CNC stand respectively for Consumer Cyclical and Consumer Non-Cyclical

Table VI

Three-year Buy-and-Hold Abnormal Returns

IPO returns have been compared against the reference total return market index and their respective size and book-to-market ratio portfolios (S/BtM) during the time horizon of thirty-six months. A specific sector breakdown has been added for clarity.

	Value Weighted						**Equally Weighted**						**Firms in portfolios**		
Benchmark	S/BtM	Market	S/BtM	Market	S/BtM	Market	S/BtM	Market	S/BtM	Market	S/BtM	Market			
Country	ITALY	ITALY	SWEDEN	SWEDEN	UK	UK	ITALY	ITALY	SWEDEN	SWEDEN	UK	UK	IT	SW	UK
All IPOs	**1,25%**	**8,88%**	**-25,27%**	**-18,96%**	**-35,07%**	**-18,61%**	**-0,91%**	**0,75%**	**-10,72%**	**-3,46%**	**-53,91%**	**-35,48%**	51	28	247
Sector specific:															
Basic Materials IPOs	-	-	-17,14%	-5,30%	5,78%	17,13%	-	-	-9,98%	2,20%	-57,58%	-41,24%	0	2	37
Communications IPOs	13,61%	5,86%	-33,07%	-19,49%	-73,76%	-48,43%	37,20%	29,36%	20,65%	34,89%	-59,48%	-41,14%	5	3	11
Consumer-Cyclical IPOs	-23,41%	-24,08%	-19,83%	-11,77%	-72,76%	-36,42%	-25,56%	-26,39%	-14,70%	-8,27%	-57,12%	-33,34%	10	8	21
Consumer-Non-Cycl IPOs	90,53%	84,33%	-38,96%	-34,68%	-26,11%	-3,18%	23,27%	24,85%	-47,56%	-37,97%	-59,41%	-29,69%	6	4	30
Energy IPOs	-9,63%	3,67%	-60,89%	-65,38%	-73,90%	-60,56%	-2,72%	9,80%	-60,89%	-65,38%	-57,01%	-30,19%	4	1	45
Financial IPOs	3,15%	8,26%	-18,84%	-13,07%	-35,12%	-25,91%	-14,71%	-14,56%	-15,23%	-9,31%	-39,84%	-39,92%	7	4	64
Industrial IPOs	21,51%	28,32%	-6,29%	0,93%	-82,73%	-70,78%	2,04%	4,61%	28,10%	31,90%	-70,72%	-61,97%	15	5	25
Technology IPOs	-37,40%	-40,77%	-53,15%	-44,73%	-17,35%	5,77%	-37,40%	-40,77%	-53,15%	-44,73%	-45,73%	-14,75%	1	1	10
Utility IPOs	8,50%	11,36%	-	-	-105,16%	4,15%	7,70%	15,64%	-	-	12,38%	63,83%	3	0	4

Table VII

Yearly Cumulative Abnormal Returns per country per year

YCTARs have been calculated by using as reference benchmarks both a reference total return market index and a respective size and book to market ratio portfolio (S/BtM) for each initial listing. The number of monthly observations for each IPO is 36.

	Value Weighted						Equally Weighted						Firms in Portfolios		
	IPO - S/BtM	IPO - Market	IPO - S/BtM	IPO - Market	IPO - S/BtM	IPO - Market	IPO - S/BtM	IPO - Market	IPO - S/BtM	IPO - Market	IPO - S/BtM	IPO - Market			
Year	**ITALY**	**ITALY**	**SWEDEN**	**SWEDEN**	**UK**	**UK**	**ITALY**	**ITALY**	**SWEDEN**	**SWEDEN**	**UK**	**UK**	IT	SW	UK
2006	-26,28%	-30,02%	-14,21%	-21,08%	-44,89%	-33,85%	-15,32%	-17,19%	3,39%	2,05%	-56,85%	-41,41%	9	5	57
2007	0,94%	0,23%	-28,07%	5,60%	-6,49%	-14,11%	-3,12%	-4,13%	-22,52%	-14,83%	-1,22%	-15,87%	34	15	166
2008	6,02%	9,92%	-34,68%	49,62%	-33,93%	-31,35%	0,46%	-2,33%	-30,14%	-19,69%	-40,17%	-47,40%	47	24	220
2009	9,78%	6,58%	28,21%	-40,77%	46,73%	59,43%	-2,99%	1,43%	30,01%	28,44%	26,63%	49,96%	38	21	169
2010	-3,27%	7,74%	17,15%	-22,07%	-1,21%	7,32%	-9,97%	0,63%	12,29%	2,36%	-7,66%	3,50%	18	12	86
2011	19,12%	31,92%	-14,69%	16,84%	-24,31%	-21,78%	20,97%	17,30%	-22,47%	-27,18%	-25,37%	-29,38%	8	10	57
2012	-13,25%	-10,55%	-15,87%	-12,34%	-21,93%	-11,97%	-9,76%	-5,92%	-19,27%	-27,19%	-67,72%	-20,11%	10	10	67
2013	23,45%	20,48%	15,46%	-21,59%	-21,15%	-25,51%	12,39%	11,96%	23,90%	50,62%	-31,01%	-24,74%	8	8	63
Average	**2,07%**	**4,54%**	**-5,84%**	**-5,73%**	**-13,40%**	**-8,98%**	**-0,92%**	**0,22%**	**-3,10%**	**-0,68%**	**-25,42%**	**-15,68%**	22	13	111
Median	3,48%	7,16%	-14,45%	-16,71%	-21,54%	-17,94%	-3,06%	-0,85%	-7,94%	-6,39%	-28,19%	-22,43%	14	11	77

Table VIII

Fama-French three-factor regression results

Here below are shown the regression outcomes when IPO excess returns have been equally (EW) or value-weighted (VW). A distinction is also made for each country.

