DO NEGLECTED FIRMS SUFFER FROM AN INFORMATION DEFICIT?

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ABSTRACT

We study the presence and distribution of private information in neglected firm stocks using a measure of private information first suggested by Roll (1988). Our results suggest that there is no shortage of information on neglected firms for investors and that this private information forms part of the decision set for managerial decisions. Our results indicate a significant negative correlation between the amount of private information and certain important firm characteristics such as market size, cash flow, sales and return on assets. When the impact of private information is analyzed on the investment and payout policies of the neglected firms, the results indicate that private information in stock price has a significant impact on firm investment but not on payout. However, private information does affect payout but through interaction with firm cash flow. Finally we find that private information impact on firm investment is stronger in smaller as compared to larger neglected firms.

JEL: G14; G35

KEYWORDS: Neglected stocks, Neglected firms, information deficit

INTRODUCTION

Market efficiency requires availability of costless information. Much of this information is generated by financial analysts for use by the investing public. When stocks, because of the small size of the issuing firm or other factors, do not attract the attention of financial analysts, they are likely to be priced to provide a significant information risk premium to any potential investor. However, investors trade not only on the basis of public information but also on the basis of their private information. We study the presence and distribution of private information based on firm characteristics and find a strong negative correlation between private information and several firm characteristics. We then study the effect of private information on the investment and payout policies of the neglected firms. Our results show that private information in price is positively correlated with the level of firm investment, while private information in cash flow is positively correlated with the level of payout. We surmise that this is private information of investors because of the way in which we construct the sample of neglected firms i.e. firms with no analyst coverage and low institutional ownership. This ensures that managers of the neglected firms cannot send information through analysts or institutional investors. In addition, low insider ownership among the sampled firms suggests that neglected firms' response to private information is less likely to be distorted by managerial incentives. We find that private information affect the investment of smaller firms more than that of larger firms. But barring this exception, we do not find size, sales or profitability to systematically influence either the investment or payout levels of the neglected firms.

The rest of the paper is organized as follows: Section II reviews the relevant literature, while Section III provides the data and methodology. Section IV reviews the results while Section V concludes.

LITERATURE REVIEW

Neglected firms, defined as firms with little or no analyst, media or institutional coverage, are enigmatic. Some researchers such as Arbel et al (1983) and Arbel and Strebel (1983) show that neglected stocks earn a premium either as compensation for associated information deficiencies and/or pricing inefficiencies caused by lack of information. These researchers find the information deficiency premium to average 10.7% for the 5-year period 1972-76. The neglected firm effect persists whether neglect is measured in terms of analyst coverage or actual investment by institutions and even after size and risk are controlled. However, if the market for information is efficient, then the information deficit should be fully discounted in the price and the observed neglected firm effect may actually be caused by other factors, such as missing variables or value-affecting attributes of securities not captured by CAPM or market model. Bhardwaj and Brooks (1992) argue that the findings of prior studies of a statistically significant independent neglected firm effect may be attributed to using firm size as the control variable rather than the more fundamental stock price variable. After controlling for price, they do not find a statistically significant neglect effect. They conclude, therefore, that the previously reported neglect effect is a premium to cover higher transaction costs of the generally lower priced neglected stocks.

Beard and Sias (1997) also basically arrive at the same conclusion as Bhadwaj and Brooks and conclude that there is no information deficiency premium. The extant literature on neglected firms is, therefore, in agreement that there is an information deficit for neglected firm stocks, but differs regarding the impact of the deficit. According to Bhadwaj and Brooks (1992), and Beard and Sias (1997), the deficit is fully discounted in the price and there is no information deficiency premium, but according to Arbel et al. (1983) and Arbel and Strebel (1983) the discount, if any, does not fully compensate for the deficit with a resultant information deficiency premium. Thus, both strands of literature basically concede an information deficit solely on the grounds that neglected firms by definition are firms that are under less scrutiny by news agencies, financial analysts, and institutional investors as compared to other firms.

The two strands differ only in whether the information deficit is fully or partially incorporated in the stock price.More recent research gives additional support to the existence of a negligent firm premium. Kelly and Ljungqvist (2007) estimate the value of analyst coverage as approximately 1% of the stock value based on a sample of firms that lose all coverage due to exogenous events. Dhiensiri and Sayrak (2004) analyze first time initiation of firms uncovered by analysts. They find returns of about 2% on all initiations and 2.3% for positive initiations. Demiroglu and Ryngaert (2010) find even a greater premium of +4.86% abnormal return at the announcement that a previously uncovered firm would have analyst coverage. Interestingly, the negligent firm premium persists regardless of the association of the analyst. Bradley, Jordan and Ritter (2003, 2008) and Iskoz (2003) find no evidence that analyst recommendations are treated differently at announcement if the analyst is affiliated with a covered firm's lead underwriter for a recent SEO or IPO. Downs and Guner (2000) also find that information deficiency is an important economic trait but that real estate securities suffer less from neglect. Consistent with the negligent firm effect, Barry and Brown (1986) find that limited information is a source of systematic risk.

