

# Determination of the Window to Return to the Equilibrium after the Listing Period

Mediha MEZHOUD<sup>1</sup> and Adel BOUBAKER<sup>2</sup>

<sup>1</sup>Faculty of Science Economics and Management of Tunis, Tunis

<sup>2</sup>Faculty of Science Economics and Management of Tunis, Campus Universitaire, Ennasr 2, Ariana 2037, Tunisia

<sup>1</sup>mezhoud.madi7a@gmail.com, <sup>2</sup>adel.boubaker@fsegt.rnu.tn

**Abstract**– This work provides an analysis of the equilibrium value after listing, reflecting the window to return to equilibrium. Our study examined a sample of 103 French companies during 2005-2008. The results show that the underperformance is confirmed in the three years following the IPO. The results allow us to see that investor demand is a good indicator of the timing necessary to return to the equilibrium value after listing. On average, the speed of adjustment of prices after listing is between 20 and 30 trading days (approximately three weeks of negotiations). Thus, the negative and significant relationship between the oversubscription rate and the performance during the three years following the listing can be attributed to over optimism or pessimism of investors from the prospects of the IPO firm.

**Keywords**– Intrinsic Value, Timing, Oversubscription Rate and Long Term IPO Performance

## I. INTRODUCTION

Sembel (1996) assumed that in the long run the price reflects fundamentals. That can go in the sense of the idea that the study of long-term performance may reflect the window to return to equilibrium after listing. Indeed, declining corporate profitability in the years following the IPO was confirmed internationally. Theoretical explanations for the decline in the post-IPO performance are mainly based on behavioral assumptions, the agency conflicts, timing effect as well as investor demand during the listing period.

The final equilibrium price can be determined by the volume of shares available for buying and the potential demand. When the issue price of shares is equal to the expected price of the buyers, and the number of shares issued is equal to the potential demand, the price tends toward equilibrium, which will reflect the intrinsic value of an IPO share (Agarwal et al (2008)). Our work is organized as follows: firstly, we present the theoretical basis that will lead us to formulate our research hypotheses. Next, we describe our study sample, the source of the data collected and the definitions of the different variables constituting our regression model. Finally, an analysis of the results will be in the last part of this study.

## II. STUDY BACKGROUND AND RESEARCH HYPOTHESIS

### A) Impact of Investor Demand on the Long Term Performance

Agarwal et al (2008) find that investor demand observed during the period before the IPO, is highly correlated with the short and long term performance. Indeed, the results show that investor demand affects negatively and significantly the long-run performance. They find a significant correlation between investor demand and abnormal returns, where IPOs with high demand are less efficient and those with weak demand outperform the market.

Sembel (1996) proposed the following theoretical scenario: the level of the demand during the IPO and immediately after the listing period, is generated on the basis of the number of investors (N) who are aware of the company and have considered be included in their portfolio. After IPO, more information is generated about the company. Production of information entails two things: (1) the distribution of valuations becomes more accurate / less variation (2) more investors become aware of the new company and begin to consider their inclusion in their portfolio, so N gradually increases. This gradual increase in demand will slow the process of convergence of market prices to the value of full information (Sembel (1996)).

Since a fraction of investors who are aware of the company is close to 1, the speed of the arrival of new investors aware becomes slower. That will weaken the dampening effect of rising demand. Consequently, market prices will converge to the equilibrium value, and this convergence process takes some time.

Based on the theoretical model advanced by Sembel (1996), we can illustrate this hypothesis:

**H 1: The return to equilibrium is observed when the demand for IPO shares is equal to that offered by the issuing company**

### B) Size of Supply

The literature shows a positive relationship between the size of supply and long-run IPO performance. Brav and Gompers (1997, p.1819) found that the underperformance is larger for small companies. They argue that small companies may be affected by investor sentiment and may be subject to "fads". The shares of small companies that went public are required, first, by individuals who are generally uninformed investors. Many institutions such as pension funds and insurance companies are required to hold shares of very small companies because taking a significant position in a small

company brings up the institution of a large shareholder in the company.