EW_Exc_Ret	ITALY	SWEDEN	UNITED KINGDOM
Coefficients	Values	Values	Values
β_1 - (Excess_Market_Return_over_Rf)	0,7439342	0,9795268	0,9881538
p-value	*0,000*	*0,000*	*0,000*
β_2 – (Small-Minus-Big)	0,5554909	0,6879981	0,6679922
p-value	*0,000*	*0,000*	*0,000*
β_3 – (High-Minus-Low)	-0,1776913	0,2387695	0,2595928
p-value	*0,039*	*0,203*	*0,008*
Alpha α	-0,0006965	0,0025901	-0,0122631
p-value	*0,836*	*0,430*	*0,011*
R_squared	0,6809	0,5448	0,5508
R_squared_adjusted	0,6704	0,5298	0,5362

VW_Exc_Ret	ITALY	SWEDEN	UNITED KINGDOM
Coefficients	Values	Values	Values
β_1 - (Excess_Market_Return_over_Rf)	0,7829358	0,9456355	1,110527
p-value	*0,000*	*0,000*	*0,000*
β_2 – (Small-Minus-Big)	0,2664364	0,6911221	0,4084422
p-value	*0,012*	*0,000*	*0,042*
β_3 – (High-Minus-Low)	-0,1003326	0,2341635	*0,2660297*
p-value	*0,325*	*0,102*	*0,027*
Alpha α	0,0031415	0,0006614	*-0,0064384*
p-value	*0,435*	*0,885*	*0,269*
R_squared	0,6313	0,6622	0,4940
R_squared_adjusted	0,6192	0,6511	0,4775

Table IX

Fama-French three-factor regression results

Here below are shown the regression outcomes when IPO excess returns have been equally (EW) or value-weighted (VW) in the case of Newey-West standard errors.

EW_Exc_Ret *Coefficients*	ITALY Values	SWEDEN Values	UNITED KINGDOM Values
β_1 - (Excess_Market_Return_over_Rf)	0,7439342	0,9795268	0,9881538
p-value	*0,000*	*0,000*	*0,000*
β_2 – (Small-Minus-Big)	0,5554909	0,6879981	0,6679922
p-value	*0,000*	*0,000*	*0,000*
β_3 – (High-Minus-Low)	-0,1776913	0,2387695	0,2595928
p-value	*0,087*	*0,259*	*0,110*
Alpha α	-0,0006965	0,0025901	-0,0122631
p-value	*0,845*	*0,654*	*0,015*

CW_Exc_Ret *Coefficients*	ITALY Values	SWEDEN Values	UNITED KINGDOM Values
β_1 - (Excess_Market_Return_over_Rf)	0,7829358	0,9456355	1,110527
p-value	*0,000*	*0,000*	*0*
β_2 – (Small-Minus-Big)	0,26644364	0,6911211	0,4084422
p-value	*0,006*	*0,000*	*0,024*
β_3 – (High-Minus-Low)	-0,1003326	0,2341635	*0,2660297*
p-value	*0,226*	*0,165*	*0,055*
Alpha α	0,0031415	0,0006614	*-0,0064384*
p-value	*0,442*	*0,881*	*0,284*

