

The Effect of Lockup on Management Earnings Forecasts Disclosure in French IPOs

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Abstract

This study investigates the effect of lockup agreements on management earnings forecasts in initial public offering (IPO) prospectuses. Using a sample of 312 French firms that went public over the period 1997–2016, we find that IPOs with lockup agreements are more likely to disclose conservative earnings forecasts. In particular, we provide evidence that IPOs with more locked-up shares and those selecting longer lockup periods, have more accurate management earnings forecasts. In other words, managers of firms with a higher proportion of shares locked up and longer lockup agreements experience greater costs of non-diversification of idiosyncratic risk. They tend, thus, to provide more conservative and accurate forecasts to prevent costs arising from earnings forecast error. These results are robust to a number of sensitivity tests.

Keywords: Lockup; Initial public offerings; Management earnings forecasts; France

1. Introduction

The finance literature recognizes that firms going public may face severe problems arising from information asymmetries between corporate insiders and investors during the initial public offering (IPO) process (see, e.g., Brav and Gompers, 2003; Courteau, 1995; Hughes, 1986). Previous studies show that these problems could be mitigated through underpricing (Allen and Faulhaber, 1989; Chemmanur, 1993; Ellul and Pagano, 2006), venture capital backing (Barry et al., 1990; Megginson and Weiss, 1991), prestigious underwriter backing (Carter and Manaster, 1990), and engaging reputable auditors (Titman and Trueman, 1986).

In the same vein, Hughes (1986) argues that voluntary disclosure plays a major role in reducing information asymmetries between issuers of IPOs and investors. Voluntary disclosure may represent a signaling mechanism that helps to discriminate between high and low quality firms. This author identifies management earnings forecasts in an IPO prospectus as a potential signal of firm quality. Moreover, a growing body of literature shows that lockup commitments can also serve as signaling devices to communicate the inherent quality of IPO firms (Bradley et al., 2001; Brav and Gompers, 2003; Courteau, 1995; Field and Hanka, 2001).

This study extends the growing body of literature on the signaling role of earnings forecast disclosures (Boubaker et al., 2017; Boubaker and Labégore, 2006; Chen and Firth, 1999; Cheng and Firth, 2000; Clarkson et al., 1992; Firth, 1998; Jog and MacConomy, 2003; Mak, 1996, among others) by examining the link between lockup agreements and earnings forecast disclosures in IPO prospectuses. Specifically, this paper addresses the following research question: Is there a relation between lockup characteristics and management earnings forecasts of IPO firms?

In lockup periods, the initial shareholders are prevented from selling their equity holdings. On NASDAQ, this time period is generally 180 days after publication of the IPO prospectus. However, in some cases, the period can span from 120 days to 1 year. Under certain conditions, if shareholders have beneficially owned their shares for less than two years, they submit to specific rules of the Securities and Exchange Commission (SEC), and in particular the SEC rule 144. This rule obliges them to make

public their sales of shares and to fix quotas for these transfers so as not to dramatically affect stock prices.

Prior to January 2000, U.S. regulation imposed compulsory lockup agreements only for firms with a trading history of less than 3 years. Since January 2000, lockup contracts have not been mandatory and have become voluntary contracts in which both underwriters and issuers jointly determine the length of the lockup period. However, most firms adopt lockup agreements. In Germany, all pre-IPO shareholders that still own shares immediately after the firm locks up are subject to mandatory lockups. The initial shareholders must be locked up for 6 months with 100% of their shares. The French regulation provides companies with a choice between preserving their shares for 180 days for 100% of shares or for 360 days for 80% of shares. On the Second Market in France, there is no obligation on this matter, but certain companies make such commitments.

In this study, we use management earnings forecast data obtained from a sample of 312 prospectuses of French IPO firms over the period 1997–2016. We find that IPO firms with more shares to lock up, and those selecting longer lockup periods exhibit more conservative and accurate earnings forecasts. These results are robust to a battery of robustness checks, including, among others, the use of an alternative measure of earnings forecast errors and excluding the crisis years.

This study contributes to the literature in several ways. First, it is, to the best of our knowledge, among the first to examine the impact of lockup structure on IPO earnings forecast accuracy. Specifically, it investigates the relation between (i) length of lockup period, and (ii) percentage of equity locked up by shareholders on the credibility of earnings forecasts. Second, this research adds to the literature on the determinants of earnings forecast accuracy of newly-listed firms (e.g., Mak, 1994; Jaggi, 1997; Labégorre and Boubaker, 2005). Thus, it offers new evidence to the debate on the role of lockup agreements in IPO firms (e.g., Field and Hanka, 2001; Brav and Gompers, 2003).

Lockup agreements in France, like many other countries, prevent the initial shareholders of IPO companies from selling a specific amount of their equity for a

contractually specified post-IPO period. Yet, newly listed firms in France, unlike in the United States, are allowed to present their earnings management forecasts in their prospectuses. This helps observing the relationship between lockup commitments and the quality of earnings forecast information in French IPO prospectuses.

The remainder of this paper proceeds as follows. Section 2 provides a brief institutional background description relating to lockup agreements and management earnings forecasts, and develops the main hypotheses. Section 3 describes the sample and defines the variables that are used in the analysis. Section 4 explains model specifications and discusses the results of the empirical analyses. Section 5 summarizes the paper and concludes.

2. Background and hypotheses

This section presents arguments suggesting a potential relation between lockups and IPO earnings forecasts. We first present a background description of the earnings forecasts in IPO prospectuses. We then provide a brief discussion of the structure of lockup contracts and develop our research hypotheses on how lockup agreements affect earnings forecasts in IPO prospectuses.