Investors trade in stocks not only on the basis of analyst recommendations, but also on the basis of private information. A true information deficit would exist only if noise trading primarily replaces informed trading in the absence of analyst information. If private information substitutes analyst information, then prices would fairly reflect the underlying demand and supply of informed traders, and there would be no information deficit despite the absence of analyst, media or institutional coverage. Existing studies have focused on stock returns to draw their conclusion. We use a different tact and employ price-nonsynchronicity to measure the Private Information of neglected firms. We then examine if neglected firm's corporate investment (capital expenditure plus R&D) and payout policies (total dividends) are affected by investors' private information. A significant relation would imply that investors have

information on the neglected firms.Price nonsynchronicity as a measure of Private Information was first proposed in a seminal article by Roll (1988) and then further developed amongst others by Morck et al. (2000), and Durnev et al (2004). The return generating process of a stock can be viewed as being powered by three factors – a market factor, an industry factor and a firm specific factor. The first two factors are systematic and if these two factors are primarily responsible for generating the stock return, then the stock has a high degree of correlation with market and industry returns and there would be high degree of synchronicity between the stock price and the market and industry indices. However, if the firm specific factor is the significant return generator then there would be considerable nonsynchronicity between stock return and market and industry indices. Roll (1988) suggested that price nonsynchronicity captures private information because it has very little correlation with the release of public information such as earnings announcements and unemployment statistics. Roll, therefore, surmised that price nonsynchronicity is the result of the trading activity of speculators who gather and possess private information. However, Roll added a caveat to this suggestion and left open the possibility of an alternative explanation i.e. an occasional frenzy or noise trading deriving the prices. Subsequent empirical and theoretical research has verified the original Ross (1988) intuition that price nonsynchronicity reflects more private information than noise. On the empirical front, Morck et al (2000), Wurgler (2000), Durnev et al (2003), Defond and Hung (2004) and Durnev et al (2004) find evidence consistent with the hypothesis that price nonsynchronicity reflects more private information than noise. On the theoretical front, Veldkamp (2006) develops a model that predicts a negative correlation between price synchronicity and the amount of private information investors produce about a firm – an outcome that validates the Roll (1988) suggestion.

DATA AND METHODOLOGY

The sample period is from January 1990 to December 2007. Our sample consists of New York Stock Exchange (NYSE) and American Stock Exchange (AMEX) stocks. We exclude financials (6000-6999), utilities (4000-4949), ADRs and REITs. We also omit firms with less than 30 days of trading and firms that do not have common shares traded as indicated by CRSP share codes 10 or 11. The degree of neglect information in each of the sample stocks is measured by analyst coverage and institutional ownership. Analyst coverage is obtained from the Institutional Brokers Estimate System (IBES) file. Institutional ownership data is retrieved from Thomson ONE database.

Each year, we double sort the sample firms by ranking them based on analyst coverage into 10 deciles and then by ranking them according to institutional ownership into 10 deciles. We rebalance the portfolio every year and define the 100th portfolio in this double-sorted (10x10) matrix as the portfolio of neglected stocks. (We also repeat the above process to form a 5x5 double- sorting portfolios and define the 25th portfolio as neglected stocks, but we only used the 100^{th} portfolio in the analysis).Stock price and return information is obtained from Center for Research in Security Prices (CRSP). Investment and other financial data are obtained from Compustat. We have 1214 firm-year observations for the sample. The methodology used in this research is adapted from Chen et al. (2007). The analysis employs two measures of Private Information which are based on the Roll (1988) reasoning that the variation of a stock return comprises three components: a market-related variation, an industry related variation, and a firm specific variation. Accordingly, we run the following regression:

$$r_{i,j,t} = \beta_{i,0} + \beta_{i,m} \cdot r_{m,t} + \beta_{i,j} \cdot r_{j,t} + \varepsilon_{i,t} \quad (1)$$

Where $r_{ij,t}$ is the return of firm *i* in industry *j* at time *t*, $r_{m,t}$is the market return at time *t*, and $r_{j,t}$ is the return of industry *j* at time *t*.

The R^2 of the equation is then used to compute the two measures of Private Information (PI1 and PI2) as follows:

1) PI1 = log[(1- R^2)/ R^2)]. This measure is used by Durnev et al. (2004) due to the concern that R^2 is skewed in its distribution.

2) PI2 = 1- R^2 . This measure is used by Chen et al. (2007).

The intuition behind the measures is simple. The amount of return that cannot be explained by market and industry factors must be the result of private information or noise. Both empirical and theoretical research mentioned earlier has established that the portion of return not caused by the systematic factors is mostly the result of private information. The basic model we use can be represented as follows:

$$I_{it}\,(D_{it}) = \alpha_t + \varphi_i + \beta_1 \cdot Q_{it-1} + \beta_2 \cdot INFO_{it-1} + \gamma \cdot CONTROL + \varepsilon_{i,t} \quad (2)$$

The dependent variable is either $I_{it}\ or (D_{it})$

Where I_{it} I_{it} is firm *i*'s investment in year *t*. We measure investment as the normalized sum of a firm's capital expenditure plus spending on research and development (Capex and R&D scaled by beginning of year book assets ($A_{it\text{-}1}$)). Q_{it} is firm *i*'s payout in year *t*. We measure payout as the normalized sum of a firm's dividend plus stock repurchase of common and preferred stock. $\alpha_t + \varphi_i$ represent year and firm-fixed effects respectively. Q_{it-1} is normalized price and is measured as the sum of the market value of equity and book value of debt scaled by the book value of assets, all measured at the end of year *t-1*. It is calculated as price times shares outstanding from CRSP plus Compustat item 6 (book value of assets) minus item 60 (book value of equity) divided by the book value of assets. Previous literature suggests that firms tend to invest more when stock prices are high, consequentlyβ_1 is expected to be positive when the dependent variable is I_{it} . $INFO_{it-1}$ is Private Information impounded in the stocks and the two measures of Private Information used in this research are PI1 and PI2 described above.