Therefore, the long-term performance of small companies is lower because such companies are more speculative. The study of Fields (1995, p.24) shows that the three-year Buy and Hold returns are greatest for the largest initial public offerings (the company size is measured by market capitalization). The study also shows that the size variable is correlated with institutional properties. The cross-sectional study of Levis (1993, p 38) has once again shown that large firms, in terms of gross proceeds of the offer, have high returns in the long run, after listing. In their study, Darmetko (2009) states that the gross proceeds of the offer and the value of assets can be considered two measures appropriate to the size of the offer. From what was mentioned, we can formulate the following hypothesis:

**H 2: The size of the offer has an effect on abnormal returns after the listing period**

### **C) Impact of the Overpricing on the Long Run Performance**

The hypothesis of Miller (1977) provides that the initial overpricing of the IPO should be reduced over time through the implementation of information, leading to underperformance after listing. However, when considering the long-term performance, we must distinguish between the normal and the bubble period, because during a bubble period, levels of overpriced stocks can be supported by the irrational exuberance of investors and may not be followed by a correction after a few years. IPO overpricing may not result in an underperformance during the bubble period, but the underperformance can appear after a certain time (Michel and Dong (2009)). Indeed, these authors consider the period 1980-2003 as the period of the bubble and the bursting of the NASDAQ (March (2000)). More specifically, referring to studies of Aggarwal, Bhagat and Rangan (2007) and Cen, Chan; Gao and Dasgupta (2007), Michel & Dong (2009) define the bubble period from January 1997 until march 2000.

Purnanandam and Swanmimathan (2004) argue that IPO prices are overpriced relative to intrinsic values and this overpricing tends to become an underperformance relative to the market and other IPO firms, until the fifth year after the offering. However, economic and theoretical reasons of the overpricing are unknown. In a study on the role of underwriter in determining the level of overpricing, Chemmanur and Krishnan (2009) show that prices of the IPO are, on average, too high and tend to converge to their intrinsic values in the long term. However, it is possible that some force more generally reduces this overpricing (Dong & Michel (2009-2010)).

The variations in terms of type and quality of information collected, have led to different levels of uncertainty among investors. This difference was called difference of opinion in the theory of Miller (1977). Furthermore, the higher the difference of opinion, the higher the overreaction in the short term, but over time, when information is available, an overreaction dissipates and the market moves to the balance (Miller (2000)). The

heterogeneity of opinions is particularly high at high-risk assets. The initial public offerings of listed firms can be classified as high risk assets due to the absence of their history and the unavailability of information to investors. Our hypothesis is therefore:

**H 3: There is a relationship between the overpricing and the long-term performance**

### **D) Impact of the underpricing on the Long Run Performance**

A high initial return is an indicator of poor performance after the IPO. In contrast, Shiller (1990, p61) argues that the IPO market is subject to fads exploited in an opportunistic manner by intermediaries through underpriced emissions. These "fads" temporary must eventually disappear, resulting in poor performance in the long run. Rock (1986, p.188) argues that the purpose of the evaluation is to draw the less informed investors (theory of the "winner's curse"). This idea is supported by Michaely and Shaw (1994, p279) who find that large firms and those issued by investment banks are considered less underpriced. There are results showing the negative relationship between initial returns and long-term returns for IPO firms. Ritter (1991, p.15) gives the idea that high initial returns during the first day of trading, followed by a poor performance in the long run. The author claims that low long-term abnormal returns are consistent with the theory of divergence of opinions.

The model of Ljungqvist et al (2007) suggests a possible relationship between underpricing and long run underperformance.

These authors show that the nature of the link between underpricing and long-term performance is not necessarily monotone. They show that this relationship is negative, only when the probability of the end of the hot issue markets is low. We can, therefore, illustrate the following hypothesis:

**H 4: The initial underpricing is a determinant of long run IPO performance**

### **E) Age of Firm**

Ritter (1984a, 1991), Fields (1995) and Carter et al (1998) found a significant relationship between company age and long term IPO performance. Ritter (1984, p 223) suggests a relationship between the difficulty of assessing and the long-term performance and states that "the age of the company" is probably the best proxy for the initial uncertainty about its future. Fields (1995, p.24) studied the impact of firm age on long-term performance and found that the relative wealth (WR) after three years is between 0,72 and 0,76 for IPO firms aged between 0-5 years from the date of introduction, while firms older than 16 years, outperform the control firms, with a relative wealth of 1,07. This author suggested that most established companies are associated with a low divergence of opinion and information asymmetry, so the age of the company may have an impact on the long-term IPO performance. We can, therefore, propose the hypothesis that:

**H 5: The age of the firm affects positively the long-term performance**

### III. SAMPLING

Our study concerns a sample of 103 French companies listed on the Stock Exchange, between 2005-2008. This sample was obtained from the site of Euronext (www.euronext.com). Almost two thirds (2/3) of the sample firms were listed on Alternext of Euronext.

