The Decision to Voluntarily Provide an IPO Prospectus Earnings Forecast:

Theoretical Implications and Empirical Evidence

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Abstract:

This paper explores the conditions under which owners and managers of private firms going public will want to directly provide an earnings forecast in their IPO prospectus. The theoretical model developed in this paper indicates the conditions under which a firm will choose to not make a forecast, and also characterizes the level of the earnings forecast chosen by firms that do decide to forecast. The model implies that the potential costs of missing an earnings forecast for firms with volatile earnings can combine with an absence of credibility of smaller, less well-known, or younger companies to increase the expected costs and reduce the valuation benefits to the point where the direct provision of an earnings forecast in an IPO prospectus is unwarranted. Theoretical implications of the model concerning the characteristics of firms that choose to make forecasts and the long-run performance of forecasting versus non-forecasting firms are empirically tested using Australian IPOs during the time period 1991 to 1997 when the decision as to whether a private company going would make an earnings forecast was completely voluntary. The study's results support the model's implications, and imply that younger, riskier companies should be able to have the flexibility to opt out of providing an earnings forecast in their prospectuses if the potential costs of a forecast inclusion outweighs the benefits.

1. Introduction

Earnings forecasts can be extremely important when valuing Initial Public Offerings (IPOs) since publicly available information concerning private companies is usually quite limited. This paper explores the conditions under which owners and managers of private firms going public will want to directly provide an earnings forecast in their IPO prospectus. A lack of public information concerning private companies, especially companies with a short earnings history, implies that the owners and managers of a private firm about to go public can be in a favourable position to provide IPO earnings forecast relative to potential subscribers to the issue as well as analysts who will subsequently follow the company, so it somewhat surprizing that IPO prospectuses in most countries do not contain earnings forecasts. Possible explanations for this phenomenon include the risks of providing an earnings forecast, especially in overly litigious environments where large penalties can be assessed if a forecast is missed, as well as the possibility that forecasts will not be believed. The theoretical model developed in this paper indicates the conditions under which a firm will choose to not make a forecast, and also characterizes the level of the earnings forecast chosen by firms that do decide to forecast. The model implies that the potential costs of missing an earnings forecast for firms with volatile earnings can combine with an absence of credibility of smaller, less well-known, or younger companies to increase the expected costs and reduce the valuation benefits to the point where the direct provision of an earnings forecast in an IPO prospectus is unwarranted.

Incentives to provide optimistic versus pessimistic earnings forecasts in an IPO prospectus earnings forecast are a direct outcome of considerations such as earnings variability, the expected level of earnings, past earnings histories, the marginal perceived credibility of earnings forecast, shareholder reactions to missed or exceeded forecasts, and the potential for legal penalties. The model assumes that issuing firms can actually benefit from the provision of an earnings forecast that can subsequently be met or exceeded, due to the anticipated credibility enhancement and the share price reactions that can occur, so it does not rely exclusively on potential penalties to create a scenario whereby an earnings forecast is a credible signal of firm value (see Hughes, 1986). The paper therefore also has direct implications for the earnings forecast bias literature (see Clarkson *et al*, 1991, Chen, Firth and Krishnan, 2001).

Theoretical implications of the model concerning the characteristics of firms that choose to make forecasts and the long-run performance of forecasting versus non-forecasting firms are empirically tested using Australian IPOs during the time period 1991 to 1997. This time period is useful for empirically examining the decision about whether a private company going should make an earnings forecast because forecasts were completely voluntary, and companies were not put under any overt pressure to make a forecast, as now happens. This led to close to half of issuing companies choosing to not make a forecast during the sample, in sharp contrast to the United States where most IPO prospectuses do not contain a forecast (presumably due to the heightened risk of litigation), or countries like New Zealand where prospectus forecasts are mandated.

An important issue addressed by the study's findings is whether it is advisable for Australia to continue to move towards encouraging universal inclusion of an earnings forecast in their IPO prospectus as opposed to allowing companies the flexibility to opt out of providing an earnings forecast if the perceived risk is too high. The study indicates that some companies, especially risky companies, should be able to have the flexibility to opt out of providing an earnings forecast in their prospectuses if the potential costs of a forecast inclusion outweighs the benefits. The analysis implies that forcing companies to forecast earnings in their prospectus, as occurs in New Zealand, is counter-productive. Australia offers an excellent setting for studying these issues because companies have the option of deciding whether or not to make a forecast.

A theoretical model of the decision to provide an IPO prospectus earnings forecast is provided in the third section of the paper following a brief literature review. The paper's data set is introduced in a fourth section, and empirical tests of the model's hypothesis are outlined in a results section. A brief discussion of the implications of the results concludes the paper.

2. Literature Review

The issue of whether an earnings forecast would be credibly received if it is provided in an IPO prospectus is directly related to the extensive literature that applies signalling theory to the valuation of IPOs. Numerous signalling mechanisms have been examined, such as retained ownership by insiders (Leland and Pyle, 1977), direct disclosure of cash flows that are subject to false disclosure penalties (Hughes, 1986), the level of underpricing of issuing firms (Allen and Faulhaber, 1989; Welch, 1989; Grinblatt and Hwang, 1989), and the quality of auditor and investment banker (Titman and Trueman, 1986).

Leland and Pyle's (1977) signalling model implies that the level of equity retained by the pre-offering shareholders (or issuers) provides investors with a signal concerning the quality of the firm. Since the costs of conducting an IPO with a high level of retained ownership is a lack of portfolio diversification, only issuers who have private information that suggests the true value of the firm is high would take this course of action. Hence, the issuer's fractional holding signals the firm's expected future cash flow. The higher the percentage of equity retained, the better the issuer's expectation of the firm's future returns.

Titman and Trueman (1986) develop a model wherein issuers have an incentive to signal their firm value through the quality of the investment bankers or auditors selected for the IPO. An issuer with favourable information about firm value chooses a high quality investment banker or auditor. The higher the quality level chosen, the higher is the investors' assessment of the firm's value.

A further signalling argument is developed based on the level of IPO underpricing (Welch 1989; Allen and Faulhaber 1989; Grinblatt and Hwang 1989). They argue that underpricing is, in fact, an instrument adopted by issuers to reveal corporation information to investors. In these models, issuers are assumed to have private information concerning the quality of their firm and can distinguish their own firm as high- or low-value based on expected future operating performance. High-value firms may choose to underprice their issues to signal to the market that they are high-value firms since they are confident about their future operational performance and expect to benefit sufficiently from higher prices later when making seasoned offerings. High-value firms therefore have no incentive to avoid underpricing. Low-value firms cannot offer this tradeoff because they do not expect the same relative level of future cashflows and dividends as high-value firms. Given this argument, the market value of the issuing firm should be positively correlated with the level of IPO underpricing.