2.1. Earnings forecast disclosure

There is a large body of literature that focuses on management earnings forecasts due to the importance of the issue to investors (Wang et al., 2008; Abhayawansa and Abeysekera, 2009). Verrecchia (1983) claims that earnings forecasts play a significant signaling role since their publication provides investors with private information. In the same vein, Firth (1998) and Cheng and Firth (2000) demonstrate that disclosure of future earnings forecasts in the IPO prospectuses can be an important signal that helps in valuing firms. In fact, accurate forecasts mitigate information asymmetry between managers and investors and thus lower agency costs. Moreover, an IPO that provides accurate and reliable disclosure ensures lower information asymmetry and signals to outsiders that the firm is performing better than its peers (Miller, 2002).

The past three decades have witnessed a tremendous amount of academic research on IPOs. However, only a limited number of studies examine the determinants and accuracy of earnings forecasts in IPO prospectuses (e.g., Clarkson et

al., 1989; Keasey and McGuinness, 1991; Firth and Smith, 1992; Firth et al., 1995; Jelic et al., 1998; Jog and McConomy, 2003; Mbuthia and Ward, 2003; Jaggi et al., 2006; Gounopoulos, 2011; Cormier et al., 2014). For instance, Keasey and McGuinness (1991) argue that including an earnings forecast in an IPO firm's prospectus depends upon its competitive position. Cormier et al. (2014) provide evidence that Canadian IPO firms with better governance are less likely to voluntarily disclose earnings forecasts in their prospectuses.

Moreover, previous studies on the accuracy of management earnings forecasts have reported mixed results. In this vein, Keasey and McGuinness (1991), Mbuthia and Ward (2003), and Jaggi et al. (2006) show that, on average, managers of IPO firms underestimate future earnings, while Firth and Smith (1992) and Hartnett and Romcke (2000) find negative average forecast errors, implying that managers of IPOs are optimistic in their earnings forecasts. Previous studies also show mixed results concerning the magnitude of absolute forecast errors. In this respect, Keasey and McGuinness (1991) and Jaggi (1997) find an average absolute forecast error of 11% (in Singapore) and 12.79% (in Hong Kong), respectively. Other studies, however, report an average absolute forecast error of more than 80% (e.g., Mak, 1989; Firth and Smith, 1992; Hartnett and Romcke, 2000).

2.2. Lockup Agreements

A large number of studies on IPOs examine the usefulness of lockup agreements. Brav and Gompers (2003) focus on the determinants of lockup period and consider three objectives to the use of lockup provisions: (i) a signaling mechanism to adverse selection problem; (ii) a commitment mechanism to moral hazard problem, and (iii) a rent extraction solution by powerful underwriters. These authors find evidence that lockup is an effective bonding device to overcome post-IPO moral hazard problems. However, they reject the hypothesis that lockup is a signaling device to an adverse selection problem. Brau et al. (2015) revisit this research area and find support for the concern that insiders signal their quality using longer lockup period since it is associated with larger asymmetric information and lower idiosyncratic risk.

Many other studies were also carried to explain existing contradictory findings. Using a sample of 4,025 IPO firms between 1988 and 2006, Yung and Zender (2010) argue that IPO issues are likely to lock in their shares for a long period to alleviate both moral hazard and information asymmetry problems subsequent to the IPO. Karpoff et al. (2013) analyze 2,579 SEOs from 1996 to 2006 and treat lockup agreements as a contracting solution to asymmetric information phenomenon between insiders and new investors. Their results give support to the idea that lockups help to ensure the quality of an issue to the outside investors. In the same thread, Hoque (2014) examines a sample of UK IPOs listed between 1999 and 2006 and find evidence that lockups mitigate post-IPO moral hazard problems.

2.3. Hypotheses development

At the time of flotation, the quality of a particular firm is not apparent to outside investors. High quality firms may be concerned that potential investors would not be willing to pay a high price for their equity. Even if stock issues are, on average, fairly priced, high quality firms would still suffer from mispricing losses, because they are pooled with low firms. Hence, investors could be not able to distinguish between high quality and low quality firms. In contrast, incumbent shareholders, who are involved in firm management, tend to have a better picture of the firm's prospects. They are more inclined to make optimistic forecasts to achieve a better offering price, but there are mechanisms that can mitigate this opportunistic behavior such as lockups. IPO lockup agreements give insiders motivation to provide truthful earnings forecasts and can guarantee investors that insiders remain committed to the firm until such time when more information concerning future earnings prospects are divulged to the public through news, analyst reports, and regulatory filings.

Following Leland and Pyle (1977), Courteau (1995) argues that the length of the lockup could serve as a mechanism to reduce asymmetric information, and thus as a signal of firm quality. This author claims that high quality IPOs signal their quality by implementing longer lockups. Moreover, Brav and Gompers (2003) document that lockup agreements play a significant role in alleviating moral hazard, signaling the quality of issuing firms and generating additional profit to the underwriter.

In a similar vein, Chong and Ho (2007) claim that managers of firms with longer lockup periods are associated with longer periods of non-diversification of idiosyncratic risk. As a consequence, entrepreneurs tend to provide more conservative and more accurate forecasts to avoid the costs related to forecast errors, which can negatively affect the wealth of insiders and the long-term performance of the firm.

The foregoing reasoning leads to the following hypotheses:

H1: *Firms with a higher percentage of shares locked up issue more conservative earnings forecasts.*

H2: *Firms with longer lockup periods issue more conservative earnings forecasts.*

3. Data and variables

This section describes data sources and sample selection procedure. It defines the variables used in our analysis and provides descriptive statistics.

3.1. Sample selection and data sources

Our initial sample consists of all French IPOs listed between 1997 and 2016 on the *Second Marché* and *Nouveau Marché*. We first eliminate financial corporations (SIC codes 6000-6999) and IPOs from utility industries (two-digit SIC code 49) because their earnings are highly regulated. We exclude foreign IPOs, transfers between market compartments, as well as issues listed on the over-the-counter market (*Marché Libre*). We also discard firms with missing financial data. This process yields a final sample of 312 IPOs. Financial and specific information concerning IPOs are gathered from IPO prospectuses, annual reports published on firm websites and the website of the Financial Market Authority¹.