APPENDICES

APPENDIX 1

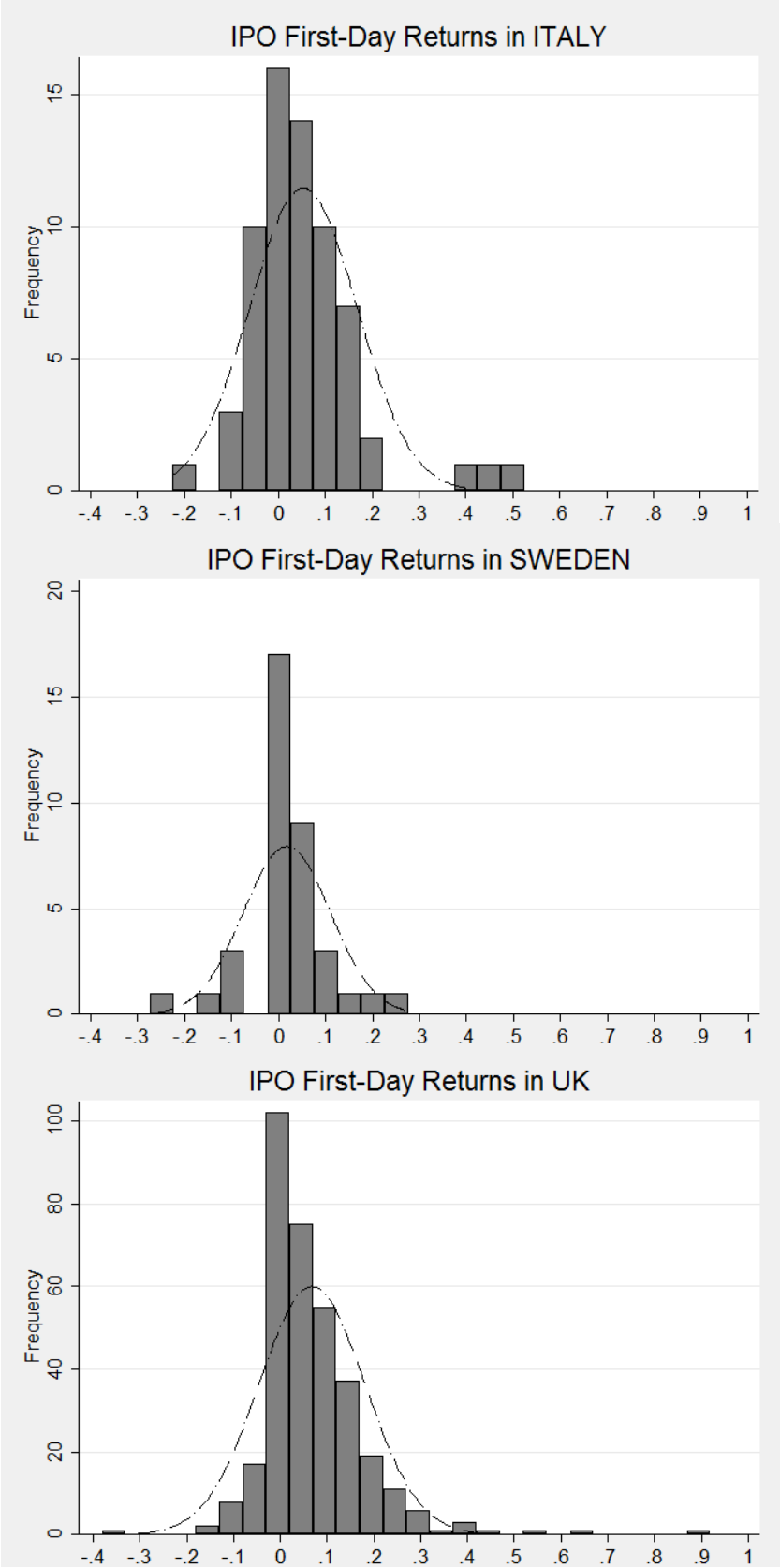
UNDERPRICING IN ITALY, SWEDEN AND UK - STATISTICS

First-day return statistics and frequency histogram as calculated by using Stata

	EWR_ITALY	EWR_SWEDEN	EWR_UK
Mean	0,0533985	0,0175975	0,678856
Std.dev	0,1148143	0,0930083	0,1134017
Std.err	0,0141327	0,0152905	0,006141
Min	-0,20	-0,2482857	-0,38
Max	0,4967742	0,2609457	0,92
95% conf_interval_lower	0,0251736	-0,013413	0,0558063
95% conf_interval_upper	0,0816234	0,048608	0,0799648
t-statistics	**3,7784**	**1,1509**	**11,0544**
Skewness	1,724166	0,0502872	2,141913
Kurtosis	7,92769	4,738469	15,068
Pr(mean>0)	**0,998**	**0,871**	**1,000**