The control variables ($CONTROL$) we use are those that prior studies have shown to be important in investment and payout decisions. These variables are: cash flow (*CF*), value weighted market adjusted three year cumulative returns ($RET_{i,t+3}$), insider ownership (*IO*) and (*LEVERAGE*). An interaction term of *CF* with $INFO_{it\text{-}1}$ is also added to control for the effect of cash flow on investment and payout decisions. Finally, the reciprocal of assets ($1/ASSETS_{i,t\text{-}1}$) is included for the statistical integrity of the model. Since the dependent variables I_{it} and D_{it}, and the regressor Q_{it-1} are scaled by last year's assets, the addition of the control variable $1/ASSETS_{i,t\text{-}1}$ ensures there is no spurious correlation.

The full model is given in equation 3 and contains the additional interaction term $INFO_{it-1}$ Q_{it-1}.

$$I_{it}\,(D_{it}) = \alpha_t + \varphi_i + \beta_1 \cdot Q_{it-1} + \beta_2 \cdot INFO_{it-1} + \beta_3 \cdot INFO_{it-1} \cdot Q_{it-1} + \gamma \cdot CONTROL + \varepsilon_{i,t} \quad (3)$$

Whereasβ_1 measures the unique effect of$Q_{it\text{-}1}$, the coefficientβ_2 measures the additional explanatory power of Q_{it-1} contributed by Private Information.

Table 1 provides the summary statistics for the full sample of 1214 observations. The mean of the normalized share price is $1.95, and the mean market size is $275.20 million. The average sale in $ millions is $561.13. The dependent variables Capex and R&D and Dividends have means of .09 and .007 respectively. The large standard deviation of these variables with respect to their means is indicative of the wide range of firm characteristics that are found in neglected firms.

Table 1: Descriptive Statistics

	Mean	Median	Std. deviation
Q	1.95	1.35	1.56
Market Size ($mm)	275.20	12.72	200.70
Leverage	0.63	0.52	0.77
Cash Flow (CF)	-0.17	0.04	0.86
Sales ($mm)	561.13	21.13	2184
Capex and R&D	0.09	0.04	0.17
ROA	-0.01	0.006	0.08
Sales Growth	0.009	0.001	0.18
Institutional Ownership (INST)	0.014	0.013	0.005
Insider Ownership (IOWN)	0.028	0.003	0.051
Dividends	0.007	0	0.0391

Table 1 provides the summary statics for 1214 firm-year observations during the periods between 1987 and 2007.

RESULTS

Private Information by Firm Characteristics

Table 2 compares the size of private information by firm characteristics. We run the regression model in equation 1 on the firms in our data set to determine the R^2 for the firm. The R^2 provides the necessary input for computing the two measures of Private Information PI1 and PI2 for each observation. The firms are then sorted into quartiles based on various firm characteristics. The last two columns of the table respectively provide the incremental difference between Private Information measures PI1 and PI2 for firms in the highest and lowest quartile of the characteristic specified in the first column, and the t-statistic for the statistical significance of the difference between Q4 and Q1. Neglected firms sorted on the basis of market size, cash flow (CF), sales, and return on assets (ROA) show a significant negative difference between the highest and lowest quartile firms for both PI1 and PI2. In the case of firms sorted by Q (market value of equity plus book value of assets minus book value of debt scaled by book value of assets), the difference between Q4 and Q1 is negative and statistically significant only for PI1 and that too at the 10% level while PI2 is not significant. Firms sorted on the basis of insider ownership (IOWN) show a negative difference between Q4 and Q1 but only PI1 is significant.

Our results show that firms with higher values of the characteristics discussed above have significantly less private information than firms with lower values. This is to be expected. Private information is incorporated into price through the trading activities of private investors. The stock prices reflect both public and private information about firm fundamentals. For firms with higher Q, market size, cash flow, sales, return on assets and insider ownership, public information will overwhelm private information. Firms with lower values of these characteristics have little available public information and the price is largely determined by the trading activities of private investors and speculators. Firms sorted on the basis of leverage, capital expenditure, sales growth and institutional ownership do not show significant difference in the amount of private information between firms with higher and lower values of these firm characteristics.

Table 2: Comparing the Size of Private Information by Firm Characteristics

Firms Sorted by		Q1 (lowest)	Q2	Q3	Q4 (highest)	Q4-Q1	t-stat.
Q	PI1	2.38	2.09	2.22	2.15	-0.23	-1.87*
	PI2	0.81	0.81	0.80	0.81	0.02	0.02
Market Size	PI1	2.58	2.48	2.21	1.57	-1.01	-6.49***
	PI2	0.85	0.84	0.83	0.72	-0.13	-5.72***
Leverage	PI1	2.18	2.23	2.15	2.31	0.13	0.66
	PI2	0.80	0.81	0.80	0.81	0.01	0.38
CF	PI1	2.28	2.45	2.25	1.64	-0.62	-3.97***
	PI2	0.82	0.84	0.84	0.74	-0.07	-3.34***
Sales	PI1	2.45	2.21	2.23	1.97	-0.48	-5.11***
	PI2	0.86	0.83	0.82	0.74	-0.12	-6.19***
Capex and R&D	PI1	2.54	2.20	2.20	2.35	-0.19	-1.24
	PI2	0.86	0.82	0.82	0.85	-0.01	-0.17
ROA	PI1	2.44	2.21	2.23	1.97	-0.47	-2.45**
	PI2	0.87	0.80	0.81	0.76	-0.11	-4.45***
Sales Growth	PI1	2.18	2.24	2.40	2.45	0.27	1.52
	PI2	0.83	0.82	0.83	0.86	0.03	1.62
INST	PI1	2.18	2.20	2.39	2.12	-0.06	-1.26
	PI2	0.81	0.80	0.83	0.82	0.01	0.52
IOWN	PI1	2.25	0.82	0.87	0.36	-1.89	-2.29**
	PI2	0.81	0.60	0.62	0.58	-0.23	-1.42