Hughes (1986) signalling model directly relates a forecast as a signal (a cash flow forecast) to the valuation of IPOs. The Hughes model assumes that the potential for litigation if forecasts are missed is a sufficient penalty to ensure that forecasts provided in prospectuses are credible signals of IPO firm value. The anticipated penalty is endogenously adjusted in Hughes' model so that all but the lowest quality firms choose to make a prospectus forecast of future cash flows to signal the value of IPO firms' value. Related papers have looked specifically at whether earnings forecasts in IPO prospectuses are biased, and whether investors can anticipate this bias (Firth and Smith, 1992; Chen, Firth and Krishnan, 2001; Richardson and Sefcik, 1992). The literature on long run performance of companies that forecast is much less extensive (Firth, 1998; Jog and McConomy, 1999).

In contrast to signalling models of IPO valuation, Tinic (1988) examines the issue of whether IPO underpricing can be explained by IPO underpricing acting as insurance against possible legal liabilities of the underwriter and issuer as well as potential damage to the reputation of underwriter. In addition to costly lawsuits, issuers may face a higher cost of capital in future equity issues and litigation-prone investment banks may lose the confidence of their regular clients. The higher the offer price for an IPO, the higher the possibility that the IPO is overpriced. Consequently, the more likely is a future lawsuit. To protect against any potential lawsuit, the issuer and underwriter underprice the IPO. Lowry and Shu (2002) supports the litigation-risk hypothesis, and indicates that underpricing has not only an insurance effect but also a litigation deterrence effect that lowers the expected costs of litigation.

Recent empirical research indicates that earnings forecasts are important for valuation. Kim and Ritter (1999) note that accounting information is very important in the valuation of IPOs because it is often the only information that is available to investors. Price – earnings ratios, market to book ratios, and price to sales multiples are used in their "comparable firms" analysis of IPO valuation, and it is apparent that earnings forecasts provide valuable information for valuation purposes, much more so than historical earnings information.

3. Earnings Forecast Model

3.1. Comparable Firms IPO Valuation

The benefits and potential costs of providing an earnings forecast in an IPO prospectus can be analyzed in relation to the "comparable firms" valuation model, a standard approach for valuing new issues (Kim and Ritter, 1999; Purhanandam and Swaminathan, 2001). A comparable firms valuation of an IPO is equal to expected future earnings per share $E(e_1)$ times an appropriate price-earnings ratio PE, where the appropriate price-earnings ratio is obtained by evaluating the price-earnings ratios of publicly traded firms in the same industry as the IPO that have similar expected long term growth rates and risk profiles:

$$V = PE[E(e_1)] \tag{1}$$

In the absence of the provision of an earnings forecast in the IPO prospectus, investors must form their own earnings per share forecast using all other information that is available to them. Information for non-public firms tends to be much more limited than the intensive media and analyst coverage provided to many traded firms, thus making the formation of an earnings expectation especially challenging for potential IPO investors.

The difficulties potential investors face when forming an earnings expectation for IPOs suggest that the provision of an earnings forecast in an IPO prospectus could be especially beneficial to potential investors. Owners and managers of private firms about to go public can be in a much more favourable position to make relatively accurate earnings forecasts than potential subscribers to the offerings or analysts who will subsequently follow the companies, thus providing much needed information with which the IPO can be valued by potential shareholders. Kim and Ritter (1999) empirically demonstrate that earnings forecasts are highly relevant when valuing IPO firms, and are much more informative than historical earnings. These observations suggest that issuers could benefit by directly supplying an earnings forecast in their IPO prospectus.

3.2. IPO Valuation Benefits from Providing a Prospectus Earnings Forecast

The potential valuation benefit of the provision of a prospectus forecast of future Earnings Per Share (EPS_1^*) depends upon the credibility of the earnings forecast.[1] Prior studies have shown that IPO prospectus earnings forecasts are informative, but they also tend to be upwardly biased, with the extent of the bias being dependent upon IPO firm characteristics (Firth 1998; Chen, Firth and Krishnan, 2001). It is therefore assumed that when a prospectus forecast is provided, investors make a revised earnings per share forecast $E(e_1^*)$ that is a function f of the prospectus Earnings Per Share forecast EPS_1^*:

$$E(e_1^*) = f(EPS_1^*). \tag{2}$$

where 0 \< f’ \< 1.

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[1] Hughes (1986) outlines assumptions and develops a resultant model that leads to the implication that only unbiased forecasts will be provided. No such model assumptions are imposed here, although tradeoffs outlined below provide incentives towards the provision of accurate forecasts.

The provision of a prospectus earnings forecast therefore results in a comparable firm IPO valuation V^* of

$$V^* = PE^* f(EPS_1^*), \tag{3}$$

where PE^* is the appropriate price-earnings ratio that is assigned to the firm following the provision of the earnings forecast. The direct valuation benefit to the issuer of the provision of an earnings forecast is the difference between valuation formulae (3) and (1), and it is dependent upon the level of the forecast provided as well as the credibility attached to the forecast (function $f(EPS_1^*)$).[2] Companies with insufficient earnings histories or other credibility problems can therefore, all else being equal, be expected to receive less of a valuation benefit from providing a forecast in their prospectus, even if they have a strong initial incentive to provide one. This is especially so for young firms with limited earnings histories.

The marginal valuation benefit to the issuer of providing a higher prospectus earnings forecast EPS_1^* is

$$\frac{dV^*}{dEPS_1^*} = PE^* * f'(EPS_1^*) + \Delta PE^* * f(EPS_1^*), \tag{4}$$

where $?PE^*$ is the marginal change (if any) in the appropriate comparable firm PE ratio that results from a marginally higher prospectus forecast. The first term is the direct marginal valuation benefit that results from an increase in the prospectus

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[2] It can be assumed, for simplicity, that the total number of shares to be issued is constant, so the effect of the provision of an IPO forecast on the issue price at which the IPO can be floated translates directly into an equivalent influence on the total value of the issue.

earnings forecast, and the second term is an indirect marginal valuation effect that occurs via the PE ratio.[3]

3.3. Other Potential Costs and Benefits of Providing a Prospectus Earnings Forecast

The potential valuation benefits of providing a forecast are offset by the risks of inadvertently (or opportunistically) providing a misleading forecast, especially in situations where the threat of litigation is strong (Tinic, 1988; Hughes, 1986). The downside to providing a forecast includes the anticipation of potential costs due to possible shareholder lawsuits, the possible effects on retained earnings of an adverse share price reaction to a missed forecast, reduced credibility for secondary offerings, and damage to the original owners and the underwriters' reputations if the forecast is missed. Adverse reputation effects and shareholder reactions that could be anticipated from missing a forecast (especially an overly optimistic forecast) can be an important risk consideration when deciding upon the level of the forecast to provide, or even whether to forecast.