Table 1 presents the distribution by year (Panel A) and by industry (Panel B) of the full sample as well as the forecasters' subsample. In Panel A, we observe a significant decrease in the proportion of forecasters over the 2005–2016 period (less than 40%) compared to the previous period. This finding could be due to the reform of the Paris Stock Exchange implemented on 21 February 2005. Panel B of Table 1

¹ *Autorité des Marchés Financier* is the French equivalent of the SEC..

reports the distribution of our sample firms by industry². The two industries that have a higher percentage of IPOs are services (41.91%) and consumer durables (18.32%). Note also that 81.48% (79.41%) of IPOs in the leisure (textile & trade) industry provide an earnings forecast in their prospectuses, while only 47.50% of the basic industry firms publish their earnings forecasts during the IPO. Table 2 presents the distribution of lockup periods. The mean (median) lockup lengths for forecasters are 14.2 (12.0).

[Insert Table 1 about here]

[Insert Table 2 about here]

3.2. Regression variables

Appendix A summarizes the definitions and measurement of all variables used in the analysis.

3.2.1. Dependent variable: Earnings forecast error

Following Chin et al. (2006), we compute earnings forecast errors as the difference between forecasted earnings and actual earnings, all scaled by total assets. Earnings are profits after tax and before extraordinary items. We define forecast error as:

$$FE_{it} = \frac{(FP_{it} - AP_{it})}{Total\ assets} \times 100 \quad (1)$$

where, FE is forecast error for the IPO; AP is the actual earnings of the IPO; and FP is the earnings forecast as provided in the IPO prospectus. The mean forecast error reflects the degree of bias in forecasting. If the forecasted earnings are lower than actual earnings, FE is negative, implying a pessimistic (conservative) bias in managers' forecasts, while a positive FE indicates an optimistic bias.

² We classify the industry of our sample firms using the Campbell (1996) industry classification. When we rerun the regressions by including industry variables, our findings remain qualitatively unchanged.

To proxy for the magnitude of forecast error, we use absolute forecast error (AFE), measured as follows:

$$AFE_{it} = |FE_{it}| \quad (2)$$

3.2.2. Variables of interest: Lockup agreements

We determine whether a firm has a lockup agreement by investigating IPO prospectuses. If it has an agreement, we check whether it is a voluntary contract and collect the expiration date of the lockup and the fraction of shares subject to lockup. We consider two lockup-related variables to proxy for the presence of voluntary lockup agreements and the characteristics of these contracts: (i) *LOCKUP_PER* is the percentage of shares subject to lockup; and (ii) *LOCKUP_LENGTH* is the number of months after the listing date during which the insiders agree not to sell a specified number of their shares.

3.2.3. Control variables

The literature identifies a set of factors that are expected to affect earnings forecast accuracy. These control variables included in the model are firm size, firm age, horizon forecast, financial leverage, ownership, and stock exchange.

Size is proxied using the natural logarithm of total assets in thousands of euros. It is argued that earnings forecast errors depend on firm size. Previous research shows that it is easier for large firms to generate credible forecasts, since they have more control of their market settings and more influence over the level of their profits (Chan et al., 1996; Chen et al., 2001). Also, large firms are usually more diversified, able to cope with economic fluctuations, and so are able to contend with unpredicted financial events (Firth and Smith, 1992; Hagerman and Ruland, 1997). Other studies document that large-sized firms benefit from more available information, more detailed disclosure strategies, and better predicting systems, since they are followed by more prestigious analysts (Mefteh-Wali et al., 2012).

HORIZON (*Horizon forecast*) is defined as the number of months between the date of issue of the prospectus and the first post-listing year-end of the company. Under certain circumstances, the horizon forecast may become a potential proxy for forecast

credibility. It has been argued that forecasts with a longer time horizon may make forecasting of the firm's earnings more complicated. Indeed, the longer the time lapse between the release of the forecast and the realization of the forecast, the more the firm will be associated with uncertainty (Jaggi, 1997). Therefore, short-term earnings are intrinsically easier to predict (Firth et al., 1995). Furthermore, Brown et al. (2000) suggest that the length of the forecast horizon is the most important determinant of earnings predictability.

LNAGE is proxied by the natural logarithm of the number of years between establishment of the firm and the IPO date. Earlier studies show evidence that age is negatively associated with forecast error. In fact, mature companies have longer experience, historical bases and are in a better position to control their market situation (Hartnett and Rômcke, 2000). However, firms that went public just a few years after their creation suffer from comparatively lower level of appreciation, so that they tend to provide a more optimistic picture of their future performance prospects (Firth et al., 1995; Jaggi, 1997).

LEVERAGE (Financial Leverage) is the ratio of total liabilities to total assets. The financial leverage of a company indicates the fraction of firm profit expensed as interest. In fact, firms with higher leverage face higher levels of debt, and so more risk factors (Jaggi, 1997; Chen et al., 2001). Eddy and Seifert (1992) claim that higher leverage can cause greater fluctuation in earnings and therefore make the earnings forecast process more uncertain and difficult. Thus, firms with important levels of debt are likely to experience more volatile earnings.

OWNERSHIP controls for the equity stock held by all inside board members. Several studies focus on ownership retained and its impact on management earnings forecasts. Most of this research emphasizes that forecast quality might be affected by the fraction of shares retained by insiders (Ajinkya et al., 2005). Firms with higher retained ownership face fewer information asymmetry problems (Leland and Pyle, 1977), hence, they are likely to provide conservative earnings forecasts. In other words, firms with higher retained ownership have incentives to signal their quality by

providing conservative forecasts. As a result, forecast accuracy increases in the case of high insider ownership.

