significant abnormal return at the expiry of lock-up agreements in the UK market. Similar conclusions are made by Goergen, Renneboog and Khursted (2006) regarding the French and the German markets.

Brav and Gompers (2000) represent one of the pioneer explorers in the use of lock-up agreements. They explore the motivation for the lock-ups by examining the structure and how it affects underpricing at the time of the IPO. Further, they explore the price reaction and trading activity at the time of the lock-up expiration. In addition, they explore the recommendations of affiliated and unaffiliated analysts around the time of expiration. Their paper finds support for the theory that lock-ups serve as commitment mechanisms at the time of the IPO, and that IPO underpricing is higher for firms with longer lock-up period and firms that lock up a larger fraction of their shares. They find an average abnormal return of -1.2% at the time of lock-up expiry, and that the abnormal return is greater for firms that lock up a greater fraction of their shares, and for firms that are backed by venture capitalists. They imply that the stock price drop challenges the framework of rational expectations, and that it is potentially consistent with downward sloping demand curves for stocks and/or investors' incorrect prior beliefs.

Brav and Gompers (2003) extend their previous work, and develop three different hypotheses regarding reasons for the existence of lock-up agreements. They explore whether lock-ups serve the purpose of being a signaling mechanism for firm quality, a commitment device to alleviate problems of moral hazard or a mechanism for underwriters to extract additional compensation from the issuing firms. While they find support for the commitment hypothesis, they find little support for the signaling hypothesis. The rejection of the signaling hypothesis is considerably challenged by Brau, Lambson and McQueen (2005). They argue that the dismissal of the signaling theory is at best premature. By developing the hypothesis into a formal model, they are able to provide support for the signaling hypothesis, and conclude that the signaling theory continues to possess both theoretical and empirical merit.

Having reviewed most of the interesting existing literature, we continue with developing hypotheses.

Hypotheses

During our paper we will discuss and explore a few hypotheses.

Hypothesis 1

The first hypothesis is based on the traditional view of efficiency in the stock market. Investors form rational expectations, and since all information about the terms and length of the lock-up is fully available, it should be embedded in the stock price at the first day of IPO trading and prior to lock-up expiry. Thus investors will not systematically fail in their pricing of the stock, and there should be no significant price reaction at lock-up expiration. Moreover, as a consequence of Modigliani and Miller (1958), firms issuing shares are price takers and the supply of shares has no impact on the stock price. This leads us to the hypothesis of no statistically significant price reaction at the time around lock-up expiration. We can therefore formulate the first hypothesis as follows:

There will, on average, be zero abnormal return in the time around the lock-up expiration.

Hypothesis 2

The competing hypothesis is inspired by the research and empirical findings of Ofek and Richardson (2000), Field and Hanka (2001) and Brav and Gompers (2000), which document a statistically significant negative abnormal returns on the time around lock-up expiration. The theory of downward sloping demand curves for stocks suggests and supports a negative abnormal return. At the event of lock-up expiration a significant number of shares are suddenly released to the market, causing a positive shift in the supply curve of stocks. With downward sloping demand curves this implies a drop in the stock price. From this we form a competing second hypothesis:

There will, on average, be negative abnormal returns in the time around the lock-up expiration.

Possible extensions

As the existing empirical results are ambiguous with respect to different countries, we are uncertain which hypothesis we will find most empirical support for. We are aware there may be a need to extend our research and provide additional

hypotheses. Among additional hypotheses, we have hypotheses intended to explain differences in firm characteristics leading to differences in abnormal returns (e.g. firms with venture capital backing suffer higher negative abnormal return, etc). Note also that downward sloping demand curves imply negative abnormal returns, but one cannot conclude the other way around. The reason for this is that there are other possible explanations for abnormal returns, including bid-ask bounce, liquidity effects and biased expectations of supply shocks. We can also extend our research to assess whether it is possible to exploit arbitrage opportunities.

Having formulated our hypotheses, we will now present the methodology.