Table 1: Sample Selection Procedure

	2005	2006	2007	2008	Total
<b>Eurolist</b>	12	14	9	1	36
<b>Alternext</b>	-	35	26	-	61
<b>Free Market (Marché Libre)</b>	-	1	-	5	6
<b>Total</b>	12	50	35	6	103

This table shows the composition of the sample by year and market. We chose a study period during 2005-2008, as we examine the long-term IPO performance during the three years after listing. Also, we can see that 2006 is a strong year of activity in the sense that the number of companies is relatively large compared to other years of study.

### IV. DESCRIPTION OF THE EMPIRICAL MODEL

To study the impact of investor demand on the determination of the window to return to equilibrium after listing, it is essential, first, to present the measures of abnormal returns to be used to examine the evolution of long-term performance. Next, correlational tests are performed in order to determine the timing necessary to achieve the equilibrium value after IPO.

#### A) Measures of Long-Run Performance

Initially, we will measure the abnormal returns by the method of cumulative abnormal returns (CARs), and then, for a second time by the average buy and hold abnormal returns (ABHARs).

##### 1) The Cumulative Abnormal Returns (CARs)

It is the difference between the observed return  $R_i$  and the expected or normal return  $E(R_i)$ . The monthly abnormal return of firm  $i$  is calculated as follows:

$$ar_{it} = R_i - E(R_i)$$

The expected return is determined by the return of the model adopted. The cumulative abnormal return on a date 'q' to a date 's' of a portfolio of shares is given by:

$$CAR_{q,s} = \sum_{t=q}^s AR_t$$

Where,  $AR_t = 1/n \sum_{i=1}^n ar_{it}$  represents the average return adjusted to a reference portfolio.

##### 2) The Buy and Hold Abnormal Returns (BHARs)

The long-run performance is examined by calculating the Buy and Hold abnormal returns (BHARs) for a period of 12,

24 and 36 months after IPO. According to Barber and Lyon (1997), researchers should calculate abnormal returns as simple Buy and Hold returns less Buy and Hold returns of the benchmark portfolio of control firms. In addition, the Buy and Hold returns reflect the actual return that investors received from their investments.

According to the work of Kothari and Warner (1997), Barber and Lyon (1997), Lyon, Barber and Tsai (1999), there are three bias in the estimation of long-term returns, which are: 1) through the new listing 2) through rebalancing and 3) through skewness; Lyon, Barber and Tsai suggest several methods to control the missing specification. However, there is no correct method. They conclude that the analysis of long-term returns is perilous. Buy-and-Hold Abnormal Returns are defined as follows:

$$BHR_{i,T} = \left[ \prod_{t=1}^T (1 + r_{i,t}) \right] - 1$$

Where,  $r_{i,t}$  is the return of firm  $i$  in period  $t$ ,  $t = 1$  indicates that the first trading day after IPO and 't' is the trading day after IPO during the third anniversary of trading after listing. Buy and Hold returns corresponding to the benchmark firms are defined as follows:

$$BHR_{B,i,T} = \left[ \prod_{t=1}^T (1 + r_{B,i,t}) \right] - 1$$

Where  $r_{B,i,t}$  is the return of the benchmark index of company  $i$  in period  $t$ ,  $t = 1$  indicates the first day of trading of the company  $i$  after IPO,  $T$  is the trading day corresponding to the third anniversary of the year following the IPO. Therefore, the Buy and Hold abnormal returns for each company can be written as follows:

$$BHAR_{i,T} = BHR_{i,T} - BHR_{B,i,T}$$

then, the average Buy and Hold return is given by:

$$BHAR_t = \sum_{i=1}^{nt} x_{i,t} [BHAR_{it}]$$

#### B) Equations of the Model and Description of Variables

To examine the factors that are associated with long-term performance that have been examined theoretically and empirically in the literature, models that test the CARs and BHARs for periods of one year, 24 months and 36 months and abnormal returns for periods of 7 days and 20 days after the IPO, in the form of cross-sectional regressions, are presented as follow:

$$\text{Return}_{7d, 20d} = \alpha + \beta_1 (\text{O.R}) + \beta_2 (\text{Underp}) + \beta_3 (\text{Overp}) + \beta_4 (\text{OS}) + \beta_5 (\text{FA}) + e$$

$$\text{CAR}_{12, 24, 36} = \alpha + \beta_1 (\text{O.R}) + \beta_2 (\text{Underp}) + \beta_3 (\text{Overp}) + \beta_4 (\text{OS}) + \beta_5 (\text{FA}) + e$$

$$\text{BHAR}_{12, 24, 36} = \alpha + \beta_1 (\text{O.R}) + \beta_2 (\text{Underp}) + \beta_3 (\text{Overp}) + \beta_4 (\text{OS}) + \beta_5 (\text{FA}) + e$$