NM (Nouveau Marché) is a dummy variable that equals 1 if a firm is listed on the *Nouveau Marché*, and zero otherwise. Prior French studies consider two distinct exchanges where most companies go public: the *Second Marché* and *Nouveau Marché*. While the *Second Marché* is designed to serve well-known and large companies, the *Nouveau Marché* was created to attract smaller-size offerings with a short history, mainly in high-technology industries. It follows then that firms undertaking an IPO on the *Nouveau Marché* are riskier than those choosing the *Second Marché* for listing. Furthermore, IPOs on the *Nouveau Marché* are required to generate forecast financial statements of at least a three-year history, but there are no such requirements for *Second Marché* offerings. According to Degeorge and Derrien (2001), managers are less conservative for *Nouveau Marché* IPOs, which is explained by the relationship between ex ante uncertainty and manager optimism.

3.3. Descriptive statistics

Table 3 provides summary statistics of the variables used in our analysis. On average, our sample IPOs lock up around 80% (median, 81.56%) of their post-IPO insiders' shares with a mean (median) lockup period of about 14 months (12 months). The forecast horizon ranges from less than two weeks (0.3) to slightly more than one year (12.36 months), with an average of 6.30 months. Furthermore, the sample includes newly founded (minimum age of 2 months) and old (maximum age of 115 years) firms, with an average age of more than 14 years. It also includes low-leveraged (minimum of 3.52%) and highly leveraged (maximum of 94.23) firms, with an average leverage ratio of 57.34%. In addition, pre-IPO insiders retain, on average, about 61.60% of their firms' shares. Moreover, 28.92% of the sample firms are listed on the *Nouveau Marché*. Panel B of Table 3 depicts Pearson (above the diagonal) and Spearman (below the diagonal) correlations between the regressors. The correlation coefficients between the independent variables used in the same specification are low, which provides some assurance that multicollinearity is not a serious problem. In addition, we calculate the

variance inflation factors (VIFs) for each specification as an additional test for multicollinearity. The VIFs do not exceed the critical value of 10 (Neter et al., 1989), with a maximum value of 2.2, implying that multicollinearity does not appear to pose a serious problem.

[Insert Table 3 about here]

Table 4 presents the distribution of forecast errors. As shown, 20.19% (22.76%) of forecast errors are less (greater) than -10% (10%) of the forecast errors. Moreover, 75.32 % of the earnings forecast are positive indicating that there is optimistic bias in the forecasts issued by the IPO firms.

4. Empirical Analysis

This section details the empirical model, presents and discusses the main results, and sets forth several sensitivity tests.

4.1. Empirical model

To empirically test our hypotheses, we estimate the following cross-sectional model:

$$\begin{aligned} FORECAST = & \beta_0 + \beta_1 LOCKUP + \beta_2 SIZE + \beta_3 HORIZON + \beta_4 LNAGE + \beta_5 LEVERAGE \\ & + \beta_6 OWNERSHIP + \beta_7 NM + Industry\ dummies + Year\ dummies \end{aligned} \quad (3)$$

The dependent variable is the earnings forecast error, which indicates the difference between the earnings forecast provided in the IPO prospectus and actual earnings, deflated by total assets. The key variable of interest is *LOCKUP*, which is predicted to be negative. Control variables are *SIZE*, *HORIZON*, *LNAGE*, *LEVERAGE*, *OWNERSHIP* and *NM*.

4.2. The voluntary earnings forecast disclosure decision

In this subsection, we examine the determinants that affect a firm's choice to issue an earnings forecast. Thus, we run a logistic regression that explains the decision of IPO firms to disclose voluntary earnings forecasts. In this case, the dependent variable *FORECAST* is a dummy variable that takes the value 1 when the firm provides an

earnings forecast in its prospectus, and 0 otherwise. We use the same set of independent variables as in Equation 3.

Table 5 reports the results of the logistic regression of *FORECAST*. First, we find that larger IPO firms are more likely to disclose an earnings forecast in their prospectuses. This finding implies that larger firms have more control of their market setting, making it easier to forecast (Cox, 1985; Firth and Smith, 1992; Brown et al., 2000; Chen et al., 2001). Managers of old firms are also more inclined to publish earnings forecasts in their IPO prospectuses as they have longer business experience and better capabilities to control the financial situation. In addition, *OWNERSHIP* appears to be positively related to voluntary disclosure of earnings forecasts. This result suggests that firms with higher retained ownership are more likely to forecast their profits, since they face fewer information asymmetry problems (Leland and Pyle, 1977). Because of differing listing requirements, firms listed in the *Nouveau Marché* are more likely to disclose their earnings forecasts in their prospectuses. We also find that firms in industrial sectors are more likely to issue forecasts compared to firms in other industries. The coefficient estimates of the other explanatory variables show the expected signs, but are not statistically significant.

[Insert Table 5 about here]

4.3. Evidence on the impact of lockup on earnings forecast errors

Tables 5 and 6 report regression results of Equation (3) using, respectively, earnings forecast bias (FE) and earnings forecast accuracy (AFE) as dependent variables. These tables present the results from ordinary least squares regressions for our sample IPOs over the 1997–2016 period. Each column in the tables represents a variant of the regression. In each specification, we consider two groups of independent variables. First, our main concern is the coefficient estimates for the lockup-related variables. Thus, we include in the first specification the variable *LP_PER*, which proxies for lockup agreement. This variable is equal to the percentage of shares subject to lockup. In the second specification, we use the variable *LP_LENGTH*, which indicates the lockup period. The second group consists of firm-specific characteristics

variables that have been shown in previous literature to affect earnings forecasts, namely, *SIZE*, *HORIZON*, *LNAGE*, *LEVERAGE*, *OWNERSHIP* and *NM*.

Table 6 provides empirical results for forecast bias. In all specifications, the VIFs are less than 2, indicating the absence of multicollinearity problems. The first specification includes the variable *LP_PER*, which equals the fraction of shares subject to lockup. The results show that the coefficient of this variable exerts a negative and significant impact (at the 1% level) on forecast errors. This finding indicates that IPOs of companies with a higher proportion of shares locked up experience small earnings forecast errors (H1). In the second specification, we use the variable *LP_LENGTH*, which is equal to the length of the lockup period in months. As expected, the coefficient of this variable is negative and statistically significant at the 1% level. This finding implies that longer lockup agreements are associated with smaller earnings forecast errors, which is consistent with H2. In sum, these findings provide support for our main hypotheses, which state that IPO firms with higher shares locked up and longer lockup period might be not able to diversify their idiosyncratic risk, thus providing more conservative forecasts.