Table 2 compares the size of private information by firm characteristics. We run the regression model: $r_{i,j,t} = \beta_{i,0} + \beta_{i,m} \cdot r_{m,t} + \beta_{i,j} \cdot r_{j,t} + \varepsilon_{i,t}$ *on the firms in our data set to determine the* R^2 *for the firm. The* R^2 *provides the necessary input for computing the two measures of Private Information PI1 and PI2 for each observation. The firms are then sorted into quartiles based on various firm characteristics. The last two columns of the table respectively provide the incremental difference between Private Information measures PI1 and PI2 for firms in the highest and lowest quartile of the characteristic specified in the first column, and the t-statistic for the statistical significance of the difference between Q4 and Q1. ***, **, and ** denote significance at the 1%, 5%, and 10% levels, respectively*

Effect of Private Information on the Investment Level of Neglected Firms

Table 3 gives the result of estimating equations 2 and 3 using investment (Capital expenditure plus R&D) as the dependent variable. We estimate a total of eight different versions. Models 1 and 3 are versions of equation 2 in which the measure of private information is PI1. The two models differ from each other in that the control variables in Model 1 are cash flow, future returns (Ret) and reciprocal total assets (1/TA) while Model 3 has in addition the control variables insider ownership (IO) and Leverage. Models 2 and 4 are versions of equation 3 in which the measure of private information is PI1. The two models differ from each other in that the control variables in Model 2 are cash flow, future returns (Ret) and reciprocal total assets (1/TA) while Model 4 has in addition the control variables insider ownership (IO) and Leverage. Models 5,6,7 and 8 are respectively repeat of Models 1,2,3 and 4 but use PI2 as the measure of private information instead of PI1.

Models 1 and 5 are the base models for PI1 and PI2 respectively. The results indicate that the only significant variable in both the models is Q. This is indicative of the fact that the amounts expended for investments by neglected firms are positively correlated with the price, just as they are in firms that are not neglected (Chen et al. 2007). Models 3 and 7 tag on two additional control variables, namely insider

ownership and leverage, to the base models 1 and 5, but the results are very similar to the base model results. The two additional control variables are not significant indicating that neither insider ownership nor leverage has any bearing on the firm's investment decision. Models 2 and 6 introduce the cross product terms – the interaction of private information with Q and cash flow into the base models. The results are dramatically different. Q loses significance and the significance is transferred to the cross product term of private information and Q. The significance of this cross product term shows that the investment to price sensitivity is higher for firms whose stock prices have greater firm specific return variation. The loss of significance for Q shows that neglected firms without much monitoring may invest without regard to Q. But once investors express their views through a significant and positive PI*Q firm managers of neglected firms incorporate PI in their investment decisions. The only other significant term is PI1 in model 2 which is negatively related to investments. The corresponding measure of private information PI2 in model 6 has a negative sign but is not significant. The negative sign is a reflection of the fact that private information is negatively related to firm characteristics such as Q, market size, cash flows, sales and ROA. Since investment is likely to have a positive relation with these firm characteristics, it will result in a negative relationship with private information. Models 4 and 8 include the additional control variables insider information and leverage but the results of these models are not substantially different from models 2 and 6. The control variables are not significant in any of the models.

Table 3: Regression Results on the Relation between Firm Investments and Investors' Private Information

	Model 1	**Model 2**	**Model3**	**Model 4**	**Model5**	**Model6**	**Model7**	**Model8**
Intercept	0.12 (2.67)**	0.19 (3.18)**	0.12 (3.70)***	0.19 (3.25)***	0.13 (1.51)	0.24 (2.02)**	0.13 (1.50)	0.23 (2.03)**
Q	0.02 (3.96)***	-0.01 (-1.17)	0.01 (3.70)***	-0.01 (-1.23)	0.02 (4.19)***	-0.04 (-1.59)	0.02 (3.93)***	-0.04 (-1.50)
CF	-0.01 (-1.05)	-0.01 (-1.35)	-0.01 (-1.08)	-0.02 (-0.96)	-0.01 (-0.88)	-0.02 (-1.36)	-0.01 (-0.95)	-0.02 (-0.94)
PI1	-0.01 (-0.87)	-0.04 (-2.16)**	-0.01 (-0.77)	-0.04 (-2.61)**				
PI1*Q		0.01 (2.50)**		0.01 (2.51)**				
PI1*CF		0.01 (1.47)		0.01 (1.43)				
PI2					-0.03 (-1.25)	-0.05 (-0.54)	-0.22 (-1.37)	-0.16 (-1.34)
PI2*Q						0.07 (2.19)**		0.06 (2.05)**
PI2*CF						0.01 (0.85)		0.01 (0.77)
Ret	-0.05 (-1.48)	-0.05 (-1.45)	-0.05 (-1.01)	-0.04 (-1.49)	-0.05 (-1.45)	-0.04 (-1.38)	-0.05 (-1.47)	-0.04 (-1.40)
1/TA	0.11 (1.01)	0.09 (0.89)	0.10 (0.93)	0.09 (0.89)	0.11 (1.05)	0.01 (1.01)	0.11 (0.97)	0.10 (0.95)
IO			0.01 (0.01)	0.01 (0.22)			0.01 (0.03)	0.01 (0.02)
Leverage			0.01 (0.66)	-0.01 (-0.08)			0.01 (0.63)	0.01 (0.28)
Adj R^2	0.07	0.09	0.15	0.09	0.09	0.08	0.07	0.07