Where,

**Performance**  $_{7d, 20d}$ : represents abnormal return during 7 days and 20 days after the listing period.

**CAR**  $_{12, 24, 36}$ : represents the cumulative abnormal returns during the 12 months, 24 months and 36 months after listing

**BHAR**<sub>12,24,36</sub>: represents the Buy and Hold Abnormal Return within 12 months, 24 months and 36 months after listing

**OR**: The oversubscription rate measured by the number of shares requested / number of shares offered

**Underp**: the initial underpricing observed during the IPO.

**Overp**: The initial overpricing constituting an element of the initial return observed during the IPO.

**OS**: This is the size of the offer might be defined as the market value of the offer, observed during the first day of trading

**FA**: Age of the firm. This is the number of years between the date of creation and the IPO

Thus, the following table presents the definitions of the variables used in the context of our model.

Table 2: Definitions of variables in our model

Variables	Definitions
<b>Explanatory variables of long run IPO performance</b>	
<b>Underpricing (Underp)</b>	(Offer Price – Intrinsic Value)/Intrinsic Value
<b>Overpricing (Overp)</b>	(Market Price – Intrinsic Value)/Intrinsic Value
<b>Oversubscription Rate (O.R)</b>	Number of shares requested / number of shares offered
<b>Offer Size (OS)</b>	Logarithm of (number of shares offered * offer price)
<b>Firme Age (FA)</b>	Logarithm of the number of years between the year of creation and the IPO

## V. ANALYSIS OF RESULTS

### A) Descriptive Analysis

The results allow us to conclude that the average oversubscription rate is 35% with a minimum of 1% for French companies during 2005-2008. This implies that the average demand from investors is less than the half of the offer for the entire sample. Thus, we observe that the median size of the offer is 6.9890 with a minimum of 2.2117 and a maximum of 12.1796. The median age of a company is 8 years. This is relatively small compared with the maximum age (139 years old). Hence, companies in our sample are generally young that have a career relatively less important.

We note that the underpricing records an average of -0.0021. This means that the intrinsic value exceeds the offer price of the IPO share.

This excess is considered more important, compared to the market price. Indeed, the difference between market price and intrinsic value is -0.8776.

Table 3: Descriptive analysis of variables

	Mean	Median	S.D	Min	Max
<b>Oversubscription Rate</b>	0,35	0,20	7,6686	0,01	1
<b>Firm Age</b>	15,5331	8	22,5795	0,25	139
<b>Offer Size</b>	6,8514	6,9890	1,4669	2,2171	12,1796
<b>Overpricing</b>	-0,8776	-0,8996	0,05134	-0,9408	-0,6596
<b>Underpricing</b>	-0,0021	-0,0908	0,6056	-0,9907	1,9678

On this study, the intrinsic value is obtained by linear regression, taking into consideration the market price and the IPO price, between 2005-2008.

Replacing  $\alpha$  and  $\beta$  by their value in our model, based on market price established the first trading day, we came to determine the intrinsic value of IPO shares. The model is then written as follows:

$$IV_{i,t} = \alpha + \beta MR_{i,t} + \varepsilon_{i,t}$$

From Table 4, the coefficients  $\alpha$  and  $\beta$ , are statistically significant ( $\alpha$  is significant at 1% and  $\beta$  at the level of 5%).

Table 4: Determination of the intrinsic value

$VI_{i,t} = \alpha + \beta RM_{i,t} + \varepsilon_{i,t}$				
Variable	Coefficient	S.D	t-Student	Prob.
$\alpha$	11.78382	1.680445	7.01	0.000
$\beta$	1.606696	0.7445635	2.16	0.033
$R^2$	0.0441			
Adjusted $R^2$	0.0346			
F-statistic	4.66			
Prob (F-statistic)	0.0333			

### B) Analysis of the evolution of the long-term IPO performance

Tables 5 and table 6 show the monthly evolution of performance measured through the cumulative abnormal returns (CARs) and Buy and Hold Abnormal Returns (BHARs). We can observe that the underperformance is detected as early as 1 month after the IPO. We note as well that the IPO firms outperform the market as there are positive cumulative abnormal returns during the 32th, 33th and 34th months following the IPO. In contrast, the evolution of Buy and Hold Abnormal Returns (BHARs) allows us to see that IPO firms underperform the market portfolio during the 36 months following the IPO. Indeed, the BHARs take negative values throughout the 36 months after the listing period.