The costs of missing the profit forecast ultimately depend upon the reaction of the stock price to the negative earnings surprize if the earnings forecast is missed. The anticipated cost of missing the earnings forecast can therefore be assumed to be dependent upon the extent to which the share price (S_1) falls in reaction to the earnings forecast shortfall at the time of the earnings forecast (time period subscript 1), relative to the initial share valuation placed upon the IPO by investors following

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[3] Changing the prospectus earnings forecast can indirectly affect the appropriate price-earnings ratio that is applied to the IPO, PE^*, if the earnings forecast credibly affects the long run earnings growth rate (g^*) that investors will anticipate. The provision of an earnings forecast can also affect the perceived risk of the IPO, and thus the appropriate PE ratio that is applied to the IPO.

the provision of the prospectus forecast, V^*. V^* serves as a base of comparison for the share price reaction, so the anticipated cost to the company of missing a prospectus forecast is therefore dependent upon the amount by which the share price (S_1) is less than V^*, and it is assumed to be a proportion *n* of this value. It is further assumed that the issuer perceives that the post-listing share value, S, will be lognormally distributed through time.[4] The expected value of the cost of missing the prospectus forecast can be estimated using the Black Scholes option pricing formula, where the expected cost of missing the forecast is equivalent to a written put option (P). The value of the anticipated cost (P) of missing the forecast is

$$P = n[V^* e^{-r(T-t)} N(-d_2) - SN(-d_1)]. \tag{5}$$

where r is the risk-free interest rate, (T-t) is the length of time between the date the IPO starts listing and the first earnings are reported, and N(-d1) as well as N(-d2) are as in the Black-Scholes formula. Proportion *n* would be much higher in countries with a high potential for shareholder lawsuits (like the United States), and is also higher when investors react strongly to whether or not the forecasts is met.

Firm managers and underwriters can also anticipate that they will receive important benefits if the prospectus profit forecast is exceeded. This anticipated gain would be due to factors such as retained holdings, increased credibility for a secondary offering, an enhanced entrepreneurial (or managerial) reputation for the original owners, and an enhanced underwriter reputation. This paper's model

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[4] It is important to note that the company's estimate of the initial post-listing share value, S, can be quite different from initial share valuation placed upon the IPO by investors following the provision of the prospectus forecast, V^*. This distinction has a greater importance in the situation where the

therefore adds an anticipated credibility enhancement and shareholder reaction role for earnings forecasts, so it does not rely exclusively on potential penalties to create a scenario whereby an earnings forecast is a credible signal of firm value (see Hughes, 1996).

Firms and their initial owners can anticipate that the benefits of exceeding the earnings forecast are also dependent upon the reaction of the share price relative to the initial share valuation placed upon the IPO by investors following the provision of the prospectus forecast, V^*. The anticipated payoff to the company for exceeding the prospectus forecast is therefore dependent upon the amount by which the share price (S_1) exceeds V^* at the time of the earnings announcement, and it is assumed to be a proportion *m* of this value. The expected value of the payoff to exceeding the prospectus forecast is equivalent to a call option, and can be valued using the Black Scholes option pricing formula. The value of the anticipated benefit of exceeding the forecast (C) is

$$C = m[SN(d_1) - V^* e^{-r(T-t)} N(d_2)]. \tag{6}$$

The anticipated benefit of exceeding a forecast can play a role in the decision of whether (and how) to forecast, but it would generally be assumed that the anticipated proportionate costs of missing a forecast (as determined by n) will be much greater than the anticipated proportionate benefits (as determined by m).

company provides an earnings forecast that it knows is misleading, and is also important when valuing the anticipated costs and benefits of missing or exceeding the forecast.

3.4. The IPO Prospectus Earnings Forecast Decision

The model can now be used to indicate the conditions under which a firm will choose to make a forecast, and also characterizes the level of the earnings forecast chosen by firms that do decide to forecast. The latter decision must be evaluated first, and it is based upon marginal analysis optimization.

The marginal benefit or cost of a higher prospectus forecast EPS_1^* on the anticipated gains or losses from exceeding or missing the profit forecast (see equations (5) and (6)) are derived by differentiating the Black Scholes call option value (C from equation (6)) minus the Black Scholes put option value (P from equation (5)) with respect to EPS_1^*:

$$\frac{d(C-P)}{dEPS_1^*} = -[PE^* f\,'(EPS_1^*) + \Delta PE^* f(EPS_1^*)]e^{-r(T-t)}[m(N(d_2) + nN(-d_2)]$$
$$+S[mN\,'(d_1) + nN\,'(-d_1)] - V^* e^{-r(T-t)}[mN\,'(d_2) + nN\,'(-d_2)] \quad (7)$$

Equation (7) has a negative value, because increasing the exercise price of a call hurts the holder, as does increasing the exercise price of a written put for the writer of the put. The total marginal benefit or cost (TMB) from adjusting the earnings forecast is the sum of marginal valuation benefit equation (4) and the marginal expected benefit equation (7):

$$\frac{d(TMB)}{dEPS_1^*} = [PE^* f\,'(EPS_1^*) + \Delta PE^* f(EPS_1^*)][1 - e^{-r(T-t)}(m(N(d_2) + nN(d2))]$$
$$+S[mN\,'(d_1) + nN\,'(-d_1)] - V^* e^{-r(T-t)}[mN\,'(d_2) + nN\,'(-d_2)] \quad (8)$$

Equation (8) is set equal to zero to determine the optimal earnings forecast if a company decides to issue a forecast. Equation (8) implies that profit forecasts will be conservative when the anticipated penalties for missing a forecast are high (high n), especially if forecasts are not necessarily credibly received (low f'*(EPS_1^*)*) or if earnings variability is high (relatively low PE^*, high N(-d2), etc.).