APPENDIX 2

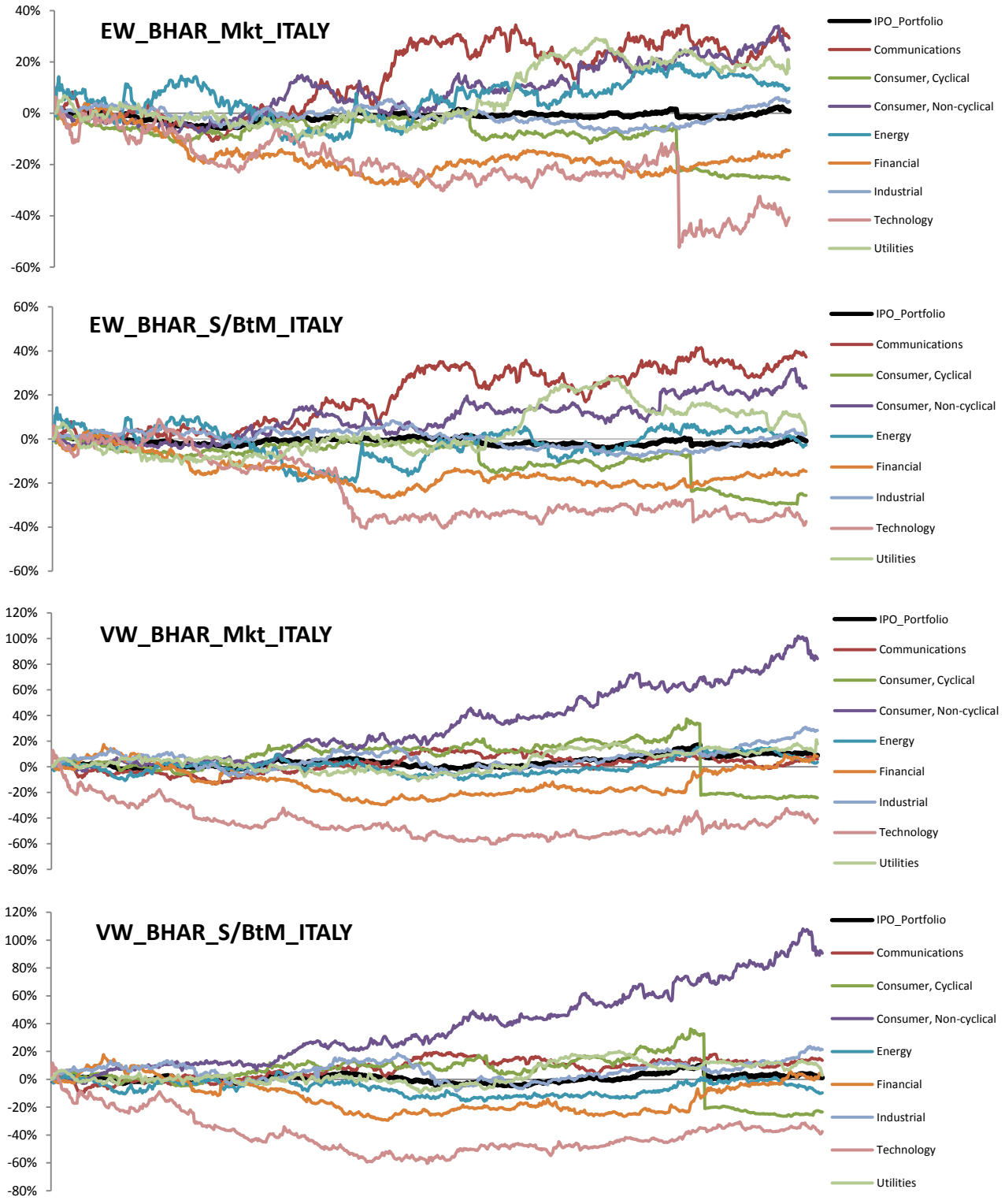
UNDERPRICING IN ITALY, SWEDEN AND UK - GRAPHS



APPENDIX 3

BHAR – GRAPHS FOR ITALIAN STOCK MARKET

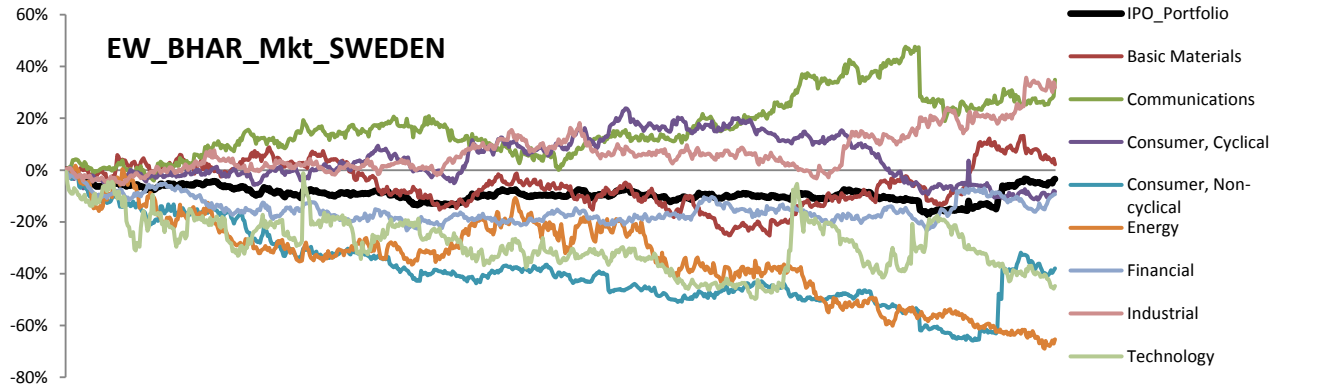
Here the graphs showing how the BHARs changed over a three-year horizon: firstly the equally-weighted (EW) procedure has been used for both reference benchmarks and then the value-weighted. In order not to confuse the representation, see Table VI for exact data regarding each BHAR.