With regard to the control variables, we report negative and highly significant coefficients for *SIZE*, showing that larger firms provide more conservative forecasts. Moreover, management in industrial-sector firms have incentive to provide conservative earnings forecasts. It seems that there is no difference in terms of forecast bias between firms that are listed on the *Nouveau Marché* and those on the *Second Marché*. The coefficient of *NM* is positive but statistically non-significant. Firm age, leverage and forecast horizon do not also seem to affect management earnings forecast bias.

[Insert Table 6 about here]

We now rerun our main regressions from Table 6 using earnings forecast accuracy (*AFE*) as a dependent variable rather than earnings forecast bias (*FE*). The results are reported in Table 7. We find that our previous results on the lockup variables remain qualitatively the same. In all specifications, the coefficients of the

variables *LP_PER* and *LP_LENGTH* are negative and statistically significant at the 1% level. These findings indicate that lockup agreements are associated with more accurate earnings forecasts. In other words, these results provide support for our hypotheses, which state that IPO firms with voluntary lockup agreements should have less absolute earnings forecast errors than other ones. This is consistent with the view that insiders of IPO firms with contractual lockup agreements, those selecting more shares to lockup or longer lockup periods have greater incentives to provide truthful earnings forecasts, since they are more exposed to more idiosyncratic risk.

Among the control variables included in the model, coefficient estimates for *SIZE* and *NM* confirm the predicted sign and are statistically significant. In particular, the coefficient of *SIZE* is consistent with previous research suggesting that larger companies are associated with a lower level of earnings forecast error, since they are typically more diversified and have more control over their market settings (Clarkson, 2000; Chen et al., 2001). Moreover, firms listed on the *Nouveau Marché* tend to achieve a significantly higher level of credibility. Specification (1) shows that the coefficient estimate on *OWNERSHIP* is negative and statistically significant at the 5% level. This suggests that the higher the percentage of shares retained by insiders, the more accurate are the earnings forecasts.

[Insert Table 7 about here]

4.4. Sensitivity tests

To check the robustness of our main findings, several supplementary tests are conducted. First, we carry out an additional regression analysis taking in account a possible selection bias since firm's characteristics can distinguish firms that publish earnings forecasts from others. Therefore, we use Heckman's (1970) two stage procedure to correct for this possible bias. In the first stage, we explain the decision to voluntarily publish earnings forecasts in the IPO prospectus. In the second stage, we explore the determinants of absolute forecast errors after correcting the sample selection bias using the inverse Mills ratio. The results are reported in Table 8.

In the first stage, we use probit regression model where the dependent variable, denoted *FORECAST*, is a dummy variable taking the value one if the IPO manager has

published earnings forecast results in the prospectus. As shown in the first-stage regression in Table 8, lockup length, firm size and insiders' ownership are associated with higher likelihood of disclosing earnings forecast in the prospectus. The second stage regression investigates the impact of lockup percentage (first specification) and lockup length (second specification) on the absolute forecast errors after correcting potential sample selection bias. As reported in Table 8, the coefficients of *LP_PER* and *LP_LENGTH* are negatively and significantly related to the absolute forecast errors, implying that managers of firms with lockup agreement (longer lockup period and larger IPO share lockup) are more likely to provide accurate earnings forecast. The results support our hypotheses (H1) and (H2). Regarding control variables, we find a significantly negative relationship between firm size and absolute forecast errors which indicates that large firms tend to publish more accurate forecasts. The estimated coefficients of insiders' ownership and Nouveau Marché are significantly positive, showing that firms with higher insider ownership and those listed in the Nouveau Marché are less likely to provide accurate predictions in their prospectuses. Generally, all the results are consistent with the baseline findings.

[Insert Table 8 about here]

To further strengthen the validity of our main results, we test whether our conclusions are robust to (i) using an alternative proxy for earnings forecast errors, (ii) modifying measurement of the lockup variable, (iii) excluding crisis years and (iv) dropping service-industry firms. All results are presented in Table 9.³

In the first specification of Table 9, we consider an alternative variable, square forecast error (SQFE), which proxies for earnings forecasts. The squared forecast error is calculated using the square of the forecast errors, which gives more weight to high errors. According to Firth and Smith (1992), SQFE better models the loss to investors due to an erroneous forecast. Specification (2) uses the natural logarithm of the lockup

³ For sake of brevity, we only include *LP_LENGTH*. Columns 2–4 (Table 9) report the results of regressions using absolute forecast error as the dependent variable. The results remain qualitatively similar when we use *LOCKUP_PER* as an alternative proxy for the importance of the lockup agreement.

period as an alternative measurement of the lockup variable. Specification (2) excludes firms that were listed during the global financial crisis of 2007–2008 from the sample. In the last specification, we drop firms operating in the services industry from the analysis as the results may be driven by firms from this particular industry due to their importance in our sample. Overall, none of these variations qualitatively affects our results.

[Insert Table 9 about here]

5. Conclusion

A large body of literature focuses on the quality of earnings forecasts in IPO prospectuses. This literature shows that many factors could affect IPO earnings forecast errors, such as corporate governance (Cormier et al., 2014) and underwriter reputation (Jelic et al., 2001). However, no attention has been given to the role of lockups in determining the accuracy of management earnings forecasts in IPOs.

This study improves our understanding of how lockup agreements affect the quality of management earnings forecasts. We hypothesize that IPOs with higher percentage of shares subject to lockup and longer lockup period experience more conservative and accurate earnings forecasts. Using a sample of 312 forecasts of French IPOs listed between 1997 and 2016, our empirical results suggest that lockup percentage and lockup period are positively associated with more accurate earnings forecasts. The underlying reasoning is consistent with Chong and Ho (2007), who predict that longer lockup periods correspond to longer periods of non-diversification of idiosyncratic risk. Insiders of firms selecting more shares to lockup and longer lockup periods tend to provide credible earnings forecasts because they are more exposed to idiosyncratic risk. Our findings are robust to a battery of robustness tests including the use of alternative proxies for earning forecast errors and lockup contacts, excluding the crisis period and discarding service-industry firms.