*$I_{it}(D_{it}) = \alpha_t + \varphi_i + \beta_1 \cdot Q_{it-1} + \beta_2 \cdot INFO_{it-1} + \gamma \cdot CONTROL + \varepsilon_{i,t}$ and $I_{it}(D_{it}) = \alpha_t + \varphi_i + \beta_1 \cdot Q_{it-1} + \beta_2 \cdot INFO_{it-1} + \beta_3 \cdot INFO_{it-1} \cdot Q_{it-1} + \gamma \cdot CONTROL + \varepsilon_{i,t}$ are used in the regression respectively. The dependent variable is Total Investments (Whole sample). Clustered standard errors are used to account for serial correlations due to firm and year effects. ***, **, and ** denote significance at the 1%, 5%, and 10% levels, respectively*

Effect of Private Information on Investments of Firms by Size, Sales and Profitability

We study the effect of private information on firm investment by sorting the firms in our sample on the basis of size, sales and profitability into four quartiles. We run the regression given in equation 3 with all the control variables but report only the coefficients for the significant variables in Table 4.

Table 4: Regression Results on the Relation between Firm Investments and Investors' Private Information On Subsamples (Dependent Variable Is Capex + R&D)

PANEL A: Investment Regressions by Firm Size								
	Model1	**Model2**	**Model3**	**Model4**	**Model5**	**Model6**	**Model7**	**Model8**
	Q1 Smallest)	Q2	Q3	Q4 (Largest)	Q1 (Smallest)	Q2	Q3	Q4 (Largest)
Intercept	0.14	0.08	0.01	0.04	-0.07	0.25	0.08	0.08
	(1.72)*	(1.44)	(0.04)	(0.32)	(-0.04)	(1.84)*	(0.55)	(0.18)
PI1	-0.03	-0.04	-0.04	-0.07				
	(-1.20)	(-1.77)*	(-1.65)	(-0.74)				
PI1*Q	0.02	0.02	0.01	-0.01				
	(3.34)***	(2.70)***	(2.14)**	(-0.44)				
PI1*CF	0.01	0.01	0.01	0.01				
	(4.23)*	(0.51)	(0.18)	(1.22)				
PI2					0.15	-0.31	-0.19	-0.21
					(0.77)	(-1.78)*	(-1.13)	(-0.33)
PI2*Q					0.07	0.21	0.09	-0.21
					(1.87)*	(2.38)**	(1.19)	(-0.45)
PI2*CF					0.29	0.06	0.01	0.01
					(2.51)**	(1.32)	(0.22)	(1.09)
Adj R^2	0.43	0.36	0.55	0.17	0.39	0.36	0.54	0.14
Panel B: Investments Regressions by Firm Sales								
	Model1	**Model2**	**Model3**	**Model4**	**Model5**	**Model6**	**Model7**	**Model8**
	Q1 (Smallest)	Q2	Q3	Q4 (Largest)	Q1 (Smallest)	Q2	Q3	Q4 (Largest)
Intercept	0.22	0.18	-0.01	0.23	0.15	1.14	0.67	-0.17
	(2.54)**	(1.65)*	(-0.07)	(1.46)	(0.45)	(2.71)**	(0.69)	(-0.42)
PI1	-0.01	-0.07	0.01	0.06				
	(-0.01)	(-2.36)**	(0.28)	(-0.96)				
PI1*Q	0.01	0.02	-0.01	-0.02				
	(1.51)	(1.43)	(-0.07)	(-0.88)				
PI1*CF	-0.03	0.01	0.03	0.01				
	(-2.55)**	(1.37)	(1.55)	(1.12)				
PI2					0.06	-1.28	-0.05	0.29
					(01.6)	(-2.81)**	(-0.32)	(0.66)
PI2*Q					0.01	0.36	0.09	-0.76
					(0.21)	(1.74)*	(0.66)	(-1.06)
PI2*CF					-0.36	0.21	0.01	0.01
					(-2.10)**	(2.28)**	(0.96)	(1.12)
Adj R^2	0.55	0.24	0.23	0.12	0.47	0.29	0.23	0.13
Panel C: Investments Regressions by Firm Profitability								
	Model1	**Model2**	**Model3**	**Model4**	**Model5**	**Model6**	**Model7**	**Model8**
	Q1 (Lowest)	Q2	Q3	Q4 (Largest)	Q1 (Smallest)	Q2	Q3	Q4 (Highest)
Intercept	0.15	0.16	0.10	0.16	0.17	0.19	0.02	0.22
	(1.47)	(.243)**	(0.87)	(4.19)***	(0.24)	(2.81)**	(0.08)	(1.16)
PI1	0.02	-0.03	-0.02	-0.03				
	(0.30)	(-1.83)*	(-0.44)	(-2.36)**				
PI1*Q	0.02	0.02	-0.02	0.01				
	(2.87)**	(5.58)***	(-0.83)	(1.37)				
PI1*CF	0.02	0.01	0.01	0.01				
	(4.55)***	(1.26)	(1.13)	(2.28)**				
PI2					0.03	-0.14	0.02	-01.6
					(0.04)	(-2.00)**	(0.05)	(-0.73)
PI2*Q					0.16	0.14	-0.24	0.11
					(2.71)**	(5.50)**	(-0.71)	(0.70)
PI2*CF					0.18	0.01	0.01	0.01
					(4.27)***	(1.47)	(0.93)	(0.75)
Adj R^2	0.30	0.35	0.07	0.07	0.26	0.35	0.07	0.10