Table 5: CARs monthly average of 103 IPO companies

Month	CAR	t-statistic	Month	CAR	t-statistic
1	-0.002471	-0.5774	19	-0.0091974	-1.1853
2	-0.0024851	-0.5713	20	-0.0101241*	-1.3156
3	-0.0043984	-0.9107	21	-0.0099976*	-1.3318
4	-0.0038473	-0.8447	22	-0.010793*	-1.4183
5	-0.0042265	-0.8860	23	-0.009449	-1.2469
6	-0.0039637	-0.8078	24	-0.010189*	-1.2953
7	-0.0040157	-0.7678	25	-0.0053712	-0.7280
8	-0.004477	-0.8973	26	-0.0043823	-0.5918
9	-0.0041307	-0.8074	27	-0.0039799	-0.5519
10	-0.0038509	-0.7550	28	-0.0041596	-0.5667
11	-0.0032987	-0.6392	29	-0.0019886	-0.2670
12	-0.004044	-0.7363	30	-0.0014434	-0.1920
13	-0.0034847	-0.6271	31	-0.0036777	-0.5013
14	-0.0035864	-0.6164	32	0.0006052	0.0914
15	-0.006664	-1.0232	33	0.000819	0.1228
16	-0.0083075	-1.1234	34	0.0011349	0.1623
17	-0.0076527	-1.0003	35	-0.0006242	-0.0806
18	-0.0092983	-1.1522	36	-0.001609	-0.1993

\*Significant at the level of 10%, \*\* at the level of 5% and \*\*\* at the level of 1%

Specifically, 33 observations of 36 cumulative abnormal returns (CARs) are considered negative with values significantly negative during the 20th, 21th, 22th and 24th months after the IPO. In contrast, all Buy and Hold Abnormal Returns are negative during the 3 years following the listing period with significant values only during the 21th and the 22th month after listing.

Table 6: BHARs monthly average of 103 IPO companies

Month	BHAR	t-statistic	Month	BHAR	t-statistic
1	-0.0024314	-0.5680	19	-0.0081022	-1.1354
2	-0.0024426	-0.5643	20	-0.0090087	-1.2609
3	-0.0043974	-0.9108	21	-0.0092213*	-1.3162
4	-0.0040724	-0.8828	22	-0.0099969 *	-1.4152
5	-0.0043618	-0.9076	23	-0.008736	-1.2298
6	-0.0040148	-0.8134	24	-0.0093455	-1.2822
7	-0.0040138	-0.7744	25	-0.0054998	-0.8040
8	-0.0047501	-0.9465	26	-0.0045922	-0.6467
9	-0.0044438	-0.8632	27	-0.0043447	-0.6204
10	-0.004198	-0.8147	28	-0.0045505	-0.6369
11	-0.0037854	-0.7255	29	-0.0026314	-0.3670
12	-0.0042828	-0.7795	30	-0.0020646	-0.2806
13	-0.0038102	-0.6870	31	-0.0043886	-0.6067
14	-0.003761	-0.6521	32	-0.0012708	-0.1891
15	-0.0063428	-1.0086	33	-0.0010071	-0.1488
16	-0.0073947	-1.0801	34	-0.0003745	-0.0513
17	-0.0067145	-0.9413	35	-0.0017937	-0.2235
18	-0.0080604	-1.1083	36	-0.0026695	-0.3249

\*Significant at the level of 10%, \*\* at the level of 5% and \*\*\* at the level of 1%

Moreover, the diagram can show us the evolution of abnormal returns. Indeed, the observation of the scheme allows us to conclude that the underperformance is relatively small for the cumulative abnormal returns (CARs), compared to that characterizing the Buy and Hold Abnormal Returns (BHARs).