The decision to issue a forecast is dependent upon a determination of whether the valuation gains plus the anticipated benefits of exceeding a forecast minus the anticipated costs of missing the forecast are positive:

$$PE^* f(EPS_1^*) - PE[E(e_1)] + S[mN(d_1) + nN(-d1)] - V^* e^{-r(T-t)}[mN(d_2) + nN(-d2)]\} > 0. \quad (9)$$

Firms with good news to reveal that can credibly reveal it (high f(EPS_1^*)) will forecast, since the first term in inequality (9) will be higher, thus making it more likely to hold. It could be assumed that the earnings forecasts of young firms will be less credibly received, thus reducing $f(EPS_1^*)$ and making it less likely that inequality (9) will hold. It can therefore be hypothesized that young firms without a long earnings history will lack credibility and will therefore refrain from issuing a forecast. These same young, non-forecasting firms could see big share gains after their first post-prospectus profit report, since so little was expected of them. A similar implication for young firms that actually do decide to forecast is that they too can see big share price gains when they beat the market's low earnings expectations.

Firms with high earnings volatility will be much less inclined to issue a forecast, since optimizing condition equation (8) implies that firms with higher earnings volatility will issue more conservative forecasts, thus lowering f(EPS_1^*), and the effect will be reinforced if the anticipated penalty for missing the forecast (as determined by variable *n*) is high.

3.5. Earnings Forecast Model Hypothesis

The implications concerning the type of firms that will forecast, as developed using equations (9) and (8), can be stated formally as testable hypothesis:

H1: Companies with high earnings variability are less likely to provide forecasts in their prospectuses.

Corollary to H1: Companies from high risk industries are less likely to provide a forecast, (e.g., companies from the Mining industry).

H2: Companies with a relatively short operating history are less likely to provide forecasts in their prospectuses. Given the uncertainty involved in valuation that results from the lack of a forecast, their aftermarket performance will likely to be volatile.

H3: Since companies with high earnings variability and a relatively short operating history are less likely to issue a forecast, the valuation of their IPOs will be more difficult. This implies high underpricing in their first-day trading as compensation for the valuation uncertainty risk (see, e.g., Tinic, 1988).

H4: The companies that do not forecast are likely to outperform their industry average, given the difficulties in valuing their IPOs (since the market might initially undervalue them due to the relative lack of available information).

4. Data Sources and Summary Statistics

4.1. IPO Sample

The Australian IPO data cover IPOs issued in Australia during the period January 1990 – December 1997. Observations are obtained from the Securities Data Corporation IPO database and are cross-checked with the Australian Financial Review, Annual Reports of the Australian Stock Exchange, and the Huntley's Financial Database. The following criteria are employed:

a) The IPO must be a common stock IPO. Issues involving debt, hybrid securities and derivatives are excluded.

b) The IPO must be issued by an Australian-based company.

c) Any IPO without detailed prospectus and annual report information is excluded.

d) Closed-end Mutual Funds, Investment Trusts and Real Estate Investment Trusts (REITs) are excluded due to their unique institutional set-up.

The final sample consists of 154 Australian IPOs.

The distribution of IPOs by year is reported in Table 1. In the sample, almost one-third of IPOs choose not to report profit forecasts in their prospectuses. Amounts raised by forecasters tend to be three times higher than their counterparts. While average IPO underpricing for forecasters is 13.26% across years, non-forecasters show an average underpricing of 39.56%.

(Table 1 about here)

Table 2 presents the distribution of IPOs by industry. An important feature in the industry distribution of new issues is the relatively large proportion of non-forecasters in the natural resource industry. Within the total of 54 non-forecasters, 29 are from the Mining industry and 7 are from the Oil and Gas industry. In contrast, there are only 6 IPOs in the Mining industry and 4 in the Oil and Gas industry that provide profit forecasts. This indirectly supports the first hypothesis that IPO from high risk industries are less likely to provide profit forecasts. It is also noted that all IPOs in the Telecommunication industry choose not to forecast. In general, industrial sector IPOs make profit forecasts in their prospectuses.

(Table 2 about here)

4.2. Explanatory Variables

Tests of the hypotheses in this paper are associated with the use of a number of explanatory variables. This section describes these variables and descriptive statistics for the variables are also presented.

Earnings variability (*Histvo*l) is computed by using standard deviation of earnings before interest and tax (EBIT) for the three years prior to listing divided by the actual EBIT in the year after listing, expressed as a percentage.[5] If EBIT is not available, we then use operating profits after tax or sales revenue. This variable is somewhat consistent with a business risk ratio popularly used in ratio analysis, the coefficient of variation of operating profits. Since this variable is a scaled measure of volatility of historical earnings performance prior to listing, it can be used in a direct comparison across firms.

In addition to Histvol, another variable, Dperform, is also used to measure earnings variability. *Dperform* is a dummy variable; it is equal to 1 if at least one of the EBITs in the three years prior to listing is negative; otherwise is 0. This dummy variable was considered as a measure of corporate risk because an operating loss during any of the three years prior to listing would tend to indicate considerable uncertainty as to whether investors can be confident that future operating profits will be forthcoming subsequent to listing.

The variable *Age* is used to measure operating history of an IPO. This is the difference in days between the data of incorporation and the first listing date. Ritter

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[5] For most companies, the historical financial information prior to listing has only been presented using EBIT. The likely reason is that the corporate and tax structure under the current owner is not deeded meaningful for the future operations of the company.

(1991) studies long run performance of US IPOs and introduces age of the firm as a proxy for ex-ante risk, arguing that less established firms are likely to have more uncertain prospects than more established firms.

It can be expected that when compared with actual profit figures, profit forecasts may be subject to errors. Overestimation in these forecasts could leave the firms' directors and management exposed to legal liabilities associated with providing false and misleading information in the prospectus. Hence, an analysis on the quality of profit forecast sheds further lights on questions such as whether a firm should provide a voluntarily profit forecast in the IPO prospectuses. *FE* denotes forecasting error (%) and is calculated as the difference between actual operating profit after tax in the year after listing and forecasted operating profits after tax in the IPO prospectus divided by actual sales revenue in the year after listing. Again, it is a scaled measure which allows direct comparison across firms. Sales were used as a scaling factor rather than a variable such as earnings because of the possibility of zero or negative realized (or forecasted) earnings.