$I_{it}\,(D_{it}) = \alpha_t + \varphi_i + \beta_1 \cdot Q_{it-1} + \beta_2 \cdot INFO_{it-1} + \beta_3 \cdot INFO_{it-1} \cdot Q_{it-1} + \gamma \cdot CONTROL + \varepsilon_{i,t}$ *is used in the subsample regression. In Panel A the firms are sorted on the basis of size with Q4 containing the largest firms and Q1 the smallest. In Panel B the firms in our sample were sorted by sales with Q4 containing the firms with the highest sales and Q1 the firms with the lowest sales. In Panel C the firms are sorted by profitability. The dependent variable is total investments. Clustered standard errors are used to account for serial correlations due to firm and year effects. ***, **, and ** denote significance at the 1%, 5%, and 10% levels, respectively. For brevity, only the salient variables are reported.*

We estimate the regressions using both PI1 and PI2 as measures of private information. In Panel A of Table 4 the firms are sorted on the basis of size with Q4 containing the largest firms and Q1 the smallest.

PI1*Q is significant at the 1 percent level for firms in Q1. The level of significance drops as the firm size increases and in the fourth quartile Q4, PI1*Q becomes insignificant and the coefficient turns negative. The result using PI2 as the measure of private information is somewhat similar. PI2*Q is significant in Q1 and Q2 but loses significance in Q3 and Q4. This shows that the effect of private information on investment depends largely on the size of the neglected firms. PI1 and PI2 in the second quartile Q2 have negative coefficients that are significant at the ten percent level. PI2*CF is positive and significant at 5 percent for the smallest quartile firms. This indicates that the private information impounded in the cash flow is most important for the smallest firms.

In Panel B of Table 4, the firms in our sample were sorted by sales with Q4 containing the firms with the highest sales and Q1 the firms with the lowest sales. PI1 and PI2 are found to be significantly negatively correlated with investments only in Q2. PI2*Q is significantly positively correlated with investments at the 10 percent level in Q2. PI1*CF is negatively correlated with investments at the 5 percent level in Q1. The sorting by sales does not show any clear cut pattern of the way in which sales level of a firm impacts its investment policy through the mechanism of private information.

In Panel C of Table 4, the firms are sorted by profitability. The PI*Q term, which is the main variable of interest, begins to show a little pattern. The smaller firms in Q1 and Q2 show a significant positive correlation of PI*Q with investments but PI*Q is neither significant nor consistent in its coefficient signs. The coefficient of PI*Q for Q3 is negative and not significant while that of Q4 is positive and not significant. This implies that the investment to price sensitivity is higher for firms whose stock prices have lower underlying profitability. PI1*CF is positively correlated with investments, and significant for firms with the lowest profitability in Q1 and the highest profitability in Q4. PI2*CF is positively correlated with investments but with statistical significance only for the least profitable firms in Q1. This indicates that private information in cash flows is much more important for firms with small profitability as compared to firms with large profitability. Although PI1 is negatively correlated and significant for firms in Q2 and Q4 quartiles of profitability and PI2 is negatively correlated and significant for firms in the Q2 quartile of profitability, the lack of any systematic pattern precludes any conclusion of a systematic relationship with profitability.

Effect of Private Information on the Payout of Neglected Firms

Table 5 shows the results of estimating regressions 2 and 3 with dividend payout as the dependent variable. Models 1 to 8 of Table 5 exactly parallel Models 1 to 8 of Table 3 except for the dependent variable.

The noteworthy feature of the results reported for models in Table 5 is the complete lack of any statistical significance for the independent variable Q, either in the standalone form or in an interaction term in determining the payout of neglected firms. The most significant variable determining payout is cash flow. This is consistent with the extant literature on dividend payout that ceteris paribus firms with higher cash flows will have higher dividend payout. The effect of private information on payout is also through its interaction with cash flow. Both PI1*CF and PI2*CF are significantly negatively related with payout at the 10 percent significance level. Because private information is negatively related to cash flow as seen in Table 2 and cash flow is positively related to payout, the cross-product term is negative. None of the control variables in Models 1 to 8 besides CF and PI*CF are significant.

Table 5: Regression Results on the Relation between Firm Payout Decisions and Investors' Private Information

	Model1	**Model2**	**Model3**	**Model4**	**Model5**	**Model6**	**Model7**	**Model8**
Intercept	0.32 (1.81)*	0.14 (0.13)	0.33 (1.81)*	-0.88 (-0.08)	0.64 (1.51)	-0.18 (-1.40)	0.64 (1.49)	-0.21 (-1.18)
Q	0.13 (0.46)	0.24 (1.17)	0.11 (0.31)	0.29 (1.26)	0.45 (1.25)	0.78 (1.18)	0.48 (1.17)	0.89 (1.23)
CF	0.29 (2.03)**	0.40 (2.40)**	0.29 (2.03)**	0.41 (2.40)**	0.31 (1.95)**	0.96 (2.02)**	0.42 (1.97)**	0.96 (2.02)**
PI1	-0.11 (-1.60)	0.12 (0.44)	-0.12 (-1.60)	0.19 (0.66)				
PI1*Q		-0.91 (-1.14)		-0.12 (-1.28)				
PI1*CF		-0.09 (-1.80)*		-0.10 (-1.80)*				
PI2					-0.71 (-1.39)	0.26 (0.43)	-0.71 (-1.38)	0.29 (1.50)
PI2*Q						0.83 (1.17)		-0.10 (-1.23)
PI2*CF						-0.95 (-1.77)*		-0.95 (-1.78)*
Ret	0.72 (0.15)	0.23 (0.57)	0.67 (0.13)	0.25 (0.61)	1.04 (0.22)	0.28 (0.65)	0.10 (0.21)	0.30 (0.67)
1/TA	-0.90 (-0.38)	-0.18 (-0.33)	-0.91 (-0.33)	-0.21 (0.84)	-0.83 (-0.34)	-0.21 (-0.96)	-0.98 (-0.35)	-0.24 (-0.95)
IO			0.01 (0.02)	0.01 (0.01)			0.01 (0.01)	0.02 (0.01)
Leverage			0.62 (0.31)	0.24 (1.12)			0.65 (0.34)	0.22 (1.13)
Adj R^2	0.19	0.31	0.91	0.31	0.17	0.30	0.16	0.30