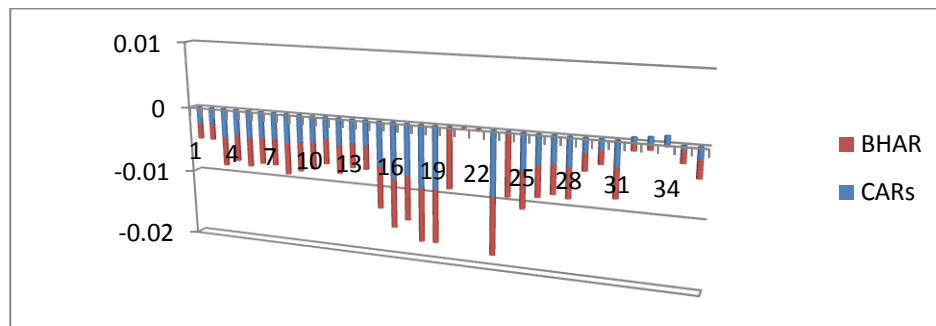


Figure 1: The evolution of performance after listing

Table 7: Determination of the equilibrium value after listing

	7 days	20 days	30 days	CARs 12 months	CARs 24 months	CARs 36 months	BHARs 12 months	BHARs 24 months	BHARs 36 months
<b>Oversubscription rate</b>	0.000024 (0.09)	0.000051 (0.47)	-0.0045*** (-12.82)	-0.0045*** (-7.82)	-0.0041*** (-4.44)	-0.0043*** (-4.45)	-0.0045*** (-7.67)	0.00045 (0.81)	-0.0003 (-0.35)
<b>Underpricing</b>	0.00032 (0.09)	0.00056 (0.39)	0.0067 (1.41)	-0.0066 (-0.84)	-0.0384*** (-3.11)	-0.01247 (-0.93)	-0.0058 (-0.74)	-0.0293*** (-3.95)	0.0302** (2.27)
<b>Overpricing</b>	-0.0332*** (-2.86)	-0.0106** (-2.37)	-0.0151 (-1.03)	-0.0181 (-0.75)	0.0756** (1.98)	0.030692 (0.75)	-0.0188 (-0.77)	0.0887*** (3.86)	-0.0503 (-1.22)
<b>Offer Size</b>	-0.0028* (-1.91)	-0.0011* (-1.90)	-0.0012 (-0.65)	-0.0036 (-1.17)	0.0043 (0.90)	0.0026 (0.50)	-0.0036 (-1.18)	0.0075*** (2.59)	-0.0021 (-0.41)
<b>Firm Age</b>	0.00240 (0.54)	0.00191 (1.12)	-0.0014 (-0.26)	0.0121 (1.32)	0.0356*** (2.46)	0.0157 (1.01)	0.01181 (1.27)	0.0222*** (2.54)	-0.0224 (-1.43)
<b>R<sup>2</sup></b>	0.2810	0.2157	0.6311	0.3952	0.2732	0.1868	0.3851	0.2097	0.0730
<b>N</b>	103	103	103	103	103	103	103	103	103
<b>F-Stat</b>	7.660442	5.389757	33.53059	12.80697	7.368767	4.503648	12.27396	5.201171	1.542753
<b>Prob (F-Stat)</b>	0.0000	0.0002	0.0000	0.0000	0.0000	0.0010	0.0000	0.0003	0.1836

### C) Multivariate Analysis

The results of Table 7 show that the oversubscription rate is a good indicator for determining the equilibrium value after listing, reflecting the window to return to equilibrium. Indeed, the final equilibrium price of IPO is determined by offer volume and potential demand. When the issue price of shares is equal to the expected price of the buyers, and the number of shares issued is equal to the potential demand, the price tends toward equilibrium, which will reflect the intrinsic value of the IPO firm.

On average, the speed of adjustment of prices after the IPO, is between 20 and 30 trading days (about 3 weeks of negotiations). Indeed, we note that the oversubscription rate is positively correlated with abnormal returns during the 7 days and 20 days after the IPO period. Considering the evolution of performance for a month or for 30 days after listing, we find that investor demand weakens significantly, the level of performance. This implies that, for some time, the gradual increase in demand does not ease the convergence of market price to the value of complete information.

After IPO, more information is generated about the company. Production of information leads to a more accurate distribution of valuations and less variation. Thus, more investors become aware of the IPO company and began to consider their inclusion in their portfolios, which leads to a gradual increase in the number of investors.

Indeed, since the proportion of investors who are aware of the company, is close to 1, the speed of the arrival of new investors aware becomes slower, which will weaken the dampening effect of rising demand. Note that the existence of three phases explaining the impact of investor demand on the abnormal returns. From what was mentioned by Sembl (1996), we see that increasing the fraction of investors moving closer to 1, increases the demand for shares, resulting in improved market performance after IPO. This improvement is reflected in the positive relationship between the oversubscription rate and performance during 7 days and 20 days after the listing period. At phase 2, where the arrival of potential investors becomes slower, the demand for them weakens, until reaching the level of shares offered by the company, and the level of performance is reduced until it reaches the value 0. This constitutes the return to equilibrium level, in the sense that the window (20d -30d) reflects the timing necessary to achieve the equilibrium value after listing.