Methodology

The central issue of our thesis is to test whether there is abnormal return around the time of lock-up expiration. We will do this by collecting returns from the days around the lock-up expiration of each individual firm. Each return will then be subtracted by the index return for the same day, and this will represent abnormal return at expiration for each firm. Our definition of abnormal return is corresponding with the one of Ofek and Richardson (2000):

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

where AR_{it} is the abnormal return of stock i on day t, R_{it} is the return of stock i on day t, and R_{It} is the return on the index I on day t. There are two ways of analyzing the lock-up expiration. We can calculate abnormal return for the lock-up day only, or we can calculate abnormal return for days prior and days following the expiration. At this point, we aim to explore both alternatives, in order to see how well the market accounts for the event of lock-up expiration. Finally, the data series of abnormal returns will be regressed upon a mean. If the mean proves to be significantly negative, hypothesis 2 is supported from our data set, otherwise hypothesis 1 is supported. We intend to apply standard OLS-procedure, but we will need to assess whether the assumptions behind the OLS-procedure is sufficiently satisfied in order to make a final assessment.

After obtaining the test results, our main focus will be to find explanations for the cross-sectional differences in abnormal return, in order to develop possible predictions. This will be done through a regression with abnormal returns at expiration as the dependent variable. The explanatory variables will be several firm characteristics and demand differences which have received empirical support from existing literature, such as Ofek and Richardson (2000) and Brav and Gompers (2000). Among possible relevant variables are the number of lock-up days, a dummy variable for venture capital backing, total return from offering price, standard deviation of stock return, daily trading volume, stock price at day -5, the equity value, the percentage of shares locked, standard deviation of analyst earnings forecast, book to market ratio and underwriter ranking.

Depending on the results, we have a few possible extensions to our research. If we are able to find evidence for a drop in stock price at expiry, we want to test whether the abnormal return is arbitrageable. An assessment of this may focus on the bid-ask spread, shorting possibilities and/or how many of the individual lock-up expiration events which actually experience negative returns.

Another potential extension to our research is to sort the sample into different groups, such as long and short lock-up periods, and assess whether there are any differences among the groups.

Having briefly presented the methodology we are going to use, we will explain how we intend to gather our data and sample selection.

Data

We intend to gather our sample from IPOs on the Oslo Stock Exchange for the period 1997 to 2009. We will further collect data from IPO prospectuses from the Department of Finance at BI Norwegian School of Management, in addition to a database on IPOs provided by BI Norwegian School of Management. We intend to collect the following information: Date of IPO, issue price, lock-up length and the date of lock-up expiration.

We will also collect additional data from the Oslo Stock Exchange (OSE), like daily return on stock indices, individual stock price development and trading volume. We intend to gather these data by e.g. Thomson Reuters Datastream.

Further, we intend to exclude firms with no lock-up period and firms with long lock-up periods (more than 365 days) from the sample selection. In addition, to avoid price discreteness, we will consider excluding firms with very low stock prices. The sample selection exclusion process is in correspondence with the one proposed by Ofek and Richardson (2000).

If a statistically significant price drop at lock-up expiry is evident, a possible extension is to explore the cross-sectional differences between firms. This will require additional data, such as the standard deviation of analysts forecast, which underwriter is used, whether the firm is venture backed or not, the stock price volatility over the lock-up period, and firm descriptive information like stock price level and size of the firm.

If we find no statistically significant drop in stock prices, we may extend our research to alternative areas of lock-up research, like Brav and Gompers' (2003) investigation of the reason for the existence of lock-ups, and the determinants of lock-up length. Again, this will require additional data, such as the number of shares locked up, the number of primary and secondary shares offered, book to market ratios, cash flow margins, and the percent of company's shares issued in the IPO.

Evaluation and Progression

Overall, we are satisfied with our progression. We have reviewed a large amount of the literature which we have found relevant for our thesis topic. For now, we have not gathered, or attempted to gather any data. Thus, we are aware, and to some extent even expect, that it may be required that we further expand our literature review.

We are also aware that previous studies on International Capital Markets may not be transferable to the Norwegian Market, thus we might have to revise and do changes to the methodology, data and sample selection if we find no statistical significant results supporting our hypotheses. Needless to say, we are excited and optimistic regarding further progression.

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