*$I_{it}(D_{it}) = \alpha_t + \varphi_i + \beta_1 \cdot Q_{it-1} + \beta_2 \cdot INFO_{it-1} + \gamma \cdot CONTROL + \varepsilon_{i,t}$ and $I_{it}(D_{it}) = \alpha_t + \varphi_i + \beta_1 \cdot Q_{it-1} + \beta_2 \cdot INFO_{it-1} + \beta_3 \cdot INFO_{it-1} \cdot Q_{it-1} + \gamma \cdot CONTROL + \varepsilon_{i,t}$ are used in the regression respectively. The dependent variable is Total Dividends (Whole sample). Clustered standard errors are used to account for serial correlations due to firm and year effects. ***, **, and ** denote significance at the 1%, 5%, and 10% levels, respectively*

Effect of Private Information on Payout of Firms by Size, Sales and Profitability

We study the effect of private information on dividend payout by sorting the firms in our sample on the basis of size, sales and profitability into four quartiles. This study parallels in all respects the study on investments reported in Section V except that the dependent variable here is payout instead of investments. We estimate equation 3. The result of this analysis is reported in Table 6 whose three panels are similar in construct to the three panels of Table 4.Table 6: Regression Results on the Relation between firm investments and investors' private information on subsamples (dependent variable is Total Dividends)

When the sample is sorted by firm size in Panel A, the effect of private information on the payout of different sized neglected firms can be seen acting out in many more ways than in the aggregate sample. However, this effect is confined to particular quartiles and there is no systematic variation by size. Thus, PI1 is positively correlated with payout at a 5 percent significance level for the firms in quartile Q4 but is negatively correlated without statistical significance for firms in Q1 and Q3. Similarly PI1 acting through Q is significantly negatively related at the 5 percent level with payout for quartile Q4, but quartiles Q1 to Q3 show no significance and the sign of the coefficients vary without a consistent pattern. The effect of private information in the cash flow (PI1*CF) on the payout is significant for Q1 and Q3 at the 5 and 10 percent level respectively, but the size and sign of the coefficients vary in an erratic manner.

The story is similar when PI2 is used as the measure of private information. PI2 in its standalone form has a significant effect on the payout decision for firms in quartiles Q1, Q2 and Q4 but the sign of the

coefficients alternate between negative and positive from Q1 to Q4. The effect of PI2 in Q and CF i.e. the cross product terms PI2*Q and PI2*CF, are significant in some quartiles but with erratic changes in the coefficient size and sign, it is hard to attribute the significance to the size effect; rather it is likely imparted by a coincidental congregation of some other firm characteristics of the firms in the quartile that impart statistical significance to it.Panel B gives the result of estimating equation 3 after sorting the firms into quartiles by sales. Q4 contains the firms with the highest sales and Q1, the firms with the least sales.