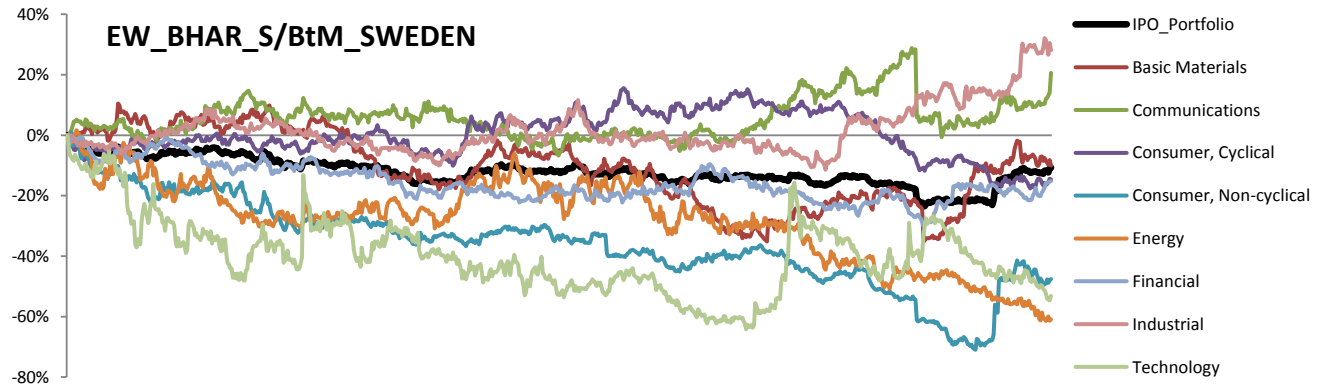


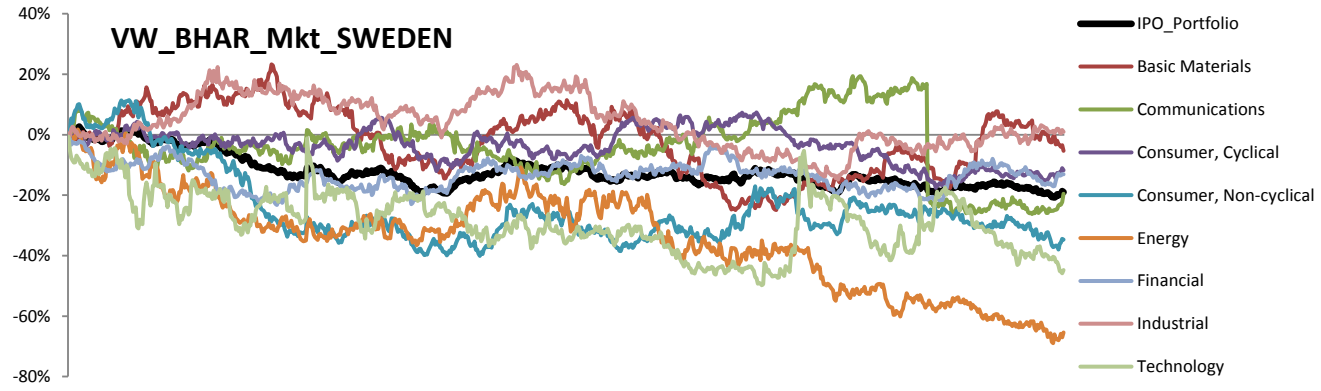
APPENDIX 4

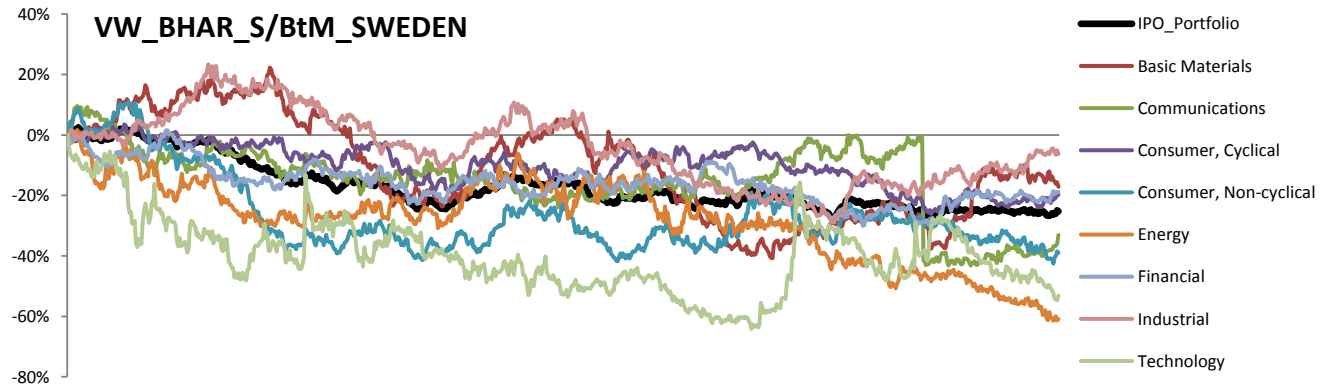
BHAR – GRAPHS FOR SWEDISH STOCK MARKET

S/BtM stands for the size and book-to-market reference adjusting portfolios. For data, see Table VI.