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Appendix A
Variable, Definitions, and Sources

Variable	Definition	Source
Panel A. Dependent variable		
<i>FE</i>	The forecast errors measured as the difference between forecast earnings and actual earnings, all scaled by total assets.	AMF website and Authors' calculation
<i>AFE</i>	It reflects the absolute deviation of actual earnings, from forecast earnings.	As above
Panel B. Independent variables		
<i>LOCKUP_PER</i>	The percentage of shares subject to lockup.	AMF website and Authors' calculation
<i>LOCKUP_LENGTH</i>	Lockup length in months.	As above
<i>SIZE</i>	The natural logarithm of the total assets in thousand of euros during the forecast period.	Worldscope
<i>HORIZON</i>	The number of months between the date of issue of the prospectus and the first post-listing year-end date.	AMF website and Authors' calculation
<i>LNAGE</i>	The natural logarithm of the number of years since establishment.	As above
<i>LEVERAGE</i>	Financial leverage measured as total liabilities over total assets.	Worldscope
<i>OWNERSHIP</i>	The capital retained by insiders measured as one minus the percentage of shares raised to the total outstanding shares.	AMF website and Authors' calculation
<i>NM</i>	A dummy variable set to one if the firm's IPO is on the <i>Nouveau Marché</i> , and zero otherwise.	As above

Table 1. Sample distribution by year and by industry

	Full Sample		Forecasters	
	Number	Percentage	Number	Percentage of Raw Total
Panel A : Distribution by Year				
1997	51	9.94	42	82.35
1998	105	20.47	80	76.19
1999	59	11.50	54	91.53
2000	59	11.50	58	98.31
2001	14	2.73	14	100
2002	8	1.56	7	87.50
2003	0	0.00	0	0
2004	8	1.56	6	75.00
2005	22	4.29	8	36.36
2006	55	10.72	15	27.27
2007	23	4.48	6	26.09
2008	4	0.78	1	25.00
2009	2	0.39	0	0.00
2010	14	2.73	4	28.57
2011	15	2.92	6	40.00
2012	9	1.75	1	11.11
2013	11	2.14	1	9.09
2014	19	3.70	3	15.59
2015	23	4.48	4	17.39
2016	12	2.34	2	16.67
Total	513	100	312	60.82
Panel B : Distribution by Industry				
Petroleum	4	0.78	2	50.00
Consumer durables	94	18.32	52	55.32
Basic industry	40	7.80	19	47.50
Food and tobacco	12	2.34	9	75.00
Construction	11	2.14	6	54.55
Capital goods	55	10.72	32	58.18
Transportation	21	4.09	11	52.38
Textiles & trades	34	6.63	27	79.41
Services	215	41.91	132	61.04
Leisure	27	5.26	22	81.48
Total	513	100	312	60.82

Notes: This table presents the sample distributions by year (Panel A) and by industry (Panel B). The sample consists of 513 French IPOs subsequently listed on the Euronext from January 1997 to December 2016.

Table 2. Distribution of lockup lengths

Lockup Period	Forecasters	
	Number	Percentage
6 Months	34	10.89
12 Months	219	70.19
>12 months	59	18.92
Total	312	100
Mean (Months)		14.2
Median (Months)		12.0

Notes: This table presents the distribution of lockup period for the forecasters.

Table 3. Summary statistics and correlations

Variables	<i>LOCKUP_PER</i>	<i>LOCKUP_LENGTH</i>	<i>SIZE</i>	<i>HORIZON</i>	<i>LNAGE</i>	<i>LEVERAGE</i>	<i>OWNERSHIP</i>	<i>NM</i>
Minimum	10.000	3.000	8.457	0.300	-1.833	0.035	0.000	0.000
Median	81.558	12.000	10.667	6.161	2.303	0.546	0.627	0.000
Mean	80	14.238	12.076	6.300	2.671	0.573	0.616	0.289
Maximum	100.000	36.000	23.592	12.367	4.745	0.942	0.964	1.000
Standard deviation	8.845	7.896	3.264	2.528	2.291	0.175	0.191	0.458

Variables	<i>LOCKUP_PER</i>	<i>LOCKUP_LENGTH</i>	<i>SIZE</i>	<i>HORIZON</i>	<i>LNAGE</i>	<i>LEVERAGE</i>	<i>OWNERSHIP</i>	<i>NM</i>
<i>LOCKUP_PER</i>	1.000	-0.528****	0.086*	-0.035	-0.097**	-0.084*	-0.110**	0.097**
<i>LOCKUP_LENGTH</i>	-0.227***	1.000	-0.075	-0.034	-0.027	0.043	-0.050	0.146***
<i>SIZE</i>	0.039	-0.106**	1.000	0.051	-0.011	0.115**	0.004	0.071
<i>HORIZON</i>	-0.023	-0.045	0.087*	1.000	0.047	-0.048	-0.042	0.023
<i>LNAGE</i>	-0.085*	-0.077	-0.021	0.052	1.000	0.068	0.119**	-0.174***
<i>LEVERAGE</i>	-0.027	0.119**	-0.002	0.000	-0.081*	1.000	0.133***	-0.231***
<i>OWNERSHIP</i>	-0.035	-0.140***	-0.041	-0.073	0.083*	-0.078	1.000	-0.377***
<i>NM</i>	0.100**	0.292***	0.203***	0.016	-0.188***	-0.051	-0.331***	1.000

Notes: Panel A of this table provides summary statistics of the variables used in the analysis. Panel B shows Pearson (below the diagonal) and Spearman (above the diagonal) correlation coefficients between the independent variables used in the regressions. The sample consists of 312 French IPOs over the period 1997–2016. *LOCKUP_PER* is the percentage of shares locked up. *LOCKUP_LENGTH* is the lockup period in months. *SIZE* equals to the natural logarithm of the total assets in thousand of euros. *HORIZON* is the number of months between the date of issue of the prospectus and the first post-listing year-end date. *LNAGE* is the natural logarithm of the number of years since establishment. *LEVERAGE* is financial leverage measured as total liabilities over total assets. *OWNERSHIP* is the capital retained by insiders measured as one minus the percentage of shares raised to the total outstanding shares. *NM* is a dummy variable set to one if the firm's IPO is on the *Nouveau Marché*, and zero otherwise.