Table 6: Payout Regressions

PANEL A Payouts Regressions by Firm Size								
	Q1 (Smallest)	**Q2**	**Q3**	**Q4 (Largest)**	**Q1 (Smallest)**	**Q2**	**Q3**	**Q4 (Largest)**
Intercept	0.08	0.08	0.20	-3.54	0.32	-0.30	0.49	-0.78
	(2.18)**	(0.57)	(1.62)	(2.16)**	(4.36)***	(1.74)*	(1.61)	(-2.20)**
PI1	-0.02	0.02	-0.67	0.96				
	(-1.30)	(0.75)	(-1.60)	(2.64)**				
PI1*Q	0.01	-0.02	0.19	-0.71				
	(0.32)	(-0.67)	(1.32)	(-2.40)**				
PI1*CF	-0.01	0.01	0.17	-01.7				
	(-3.94)**	(1.02)	(1.66)*	(-1.56)				
PI2					-0.31	0.51	-0.49	0.76
					(-3.95)***	(3.39)***	(-1.54)	(1.97)**
PI2*Q					0.02	-0.27	0.20	-0.53
					(1.30)	(-1.69)*	(1.31)	(-1.55)
PI2*CF					-0.09	0.03	0.11	-0.86
					(-5.70)***	(0.38)	(1.57)	(1.75)*
Adj R^2	0.62	0.04	0.41	0.46	0.60	0.05	0.39	0.43
Panel B: Payouts Regressions by Firm Sales								
	Q1 (Smallest)	**Q2**	**Q3**	**Q4 (Largest)**	**Q1 (Smallest)**	**Q2**	**Q3**	**Q4 (Largest)**
Intercept	0.24	0.23	1.01	-0.37	-1.54	0.82	1.35	1.17
	(0.87)	(1.25)	(0.46)	(-2.65)**	(-1.31)	(0.95)	(0.26)	(3.03)***
PI1	0.05	-0.08	-1.23	0.12				
	(0.51)	(-1.01)	(-1.06)	(3.24)***				
PI1*Q	0.02	0.01	0.54	-0.01				
	(0.76)	(0.15)	(0.59)	(-3.04)***				
PI1*CF	0.09	0.04	0.15	-0.03				
	(1.18)	(1.22)	(1.84)*	(-0.77)				
PI2					2.14	-0.87	-0.38	1.25
					(1.530	(-0.88)	(-0.52)	(3.20)***
PI2*Q					0.01	0.31	0.27	-1.06
					(0.06)	(0.73)	(0.44)	(-3.14)***
PI2*CF					1.05	0.55	0.47	-0.12
					(1.20)	(1.21)	(1.22)	(-0.37)
Adj R^2	0.16	0.25	0.47	0.48	0.19	0.24	0.42	0.46
Panel C: Payouts Regressions by Firm Profitability								
	Q1 (Lowest)	**Q2**	**Q3**	**Q4 (Largest)**	**Q1 (Smallest)**	**Q2**	**Q3**	**Q4 (Highest)**
Intercept	0.25	-0.16	-0.19	0.38	0.41	-0.51	-0.47	0.55
	(1.34)	(-0.46)	(-1.93)**	(0.82)	(0.52)	(-0.68)	(1-.77)*	(0.57)
PI1	-0.02	0.53	0.56	-0.75				
	(-0.18)	(0.52)	(1.96)**	(-0.70)				
PI1*Q	-0.01	-0.13	-0.47	0.01				
	(-0.57)	(-0.99)	(-1.89)*	(0.02)				
PI1*CF	-0.01	-0.14	-0.11	-0.02				
	(-2.53)**	(-3.61)	(-1.68)*	(-1.06)				
PI2					-0.23	0.65	0.48	-0.41
					(-0.25)	(0.77)	(1.72)*	(-0.45)
PI2*Q					-0.06	-0.21	-0.41	0.15
					(-0.54)	(-1.04)	(-1.77)*	(0.20)
PI2*CF					-0.10	-0.11	-0.85	-0.25
					(-2.28)**	(-1.27)	(-1.43)	(-3.04)**
Adj R^2	0.11	0.80	0.45	0.65	0.11	0.53	0.41	0.77

$I_{it}\,(D_{it}) = \alpha_t + \varphi_i + \beta_1 \cdot Q_{it-1} + \beta_2 \cdot INFO_{it-1} + \beta_3 \cdot INFO_{it-1} \cdot Q_{it-1} + \gamma \cdot CONTROL + \varepsilon_{i,t}$ *is used in the subsample regression. In Panel A the firms are sorted on the basis of size with Q4 containing the largest firms and Q1 the smallest. In Panel B the firms in our sample were sorted by sales with Q4 containing the firms with the highest sales and Q1 the firms with the lowest sales. In Panel C the firms are sorted by profitability. The dependent variable is total dividends. Clustered standard errors are used to account for serial correlations due to firm and year effects. ***, **, and ** denote significance at the 1%, 5%, and 10% levels, respectively. For brevity, only the salient variables are reported.*

The effect of PI1 in the standalone form, and acting through Q is significant in Q4, and acting through CF is significant in Q3. However, the erratic variability of coefficient signs precludes assigning the significance to firm sales. With the other measure of private information, PI2, the standalone value of PI2 and PI2*Q are significant for the largest Q4 firms but again the coefficients vary without any systematic pattern in the quartiles.

Panel C gives the result of estimating equation 3 after sorting the firms into quartiles by firm profitability. Q4 contains firms with the highest profitability and Q1 the firms with the least. PI1 and PI1*Q are significant for Q3 but there is no pattern in the coefficient signs. The effect of PI1*CF on payout is uniformly negative for all four quartiles and significant for Q1 and Q3. Although the results establish a negative correlation, but the nonsystematic variation in the coefficients precludes any definitive statement on the private information effect of profitability on the payout of the neglected firms. The results of using PI2 as the measure of private information has very similar results to PI1 and the conclusions are identical.

CONCLUSION

Previous researchers have assumed an information deficit in the case of neglected firm stocks because these firms have little or no analyst, institutional or media coverage. However, these researchers did not specifically consider the private information content impounded in the price of these stocks as a result of the activities of private traders. The goal of this paper was to study the presence and distribution of private information in neglected firm stocks and the impact of private information on the investment and payout policies of neglected firms. We use two measures of private information developed by Durnev et al. (2004) and Chen et al (2007) both of which are based on Roll (1988).

We employ a regression methodology where investment or payout is the dependent variable and normalized price and private information are the independent variables along with a set of control variables. We find that the extent of private information in neglected firm stocks varies with certain firm characteristics. Thus, we find a significant negative correlation between the amount of private information and the market size, cash flow, sales and return on assets of neglected firms. One of the two measures of private information that we use also provides evidence that this statistically significant negative correlation with private information persists even with normalized price and insider ownership. We further find that the investment activity of neglected firms is positively impacted by the amount of private information in the price of neglected firm stocks. An analysis of the private information effect on the investment policy by size, sales and profitability reveals that the private information impounded in the price is most important for the smallest firms. There appears to be no systematic effect of private information on the investments of the firms based on their sales and profitability. We find that the effect of private information on the payout of the firm takes place through private information impounded in its cash flow rather than in its price. There is no systematic impact on this relationship based on the size, sales or profitability of the neglected firms.

A limitation of the study is that the findings are historical and it cannot be said with certainty whether the relationships found in this study will persist in the future. A useful avenue for future research would be to test for the stability of our findings on an out of sample period, but such a test must await the lapse of a sufficient time period so that a meaningful out of sample data becomes available.

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