Summary statistics for the variables are provided in Table 3. Forecasting error ranges from an over-forecasting of 172.59% to an under-forecasting of 7.34%. While the average forecasting error is –4.91%, its standard deviation is 21.13%. The age of companies, on average, is about 10 years although the longest operating history is almost 100 years. While earnings variability ranges from an extremely low value of 0.02% to an extremely high value of 3.47%, the average earnings variability is 0.49%. The average underpricing is 23% with a standard deviation of 68%. This figure is comparable to other recent Australian IPO studies (e.g. Brailsford, et al. 2001)

(Table 3 about here)

Table 4 reports descriptive statistics for all variables by further classifying the IPO sample into forecasters and non-forecasters. It can be seen that the mean age of forecasters is almost three times higher than non-forecasters which supports the hypothesis that companies with longer operating histories tend to provide profit forecasts while companies with relatively short operating histories tend to avoid earnings forecasts. While average earnings variability for non-forecasters is 0.82% with a standard deviation of 0.64%, the mean and standard deviation of earnings variability are both lower for forecasters. In summary, the companies that make forecasts tend to have a longer operating history and lower earnings volatility.

(Table 4 about here)

5. Research Method

5.1. Probit Model

To examine the first two hypotheses developed in sub-section 3.5, a probit model is applied. The dependent variable in the model is a discrete-choice variable defined as follows:

$$P_t = \begin{cases} 1 \text{ if an IPO provided profits forecast in the prospectus;} \\ 0 \text{ if an IPO did not provide profits forecast in the prospectus} \end{cases}$$

After considering the problem of multicollinearity amongst explanatory variables,[6] three probit models are specified:

Model 1: $P_i = a_1 + a_2 histvol_i + e_{1,i}$

[6] The results are not reported here but are available upon request.

Model 2: $P_i = b_1 + b_2 AGE_i + e_{2,i}$

Model 3: $P_i = d_1 + d_2 Dperform_i + e_{3,i}$

where

$Histvol_t$ denotes earnings variability for company i;

AGE_t denotes operating history in days for company i;

$Dperform_i$ is a dummy variable; it is equal to 1 if at least one of EBITs for company i in the three years prior to listing is negative, and otherwise is 0;

$m_{1,t}$, $m_{2,t}$ and $m_{3,t}$ are the error terms.

5.2. Long Run Performance of IPOs

In this paper, the importance of profit forecasts in the IPO prospectus with respect to long run performance is also tested to provide a closer examination of the effect of providing an earnings forecast on the long run performance of IPOs.

Following Ritter (1991) and Firth (1997), abnormal returns are calculated as the difference between returns on the IPOs and returns on a benchmark (or a control firm).

Barber and Lyon (1997) analyze the empirical power and specification of test statistics in event studies and suggest that matching sample firms with control firms of similar sizes and book-to-market ratio yield well-specified test statistics. Due to the relatively small numbers of listed companies in the Australian stock market, it is difficult to follow the above approach. Therefore, each IPO firm is matched with their specific industry index. The industry-adjusted return for IPO i in event month t is defined as

$$ar_{i,t} = r_{i,t} - r_{j,t}$$

where

$r_{i,t}$ is the return on IPO i in month t; and

$r_{j,t}$ is the return on matched industry j in month t.

The initial return, $r_{i,t}$, is the relative difference between the market price of IPO i at the end of the first day's trading and the offer price. The industry benchmark comparison, $r_{j,t}$, is the return on the matched industry, j, from the IPO prospectus closing date to the end of the first trading day. Abnormal return in month 1 is measured as the closing price at the end of the first day to the end of the first month. Thereafter, abnormal returns are computed monthly for the subsequent 36 months.

Two approaches are employed in the calculation of the cumulative abnormal return. The first approach calculates the equally-weighted matched industry-adjusted abnormal return (AR_t^1) for a portfolio of n IPOs in month t as

$$AR_t^1 = \frac{1}{n}\sum_{i=1}^{n} ar_{i,t}$$

and the corresponding cumulative abnormal return from month q to month s is

$$CAR_{q,s}^1 = \sum_{t=q}^{s} AR_t^1$$

If a stock in the portfolio is delisted before the end of month 36 then, following Ritter (1991), the portfolio return for the next month is an equally-weighted average of the remaining stocks in the portfolio. Hence, the cumulative abnormal return for months 1 to 36 involves monthly rebalancing where the proceeds to the delisted stock is allocated equally among the remaining stocks in each subsequent month.

The first approach is, however, subject to the problem of outliers in the data. Hence, a second approach is also used. It first identifies the median matched industry-adjusted abnormal return (AR_t^2) for a portfolio of n IPOs in month t

$$AR_t^2 = median\,(ar_{1,t}, ar_{2,t}, ..., ar_{n,t});$$

consequently, the cumulative abnormal return from month q to month s under the second approach is

$$CAR_{q,s}^2 = \sum_{t=q}^{s} AR_t^2$$

6. Results

6.1. The Decision to Provide an IPO Prospectus Earnings Forecast

Estimation of the probit analysis is presented in Table 5, including likelihood ratio statistics and McFadden R-squares.[7] For all models in Table 5, the likelihood ratio statistics strongly reject the null hypothesis that all coefficients are zero. The results show that the probability of providing an earnings forecast increases when there is a decrease in historical earnings variability, an increase in the age of the firm, and when companies did not have a negative operating profit figure during the three years prior to listing. Thus, the results provide strong support for the paper's first two

[7] The likelihood ratio statistic tests the joint null hypothesis that all coefficients except the constant are zero and is the analog of the F-statistic in OLS regression models that tests the overall significance of the model. The McFadden R-square is the likelihood ratio index and is an analogue to the R-square reported in OLS regression models. It is bounded between zero and one.

hypotheses, that is, companies with relatively short operating histories and high earnings variability are less likely to provide forecasts in their prospectuses.

(Table 5 about here)

Table 6 extends the analysis by examining whether the earnings variability and operating history variables affect the quality of profit forecasting. In Model 1, a negative relationship between historical earnings variability and the probability of exceeding the earning forecast is observed, although the relationship is not statistically significant. Replacing Histvol with AGE, the coefficient of AGE exhibits statistical significance. This indicates that companies with longer operating history are more likely to exceed the profit forecast provided in their IPO prospectuses. It is noted, however, that the McFadden R-square for this model is relatively low. In Model 3, Dperform shows a stronger result and exhibits a significantly negative association with the probability of exceeding the profit forecast. The result suggests that companies without negative earning history are more likely to beat forecasted earnings. Of note, the McFadden R-square for this model is the highest in comparison with the first models.