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

Table 4. Descriptive statistics of forecast errors

Range in percentage	Number	Percentage
FE > 0.1	71	22.76
0.0 < FE ≤ 0.1	164	52.56
-0.1 < FE ≤ 0.0	14	4.49
FE ≤ -0.1	63	20.19
Total	312	100
Mean		0.031
Median		0.018

Notes: This table presents the descriptive statistics of forecast errors.

Table 5. Logistic regression of voluntary forecast disclosure

Variables	Coefficient	t-statistic
INTERCEPT	-3.8989d	4.40***
SIZE	0.1821	3.51***
HORIZON	-0.0326	-0.77
LNAGE	0.2062	1.75*
LEVERAGE	-0.1515	-0.88
OWNERSHIP	1.7586	2.69***
NM	1.1896	3.69***
INDUSTRY	Yes	Yes
YEARS	Yes	Yes
<i>Observations</i>		513
Pseudo R ²		0.1282***

Notes: This table presents the estimation results from the logistic regression of voluntary earnings forecast disclosure on its determinants. The dependent variable is FORECAST which takes one if the IPO firm provides an earnings forecast in its IPO prospectus and 0 otherwise. SIZE equals to the natural logarithm of the total assets in thousand of euros. HORIZON is the number of months between the date of issue of the prospectus and the first post-listing year-end date. LNAGE is the natural logarithm of the number of years since establishment. LEVERAGE is financial leverage measured as total liabilities over total assets. OWNERSHIP is the capital retained by insiders measured as one minus the percentage of shares raised to the total outstanding shares. NM is a dummy variable set to one if the firm's IPO is on the *Nouveau Marché*, and zero otherwise. Industry dummies and year dummies are included but not reported in the table.

*** Significant at the 1% level

* Significant at the 10% level.

Table 6. OLS regression results of FE

Variable	Expected sign	(1)	(2)
INTERCEPT		25.3351*** (3.69)	12.6422*** (2.47)
<i>LP_PER</i>	-	-0.2356*** (-3.55)	
<i>LP_LENGTH</i>	-		-0.1833*** (-2.66)
<i>SIZE</i>	-	-0.6460*** (-4.02)	-0.7618*** (-4.59)
<i>HORIZON</i>	+	0.0735 (0.37)	-0.0203 (-0.10)
<i>LNAGE</i>	-	0.0756 (0.14)	0.0564 (0.11)
<i>LEVERAGE</i>	+	-0.0615 (-0.38)	0.0050 (0.03)
<i>OWNERSHIP</i>	+	3.9218 (1.40)	3.0232 (1.06)
<i>NM</i>	+	1.7866 (1.40)	1.6086 (1.25)
<i>INDUSTRY</i>	.	Yes	Yes
<i>YEARS</i>	.	Yes	Yes
<i>Observations</i>		312	312
<i>Adjusted R²</i>		0.062***	0.098**
<i>F-value</i>		4.2736***	3.4341***

Notes: This table presents the estimation results from regressing earnings forecast errors (bias) on lockup-related proxies and control variables. In column 1, LOCKUP_PER is the percentage of shares locked up. In columns 2, we replace LOCKUP_PER with LOCKUP_LENGTH, which is the lockup period in months. SIZE equals to the natural logarithm of the total assets in thousand of euros. HORIZON is the number of months between the date of issue of the prospectus and the first post-listing year-end date. LNAGE is the natural logarithm of the number of years since establishment. LEVERAGE is financial leverage measured as total liabilities over total assets. OWNERSHIP is the capital retained by insiders measured as one minus the percentage of shares raised to the total outstanding shares. NM is a dummy variable set to one if the firm's IPO is on the *Nouveau Marché*, and zero otherwise. Industry dummies and year dummies are included but not reported in the table .

*** Significant at the 1% level

** Significant at the 5% level

*Significant at the 10% level

Table 7. OLS regression results of AFE

Variable	Expected sign	(1)	(2)
INTERCEPT		21.1152*** (3.12)	12.8983** (2.55)
<i>LP_PER</i>	-	-0.1724*** (-2.68)	
<i>LP_LENGTH</i>	-		-0.1714*** (-2.60)
<i>SIZE</i>	-	-0.7915*** (-5.09)	-0.8962*** (-5.62)
<i>HORIZON</i>	+	0.1049 (0.55)	0.0273 (0.14)
<i>LNAGE</i>	-	-0.0017 (-0.01)	-0.0220 (-0.04)
<i>LEVERAGE</i>	+	-0.0411 (-0.26)	0.0211 (0.13)
<i>OWNERSHIP</i>	+	4.4783* (1.69)	3.6956 (1.35)
<i>NM</i>	+	2.6660** (2.14)	2.7168** (2.16)
<i>INDUSTRY</i>	.	Yes	Yes
<i>YEARS</i>	.	Yes	Yes
<i>Observations</i>		312	312
<i>Adjusted R²</i>		0.070***	0.071***
<i>F-value</i>		4.8343***	4.7872***

Notes: This table presents estimation results from regressing absolute earnings forecast errors on lockup-related proxies and control variables. In column 1, LOCKUP_PER is the percentage of shares locked up. In columns 2, we replace LOCKUP_PER with LOCKUP_LENGTH, which is the lockup period in months. SIZE equals to the natural logarithm of the total assets in thousand of euros. HORIZON is the number of months between the date of issue of the prospectus and the first post-listing year-end date. LNAGE is the natural logarithm of the number of years since establishment LEVERAGE is financial leverage measured as total liabilities over total assets. OWNERSHIP is the capital retained by insiders measured as one minus the percentage of shares raised to the total outstanding shares. NM is a dummy variable set to one if the firm's IPO is on the *Nouveau Marché*, and zero otherwise. Industry dummies and year dummies are included but not reported in the table.