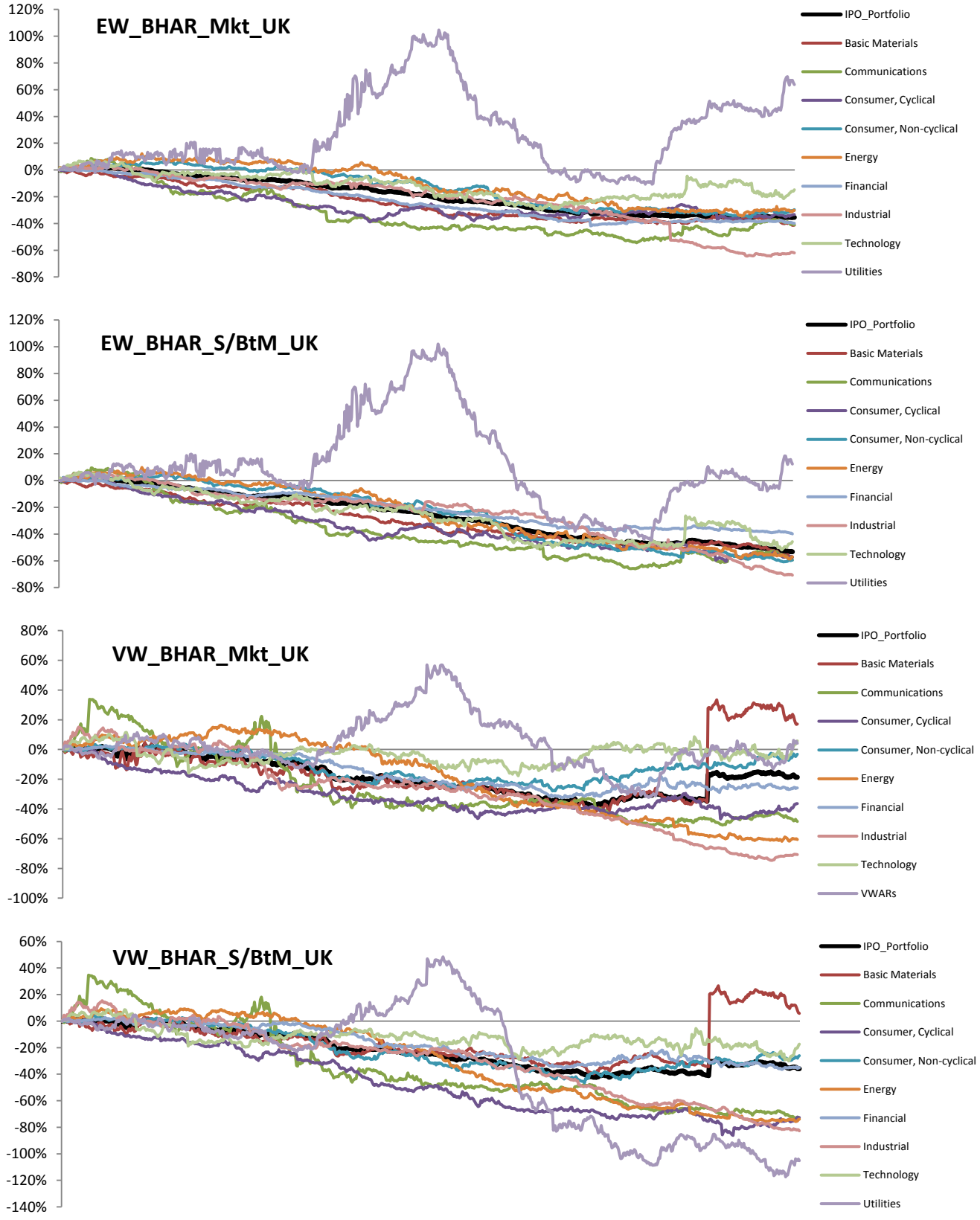




APPENDIX 5

BHAR – GRAPHS FOR BRITISH STOCK MARKET

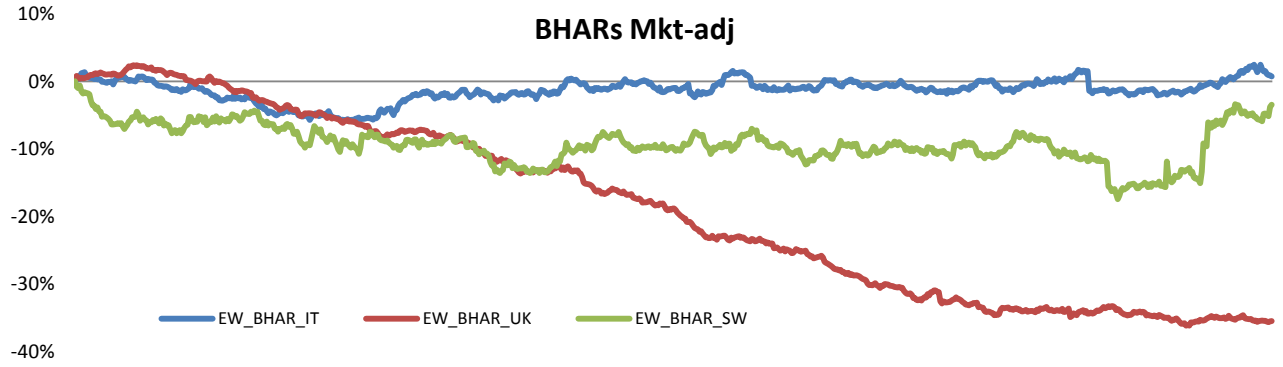
S/BtM stands for the size and book-to-market reference adjusting portfolios. For data, see Table VI.