(Table 6 about here)

In the third hypothesis, it is posited that companies with high earnings variability and a relatively short operating history should have high underpricing in their first-day trading given the valuation uncertainty. This also implies that non-forecasters, on average, should have a higher underpricing when compared with forecasters since non-forecasters generally have lower operating history and higher earning variability. In Model 1 of Table 7, Dfore presents a significantly negative relationship with IPO underpricing which supports the argument that non-forecasters have higher underpricing than their counterparts. Although Dperform provides no statistically significant explanatory power in Model 4, the results obtained in Models 2 and 3 support the third hypothesis that the companies with longer operating history and low historical earning variability exhibit lower underpricing, on average.

(Table 7 about here)

6.2. Long run performance

Analysis on the long run performance of both samples of IPOs was conducted in order to test hypothesis 4. Figures 1 and 2 graphically present CARs over a three-year post-listing period using both the average and median abnormal return methods. As seen from Figure 1, based on average abnormal returns, the average CAR of non-forecasters starts to decrease initially and then begins to rise sharply towards the end of the second year. In contrast, the sample of forecasters shows quite different behaviour which exhibits an almost steady downward trend at all the times. While the average CAR for the overall sample is 16.09%, non-forecasters achieved an average CAR of 52.93% which is much higher than an average CAR of -4.14% for forecasters. The results thus supports our hypothesis that the companies that do not forecast are likely to outperform their industry average, given the difficulties in valuing their IPOs.

(Figure 1 about here)

As argued above, to reduce the potential effects of outliers and skewness in the estimation of long run performance of IPOs, CARs are also calculated using the median abnormal return method. Using the median abnormal return method reveals quite different results. Figure 2 shows that the long run performance of IPOs deteriorates quite significantly over the three-year period, regardless of whether the companies provide profit forecast or not, though the forecasters' performance is much better than that of non-forecasters. Viewing this trend in conjunction with Figure 1 does suggest that there is evidence of a small number of IPOs overwhelming the effect of the remainder of the IPOs in the non-forecaster group, whereas the majority of IPOs in the non-forecaster group exhibit significant long run underperformance.

(Figure 2 about here)

To assess whether the quality (or accuracy) of the profit forecast affects the long run performance of IPOs, the sample of forecasters are classified into two groups, those with positive forecast errors and those with negative forecast errors.

In Figure 3, CARs for the overall sample of IPOs which provided profit forecasts slowly move downwards over time but remain positive in value for most of the period; however, the aftermarket performance differs greatly depending upon whether the IPOs met or exceeds its forecasted profits or fell short of this target. While the sample with positive forecast errors exhibits a steady upward trend in their CARs, the IPOs with negative forecast errors exhibit very poor aftermarket performance over the period. It is suggested that this performance is the result of investors' ongoing reaction to the failure of these IPOs to meet their forecasted profit targets. It is also interesting to note that the poor aftermarket performance of the group appears to commence at end of the first year after listing. This could be consistent with earnings announcement made towards the end of the first year after listing. Using the median abnormal return method, Figure 4 exhibits consistent results with Figure 3. This suggests that the results observed in Figure 3 are unlikely to be driven by a small number of the IPOs.

(Figures 3 and 4 about here)

6. Conclusion

This paper introduces a model of the decision to voluntarily provide an IPO prospectus earnings forecast. The model implies that the potential costs of missing an earnings forecast for firms with volatile earnings can combine with an absence of credibility of smaller, less well-known, or younger companies to increase the expected costs and reduce the valuation benefits to the point where the direct provision of an earnings forecast in an IPO prospectus is unwarranted. The study's empirical results support these theoretical implications and indicate that risky companies and younger companies should be able to have the flexibility to opt out of providing an earnings forecast in their prospectuses if the potential costs of a forecast inclusion outweighs the benefits. The analysis implies that forcing companies to forecast earnings in their prospectus, as occurs in New Zealand, is counter-productive. Australia offers an excellent setting for studying these issues because companies have the option of deciding whether or not to make a forecast. The paper therefore indicates that it is not advisable for Australia to continue to move towards encouraging universal inclusion of an earnings forecast in their IPO prospectus as opposed to allowing companies the flexibility to opt out of providing an earnings forecast if the perceived risk is too high.

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Description	7. Symbol
Difference in Days Between Listing and the first annual report Date	period
Forecast Error (%)	fe
Delay (Days) (diff between prospectus closing and listing dates)	delay
Age (Days) (diff between incorporation and listing date)	age
Underpricing	up
3-year aftermarket stock return volatility relative to industry	relvol
Number of Shares Offered (mil)	number
Gross Proceeds (Mil$)	gp
Offer price	offer
Volatility of historical operating performance before listing	histvol
If any one of past 3 years profit is negative=1, otherwise =0 (all positive	dperform

Car1 (did not use this one): all individual cars

Car2: (use this one in the analysis): stocks disappeared before end of year 3

Table 1: Distribution by Year

Year	Forecasters			Non-forecasters		
	Number	Average Underpricing	Average Proceeds (Mil $)	Number	Average Underpricing	Average Proceeds (Mil $)
1991	1	22.00%	235.00	0	NA	NA
1992	9	14.96%	66.70	3	-2.67%	431.67
1993	9	20.36%	73.62	4	21.25%	9.25
1994	33	5.28%	121.88	14	20.55%	7.56
1995	13	19.92%	215.10	2	0.00%	9.00
1995	15	14.06%	67.48	14	16.36%	10.95
1997	20	18.08%	35.26	17	91.09%	5.26
Overall	100	13.46%	100.34	54	39.67%	31.46

Note that average underpricing is equally weighted average underpricing.