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

Table 8. Heckman selection model

	Stage-one : FORECAST		Stage-two : AFE	
INTERCEPT	-7.6182*** (-6.7942)	INTERCEPT	0.2352*** (4.1599)	0.1405*** (4.2484)
LP_LENGTH	0.2358*** (4.3095)	LP_PER	-0.0017*** (-2.7469)	
SIZE	0.1334*** (2.9044)	LP_LENGTH		-0.0017*** (-2.7040)
HORIZON	0.0461 (1.3011)	SIZE	-0.0078*** (-5.3142)	-0.0087*** (-5.7976)
LNAGE	0.1081 (1.2127)	HORIZON	0.0010 (0.5244)	0.0002 (0.0943)
LEVERAGE	1.1535* (1.8013)	LNAGE	-0.0008 (-0.1728)	-0.0008 (-0.1680)
OWNERSHIP	1.8449*** (3.5375)	LEVERAGE	-0.0004 (-0.2674)	0.0002 (0.1171)
NM	9.4184 (0.0003)	OWNERSHIP	0.0453* (1.7341)	0.0378 (1.4430)
INDUSTRY	Yes	NM	0.0257** (2.1871)	0.0256** (2.1774)
YEARS	Yes	LAMBDA	0.0749** (2.4311)	0.0762** (2.5174)
		INDUSTRY	Yes	Yes
		YEARS	Yes	Yes
Log likelihood			208.46	208.34
Wald Chi2			39.81	39.56
Observations	513		312	312

The table reports the regression results using Heckman's (1979) two-stage selection model. In the first stage, the earnings forecast disclosure (FORECAST) is explained using a probit model. FORECAST is a dummy variable that takes the value 1 when the firm provides earnings forecast in its IPO prospectus and 0 otherwise. In the second stage, we include the inverse Mills ratio to control for potential sample selection problem in our baseline equation. We estimate two specifications where the dependent variable is the absolute forecast errors AFE. The variable of interest is LOCKUP_PER (first specification) and LOCKUP_LENGTH (second specification). LOCKUP_PER is the percentage of shares locked up. LOCKUP_LENGTH is the lockup period in months. The control variables are the following: SIZE equals to the natural logarithm of the total assets in thousand of euros. HORIZON is the number of months between the date of issue of the prospectus and the first post-listing year-end date. LNAGE is the natural logarithm of the number of years since establishment. LEVERAGE is financial leverage measured as total liabilities over total assets. OWNERSHIP is the capital retained by insiders measured as one minus the percentage of shares raised to the total outstanding shares. NM is a dummy variable set to one if the firm's IPO is on the *Nouveau Marché*, and zero otherwise. Industry dummies and year dummies are included but not reported in the table.

*** Significant at the 1% level

** Significant at the 5% level

*Significant at the 10% level

Table 9. Sensitivity tests

Variable	Alternative forecast error metric SQFE	Alternative lockup variable	Excluding 2007–2008 firms	Excluding service-industry firms
	(1)	(2)	(3)	(4)
<i>INTERCEPT</i>	501.7051 (1.16)	25.1604*** (4.18)	0.1482*** (4.39)	8.7769*** (3.44)
<i>LP_LENGTH</i>	-13.4125** (-2.37)		-0.0020*** (-3.00)	-0.0903** (-2.31)
<i>LN(LP_LENGTH)</i>		-5.2420*** (-4.39)		
<i>SIZE</i>	-28.6813** (-2.11)	-0.9275*** (-5.99)	-0.0090*** (-5.73)	-0.7150*** (-8.59)
<i>HORIZON</i>	0.4073 (0.03)	-0.0244 (-0.13)	0.0003 (0.14)	0.1553 (1.52)
<i>LNAGE</i>	6.0870 (0.14)	-0.0745 (-0.15)	-0.0017 (-0.33)	-0.0177 (-0.06)
<i>LEVERAGE</i>	2.7189 (0.20)	0.0498 (0.32)	0.0002 (0.14)	0.8835 (0.36)
<i>OWNERSHIP</i>	50.7570 (0.27)	3.8068 (1.43)	0.0369 (1.36)	3.224** (2.08)
<i>NM</i>	167.8727 (1.57)	0.7261** (2.26)	0.0261** (2.13)	1.7695** (2.46)
<i>INDUSTRY</i>	Yes	Yes	Yes	Yes
<i>YEARS</i>	Yes	Yes	Yes	Yes
<i>Observations</i>	312	312	304	180
<i>Adjusted R²</i>	0.019	0.110***	0.099***	0.272***

Notes: This table reports the results of sensitivity tests. For sake of parsimony, only results using LP_LENGTH are reported in this table. In column 1, the dependent variable is the square forecast error. In column 2, we use an alternative Lockup-related variable namely, the natural logarithm of LP_LENGTHTH. In column 3, we exclude firms listed during the crisis period (2007–2008). The dependent variable in the last three columns is the absolute forecast errors (AFE). SIZE equals to the natural logarithm of the total assets in thousand of euros. HORIZON is the number of months between the date of issue of the prospectus and the first post-listing year-end date. LNAGE is the natural logarithm of the number of years since establishment. LEVERAGE is financial leverage measured as total liabilities over total assets. OWNERSHIP is the capital retained by insiders measured as one minus the percentage of shares raised to the total outstanding shares. NM is a dummy variable set to one if the firm's IPO is on the Nouveau Marché, and zero otherwise. Industry dummies and year dummies are included but not reported in the table.

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level