Turning to the third phase relates to the existence of a negative relationship between the oversubscription rate and the long run performance after listing. Indeed, this report is mainly observed during the 30 days after the listing period. Upon arriving at a steady level of performance, reflecting a demand that is equal to the offer, the investor may increase its demand for a given level of supply. Indeed, this excess of demand allows the company to be unable to meet the needs of these investors, which may impair its performance after

IPO and more precisely from the first month following the listing. The relationship becomes, therefore, negative between two variables.

Our results are consistent with those found by Agarwal, Liu and Rhee (2008) insofar as the IPO with high demand realize high returns during the 20 days and 30 days after listing. The results show, as well, a significant long-term underperformance for a strong demand of shares. Indeed, companies with higher demand realized negative cumulative abnormal returns (CARs) for the 3 years after the IPO. In contrast, firms whose demand for shares is important realize BHARs significantly negative, only in the 12 months following the listing period. Thus, the negative and significant relationship between the oversubscription rate and the performance during the three years following the listing can be attributed to overoptimism or pessimism of investors from the prospects of the IPO firm. Indeed, a significant oversubscription rate, reflecting a high level of investors demand, can be attributed to the excessive optimism of investors about the future of a company. Nevertheless, a low level of investor demand could be attributed to overpessimism of investors due to the underestimation of the prospects of the firm (Agarwal et al (2008)). The observation of the results shows that the overpricing is negatively and significantly correlated with the abnormal returns during the 7 days and 20 days after the IPO. In contrast, it is positively and significantly correlated with the cumulative abnormal return of 2 years (CARs(24m)) and Buy and Hold Abnormal Return of two years (BHARs(24m)). These results do not corroborate those found by Purnanmimatham and Swanmimthan (2004), in the sense that the overpriced IPO tend to underperform in the short term, relative to the market until the second year following the offer. However, from the second year, we observe a positive relationship between overpricing and long-term performance. This means that the abnormal performance improves with the overpricing that characterizes IPO firms, after 12 months of the listing period.

Thus, variations in levels of performance can be attributed to the behavior of investors and the divergence of opinions between them. The positive relationship between overpricing and long-term abnormal returns after 12 months of the IPO is not compatible with the idea put forward by Miller (1977). Indeed, he claims that the short-term positive correlation and negative in the long term can be attributed to an overreaction in a few days after the listing period. However, this overreaction dissipates over time, and the market moves toward equilibrium.

However, we observe that the relationship between underpricing and long-term abnormal returns, as measured by CARs and BHARs, is positive in the short term but has a negative sign from the first year after listing. This result is consistent with that advanced by Ritter (1991) in the sense that the weak long-term abnormal returns are consistent with the theory of divergence of opinions. Indeed, we note that the underpricing is a decreasing function of long-term returns following the heterogeneous behavior among investors concerning the appropriate value of the listed shares. The results show us, so that the size of the offer is negatively correlated with abnormal performance during the 12 months

following the IPO. Conversely, this report is positive from the second year after listing. This implies that large firms (with a significant level of supply) realize an underperformance during 7 days, 20 days, 30 days and 1 year after listing. From the second year, they outperform the market and their performance, as measured by CARs and BHARs, improve.

This result does not corroborate that stated at the most previous studies, in particular, that of Brav and Gompers (1997). We note that the age of the firm is positively correlated with the cumulative abnormal return (CARs) and the compounded abnormal returns (BHARs) for 24 months. This means that even large companies, with a low level of information asymmetry and divergence of opinion among investors, are characterized by a high level of long-term performance. This is consistent with results reported by Fields (1995).

## V. CONCLUSION

The return to equilibrium following the listing period is an important step in the life of every IPO company. Thus, the process of convergence to equilibrium differs from one firm to another. Indeed, this process depends on several external and internal factors of a company. The efficiency of the stock market plays, well, a role in the process of adjustment of prices after listing. Therefore, it's interesting to study the evolution of abnormal returns after the IPO.