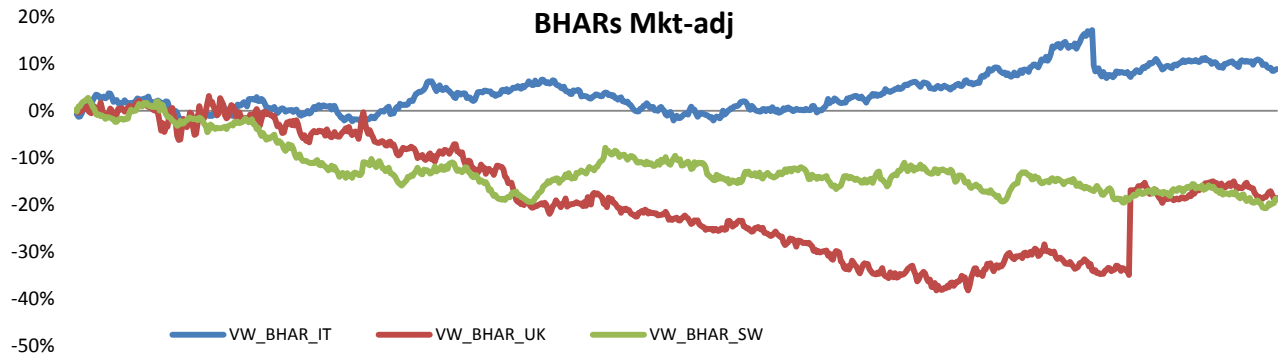


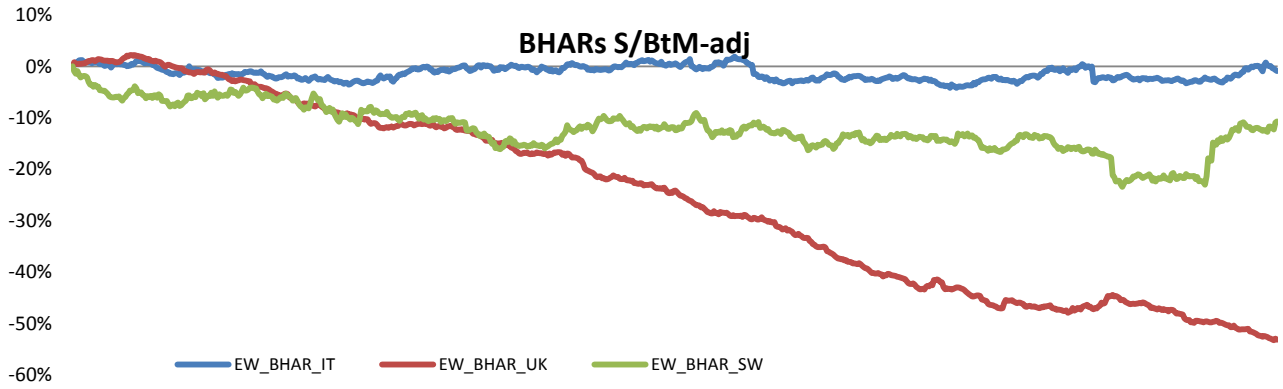
APPENDIX 6

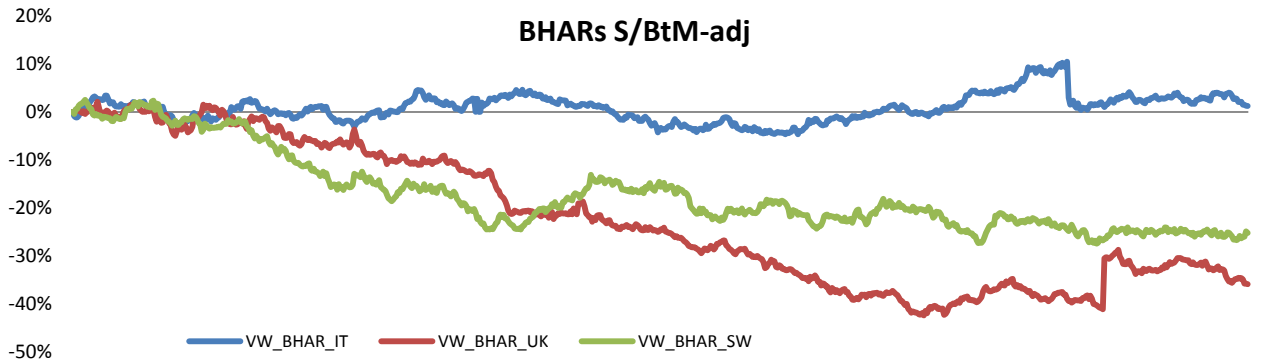
BHAR – COMPARISON FOR ITALY, SWEDEN AND UK

Here a comparison of BHAR in all three markets depending on reference portfolio adjusting and weighting.