Table 2: Distribution by Industry

	Forecasters	Non-Forecasters	Total
Automobiles, Auto Parts, Tyres and Rubber	5	0	5
Banks	1	0	1
Beverages (Brewers, Soft Drinks, Distillers and Vintners)	4	0	4
Chemicals (Commodity, Speciality and Materials)	1	1	2
Construction	5	0	5
Distribution (Vehicle Distribution and Other Distributors)	4	0	4
Diversified Industries	1	0	1
Electricity	2	0	2
Electronic and Equipment	1	0	1
Engineering	7	1	8
Food and Drug Retailers	1	0	1
Food (Farming abd Fishing, Food Processors and Producers)	3	0	3
Household (Clothing and Footwear, Furnishings and Floor Coverings)	2	0	2
Health (Health Maintenance, Hospital Management, Median Equipment and Supplies)	5	0	5
Insurance (Insurance Brokers, Re-insurance and other Insurance)	3	2	5
Investment Companies (Investment Trust, Venture and Development)	3	0	3
Leisure (Gaming, Home Ebtertainment, and Hotels)	8	0	8
Media and Broadcasting	7	1	8

Mining (Gold Mining, Mining Finance and Other Mineral Extractors)	6	29	35
Oil and Gas (Oil Services, Oil and Gas Exploration and Production)	4	7	11
Pharmaceuticals	1	2	3
Real Estate (Real Estate Development and Property Agencies)	6	3	9
Retailers-soft Goods (Computer Services, Internet Services and Software)	2	0	2
Speciality and Managers (Asset Management, consumer Finance, Investment Banks and Mortgage)	4	3	7
Support (Business Support, Eduation and Training, Laundries and Cleaners)	6	2	8
Telecom (Telecom Fixed Lin and Wireless)	0	3	3
Transportation (Airlines and Airports, Rail, Road and Freight, Shipping and Ports)	5	0	5
Retailers (Discount and Super Stores, Warehouses, and Multi Department)	3	0	3
Total	**100**	**54**	**154**

Table 3: Summary Statistics of the Whole Sample

	Mean	Stdev	Minimum	Maximum
Fe	-4.91	21.13	-172.59	7.34
Age	3613.39	5902.56	32.00	36395.00
Up	0.23	0.68	-0.21	5.45
histvol	0.49	0.61	0.02	3.47

Note that

UP is the underpricing of IPOs and is calculated by the relative difference between the first day trading price and offer pricing of IPOs;

Age is the difference in days between the data of incorporation and the first listing date.;

FE denotes forecasting error (%) and is calculated as the difference between actual operating profit after tax in the year after listing and forecasted operating profits after tax in the IPO prospectus divided by actual sales revenue in the year after listing;

Histvol is scaled measure of volatility of historical eanrings performance prior to listing. It is computed by using standard deviation of three years earnings before interests and tax (EBIT) prior to listing divided by the actual EBIT in the year after listing.

Table 4: Summary Statistics: Forecasters vs. Non-forecasters

	Non-Forecasters				Forecasters				Difference in Mean	Difference in Median
	Mean	Stdev	Minimum	Maximum	Mean	Stdev	Minimum	Maximum	t-stat	Wilcoxon Rank-sum test
fe	NA	NA	NA	NA	-4.91	21.13	-172.59	7.34	NA	NA
age	1,681.91	2,845.00	86.00	15,238.00	4,722.97	6,859.06	32.00	36,395.00	-3.77**	-3.37**
up	0.40	1.10	-0.14	5.45	0.13	0.20	-0.21	1.40	1.74*	-0.17
histvol	0.82	0.64	0.23	2.66	0.43	0.59	0.02	3.47	2.32**	4.01**

1. *denotes significance at 10% level and ** denotes significance at 5% level.

2. Difference in mean (median) is the difference in mean (median) between non-forecasters and forecasters.

Table 5: Probit model:

dependant variable: dfore (if forecasting=1, otherwise=0)

	Model 1		Model 2		Model 3	
	Coefficient	Z-stats	Coefficient	Z-stats	Coefficient	Z-stats
Constant	1.2837	6.0963 **	0.0705	0.5269	1.5079	6.7865**
Histvol	-0.4813	- 2.1732 **				
AGE			0.0001	2.9315**		
Dperform					-1.5079	-4.2162**
Likelihood Ratio Stat	4.4547**		13.0583**		18.6102**	
MaFadden R-squared	0.0538		0.0672		0.2236	

1. *denotes 10% significance and ** denotes 5% significance

Table 6: Probit model:

dependant variable: derror (if above forecasting=1, otherwise=0)

	Model 1		Model 2		Model 3	
	Coefficient	Z-stats	Coefficient	Z-stats	Coefficient	Z-stats
Constant	0.5679	3.0868**	0.1333	0.8066	0.6169	3.7571**
Histvol	-0.3836	-1.4824				
AGE			0.00004	1.7749*		
Dperform					-1.8984	-3.3604**
Likelihood Ratio Stat	2.3118		3.5565*		15.2899**	
MaFadden R-squared	0.0237		0.0298		0.1533	

1. *denotes 10% significance and ** denotes 5% significance

Table 7: Regression results on IPO underpricing

	Model 1		Model 2		Model 3		Model 4	
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Constant	0.3967	2.6571**	0.1334	3.9023**	0.2649	3.6690**	0.1153	6.3375**
Dfore	-0.2621	-1.7403*						
Histvol			0.0670	2.0911**				
Age					-0.0001	-2.1866**		
Dperform							0.2479	1.3673
F-stats	5.3803*		0.9434		1.1992		6.2569*	
R-square	0.0342		0.0100		0.0081		0.0624	

1. **, and * are significance at the 5%, and 10% level, respectively.

2. t-statistics are adjusted for heteroskedasticity according to White (1980).

Figure 1: Long Run Performance (Average AR Method): Forecasters vs. Non-Forecasters