Our study examined a sample of 103 French companies during 2005-2008. The results show that the underperformance is confirmed in the three years following the IPO. Indeed, this underperformance is relatively small for the cumulative abnormal returns (CARs) in comparison to that which characterizes the compounds abnormal returns (BHARs). The results allow us to see that investor demand is a good indicator of the timing necessary to return to the equilibrium value after listing. On average, the speed of adjustment of prices after listing is between 20 and 30 trading days (approximately three weeks of negotiations). Indeed, we note that the oversubscription rate is positively correlated with abnormal returns during the 7 days and 20 days after the IPO. Considering the performance evaluation during the 30 days after the introduction, we find that investor demand is negatively correlated with IPO performance. This implies that, for some time, the gradual increase in demand does not ease the process of convergence towards the equilibrium value. Indeed, our results are consistent with those found by Agarwal, Liu and Rhee (2008). Indeed, a significant oversubscription rate, reflecting a high level of investors demand, can be attributed to the excessive optimism of investors about the future of a company.

## REFERENCES

- Agarwal, S., Liu, C., Rhee, S.G., (2008), « Investor demand for IPOs and aftermarket performance: Evidence from the Hong Kong stock market», *Journal of International Financial Markets, Institutions & Money* 18, 176-190.

- Barber, B., & Lyon, J., (1997), «Detecting long-run abnormal stock returns: The empirical power and specification of test statistics», *Journal of Financial Economics* 43, 341-372.
- Brav, A., & Gompers, P. A., (1997), «Myth or Reality ? The Long-run Underperformance of Initial Public Offerings: Evidence from Venture and Nonventure Capital-Backed Companies», *The Journal of Finance*, 52, 5, 1791-1821.
- Carter, R., Dark, F., & Singh, A., (1998), « Underwriter reputation, initial returns, and the long- run performance of IPO stocks», *The Journal of Finance*, 53: 285-311.
- Chemmanur, T.J., & Krishnan, K., (2009), «Heterogeneous beliefs, short sale constraints, and the economic role of the underwriter in IPOs», *Working paper*, Boston College
- Darmetko, T., (2009). «Long-run performance of Initial Public Offerings in the Polish capital market», A review of the IPO stock performance and its determinants, *MSc in Finance & International Business*.
- Dong, M., & Michel, M., (2009), « Does Investor Heterogeneity Lead to IPO Overvaluation? », *SSRN Paper, Electronic copy available at: <http://ssrn.com/abstract=1364059>*
- Dong, M., Michel, J.S., & Pandes, J.A., (2010), « Underwriter quality and long-run IPO performance», *Financial Management*, forthcoming.
- Field, L.C., (1995), «Is Institutional Investment in Initial Public Offerings Related to Long-Run Performance of These Firms? », *Anderson School of Management Working Paper*, pp. 16-95. Available at: <http://repositories.cdlib.org/anderson/fin/16-95>
- Kothari, S., & Warner, J., (1997), «Measuring Long-Horizon Security Price Performance», *Journal of Financial Economics*, vol. 43, pp. 301-340.
- Levis, M., (1993), «The long-run performance of IPOs: The UK experience 1980-1988», *Financial Management* 22, 28-41.
- Ljungqvist, A., Nanda, V., & Singh, R., (2007), «Hot markets, investor sentiment, and IPO pricing», *Journal of Business*, *in press*.
- Lyon, J., Barber, B., & Tsai, C., (1999), «Improved Methods for tests of Long-run abnormal stock returns», *Journal of Finance* 54, 165-201.
- Michaely, R., & Shaw, W.H., (1994), «The Pricing of Initial Public Offerings: Tests of Adverse Selection and Signaling Theories, » *Review of Financial Studies* 7, 279-319.
- Miller, E.M., (1977), «Risk, Uncertainty, and Divergence of Opinion», *Journal of Finance* 32, 1151-1168.
- Miller, E., (2000), «Equilibrium with divergence of opinion», *Review of Financial Economics*, 9, 27-41.
- Ritter, J.R., (1991), «The Long-Run Performance of Initial Public Offerings», *Journal of Finance* 46, 3-27.
- Ritter, J., (1984a), «Signaling and the Valuation of Unseasoned New Issues: A Comment». *The Journal of Finance*, vol. 39, no. 4, pp. 1.231-1.237.
- Rock, K., (1986), «Why new issues are underpriced», *Journal of Financial Economics*, Vol. 15, pp. 187-212.
- Semmel, R., (1996), «IPO Anomalies, Truncated Excess Supply, and Heterogeneous Information», *Ph.D. Dissertation*, University of Pittsburgh, Pittsburgh
- Shiller, R., (1990), «Speculative prices and popular models», *Journal of Economic perspectives* 4, 55-65.