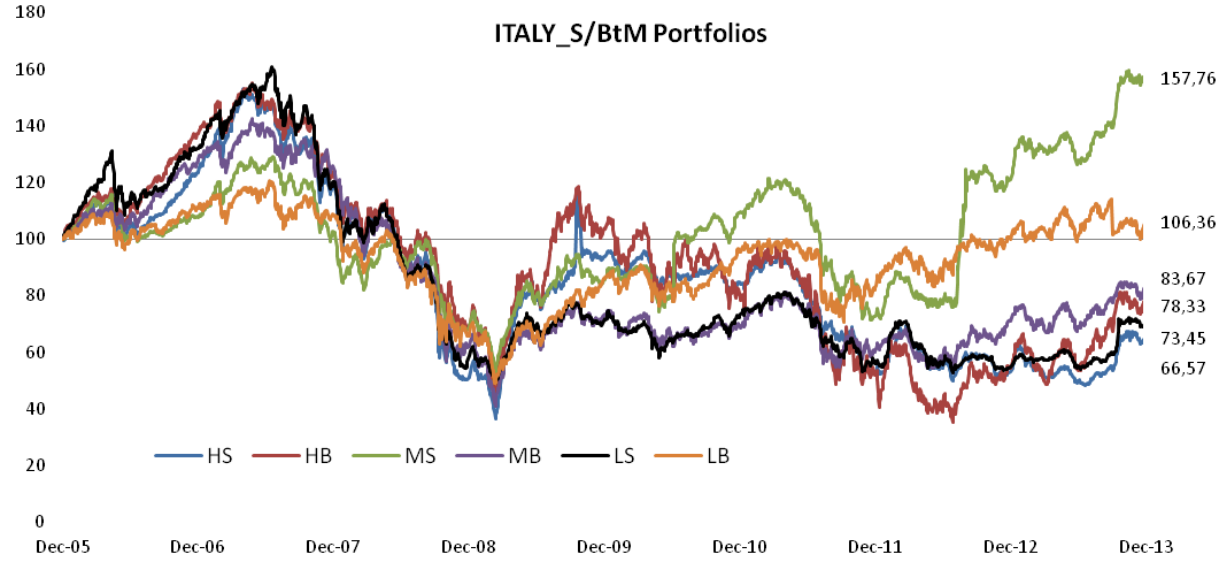


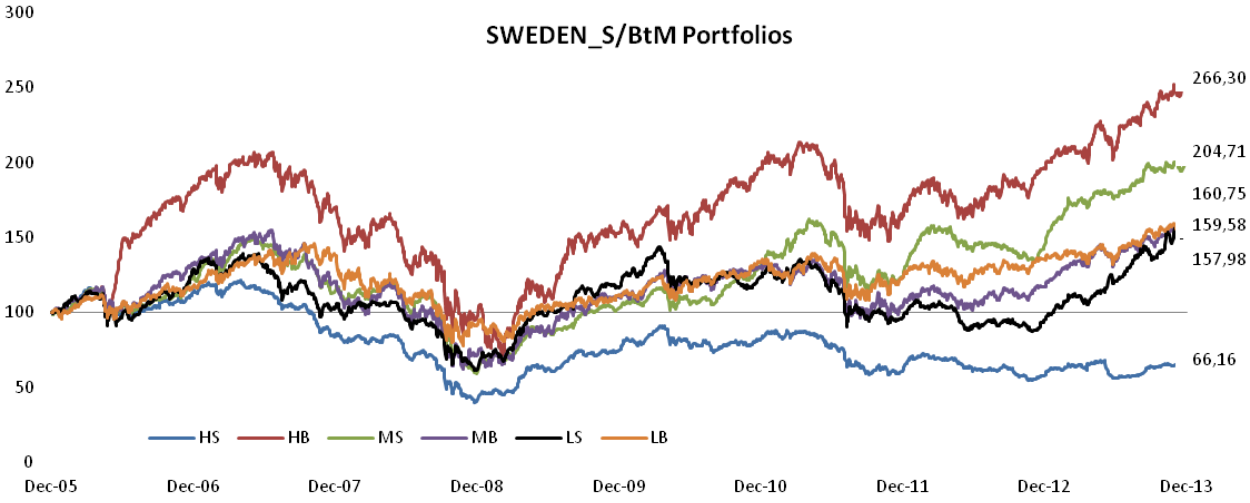


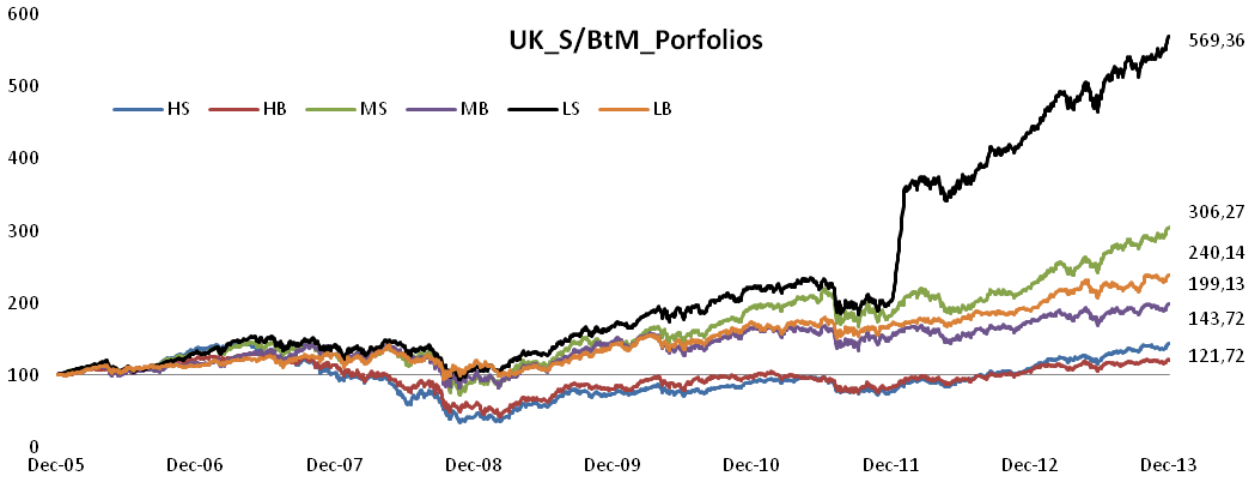
APPENDIX 7

SIZE AND BOOK-TO-MARKET PORTFOLIO PERFORMANCES

Here the performances of the S/BtM portfolios in Italy, Sweden and UK from the end of 2005 up to end of 2013. Each data point used to construct the indexes are daily.







APPENDIX 8

FAMA-FRENCH FACTOR PREMIUMS

Here below are displayed the risk factor premia in each financial market from 2006 to 20013. They have been computed by adopting the same procedure used for Yearly Cumulative Abnormal Returns (see section 3.4.1). That enables to have more stable figures which are useful to understand which sign each risk premium has. As described in the section, some premiums do differ from the past literature but it depends on the time series observed. Indeed, the historical factor premia do differ across countries and time[4]: the theoretical framework of Fama-French three-factor model, basically, starts from the Inter-temporal Capital Asset Pricing Model developed by Merton in 1973 and Ross's studies in 1976 with his APT.

	ITALY		**SWEDEN**		**UK**	
Factors	**H - M - L**	**S - M - B**	**H - M - L**	**S - M - B**	**H - M - L**	**S - M - B**
2006	8,01%	-5,07%	21,34%	-19,28%	5,62%	5,30%
2007	-1,02%	0,98%	-16,18%	-14,53%	-27,29%	-11,91%
2008	-9,64%	-4,98%	-12,85%	-15,79%	-51,71%	0,29%
2009	36,66%	4,29%	14,51%	20,99%	18,59%	4,64%
2010	-25,11%	12,14%	5,22%	-7,65%	-1,70%	2,34%
2011	-21,27%	-15,85%	-6,29%	-3,00%	-11,57%	-0,38%
2012	-0,64%	5,04%	1,24%	-9,57%	-22,91%	20,93%
2013	14,27%	6,82%	-12,54%	8,02%	-3,92%	4,82%
Mean	**0,16%**	**0,42%**	**-0,69%**	**-5,10%**	**-11,86%**	**3,25%**
Median	-0,83%	2,63%	-2,52%	-8,61%	-7,74%	3,49%

[4] In a recent paper ("Size, value and momentum in international stock markets", 2011), Fama and French showed that factor premia differ across countries and time depending on the investment opportunities which are available at that moment.