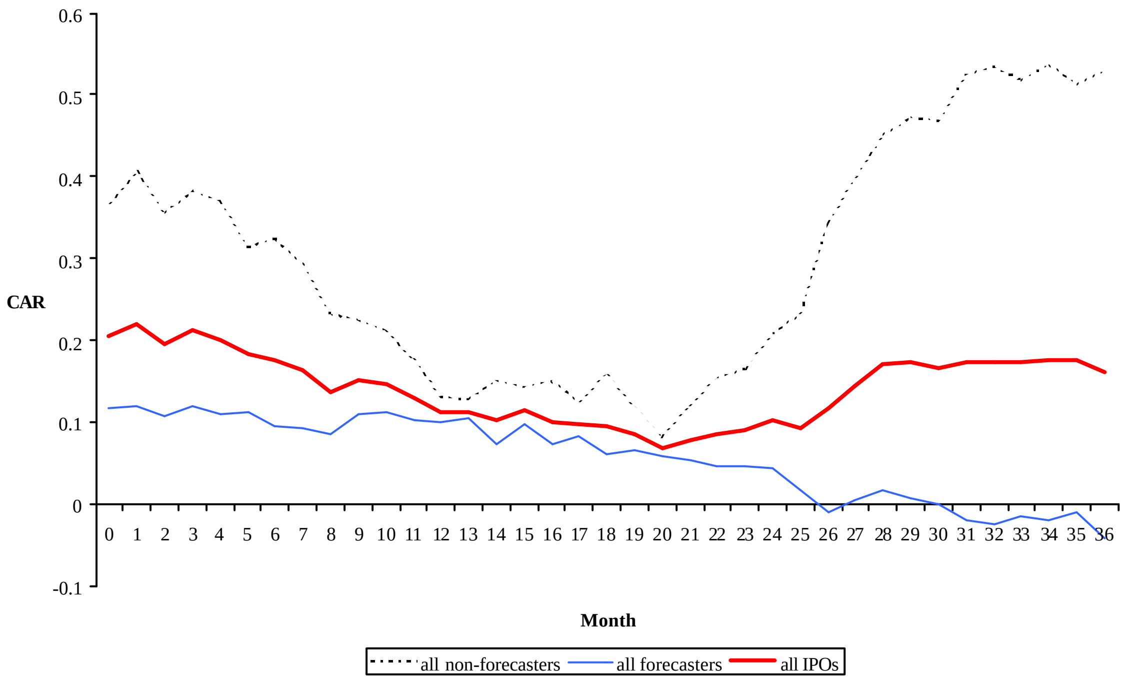

Figure 2: Long Run Performance (Median AR Method): Forecasters vs. Non-Forecasters

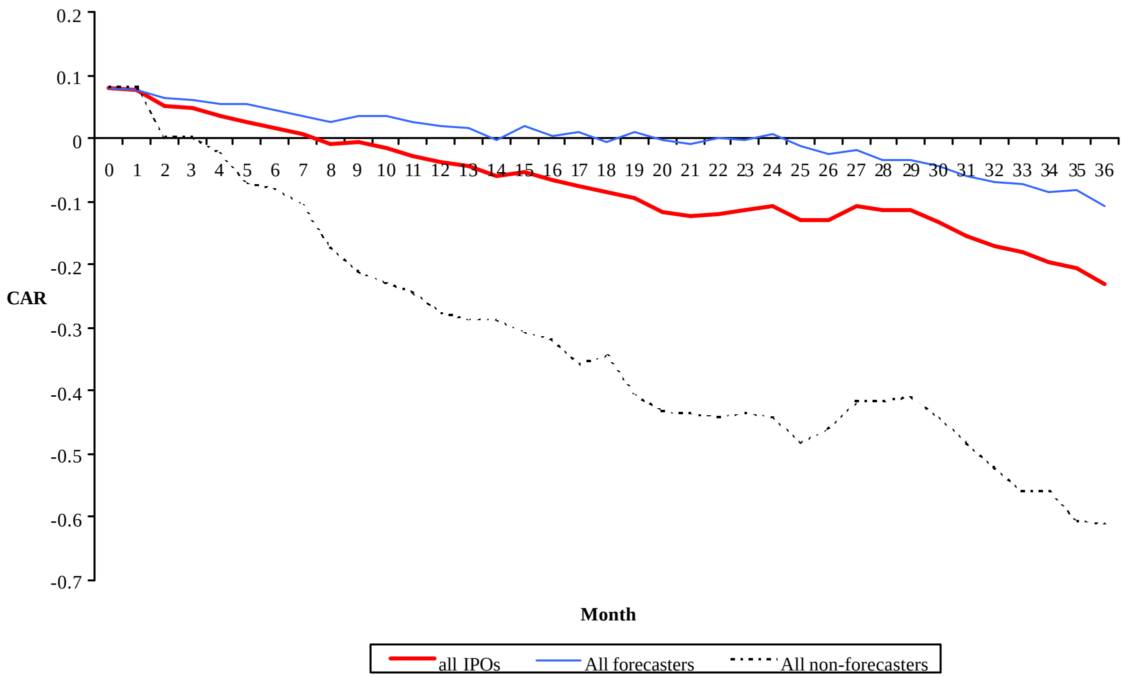

Figure 3: Long Run Performance (Average AR Method): Below vs. above Forecast

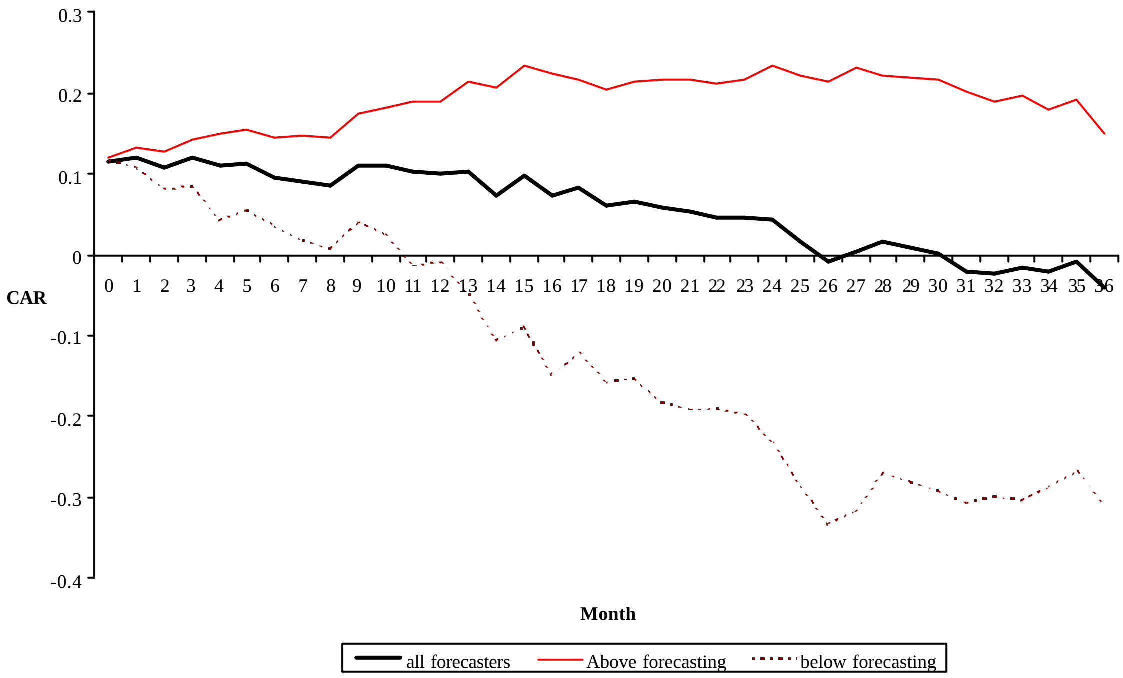

Figure 4: Long Run Performance (median AR Method): Below vs. above Forecast