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Tax Expense Momentum: Anomaly or Risk?

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Abstract

The literature on tax-expense momentum is unclear as to whether its effect is due to anomaly or risk. We apply the approach developed by Ohlson and Bilinski (2015) to assess whether the positive relationship between tax expense momentum (surprise) and future stock returns is explained by anomaly or risk. We find that tax expense momentum increases the probability of a high return and decreases that of a low return. This supports an anomaly-based explanation for the tax expense momentum.

Keywords Tax Expense Momentum, Tax Expense Surprise, Risk, Anomaly

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Ⅰ. Introduction

Is the tax-expense momentum effect an anomaly or compensation for risk? Firstly, in the literature we examine whether the tax-expense momentum effect is an anomaly or compensation for risk using the recent methodology developed by Ohlson and Bilinski (2015).

Tax-expense momentum literature states that change in quarterly tax expense forecasts one quarter-ahead future returns. In Thomas and Zhang (2011), the greater the tax-expense, the higher the future stock returns. Thomas and Zhang reason that tax expenses contain information about the state of firms. However, as the market tends to underreact to tax-expense information, there is a predictive relationship between tax information and future returns. The detailed logic is as follows. First, firms with large earnings pay more taxes. Thus, a tax-expense increase is a good sign. Second, however, investors (including stock analysts) do not understand the implications of a tax-expense increase because tax accounting is difficult. Third, therefore, the increased earnings (although implied in a tax-expense increase) appear as a surprise in the next period. This increases the stock return. Furthermore, a tax expense increase in the current period increases usually increases the tax expense in the next period, which strengthens the predictive relationship between stock price and tax expense.

However, such reasoning has a weakness. The extent to which investors are ignorant of tax accounting is unknown. Thomas and Zhang argue that tax accounting is murky, so it is not surprising that investors do not fully regard tax-expense increases as good news. However, even if Thomas and Zhang are right, this does not mean that tax expenses should predict future returns. Investors should be 'systematically' wrong, i.e. under reaction to tax information instead of random idiosyncratic reaction. Otherwise, the tax-expense effect would not occur. Furthermore, note that Thomas and Zhang use the change in tax expense, or tax-expense momentum. This is a simple measure that everyone can compute. Tax accounting can be opaque, but tax-expense momentum is not. Thus, what kind of mental mechanism is needed in order to produce systematic bias and generate the predictive relationship? Moreover, what prevents investors from learning the obvious relationship between tax expense surprise and future earnings surprise? It might be possible to come up with some behavioral economics stories to produce the behavioral bias. Nevertheless, the literature is silent about this issue.

This issue suggests an alternative explanation based on risk. Tax expense change can signal risk change. If a tax expense increase implies the changing riskiness of a firm, then stock returns should increase. A long-short portfolio based on tax expense change may capture state variables that regulate the utility optimization behavior of investors. As any state variable can be a factor, the tax expense change can imply a factor about the changes in future returns.

In order to examine whether the tax-expense momentum effect results from investor under-reaction or from risk factors, we apply the Ohlson and Bilinski (2015) approach. This method is known to be intuitive, easy to implement, simple to specify, and robust. We explain the Ohlson and Bilinski approach in detail in the next section as well as the literature on tax expense momentum. Then, we explain our sample and results. Finally, we conclude our study in the last section.

Ⅱ. Literature Review

2. Tax and Stock Returns

There is ample literature about what information tax accounting contains about stock price. First, some researchers investigated the contemporaneous relationship between tax and stock price. Lipe (1986) argues that tax expense is a cash outflow, so it reduces stock price. Lipe validates this claim by showing that tax expense and stock returns are negatively correlated. Second, some researchers, such as Ohlson and Penman (1992), Lev and Thiagarajan (1993), and Hanlon, Laplante, and Shevlin (2005), find that tax expenses are positively correlated with both contemporaneous and future stock prices. This differs from the findings of Lipe (1986). Thomas and Zhang (2014) offer a detailed and direct analysis on the contemporaneous relation between tax expense and stock prices. In addition, Thomas and Zhang (2011) highlight the tax-expense momentum effect that a positive tax-expense surprise in the current period predicts a positive stock return, positive earnings surprise, and tax expense in the next period.

Then why does tax-expense momentum predict future stock returns and earnings? Lev and Nissim (2004) ascribe the positive relationship between book-tax ratio and future returns to investor under-reaction. Schmidt (2006) finds that investors tend to ignore the persistent component in an effective tax rate. Weber (2009) argues that even stock analysts fail to fully comprehend tax information. Thomas and Zhang (2011) propose that investors fail to understand the change in core profitability of a firm implied in a tax expense surprise.

In conclusion, existing literature finds that tax expenses predict future stock returns. The literature attributes the relationship to investor under-reaction, which in turn results from opaque and complex tax accounting. Nevertheless, we cannot rule out the possibility that there is a risk-based explanation for the relationship between tax expense and future returns. In addition, while tax accounting is opaque, announced tax expenses and the corresponding surprise are straightforward. This weakens the logic from murky tax accounting to investor under reaction. We fill the void in the literature on whether the tax-expense momentum effect is a risk or anomaly using the Ohlson-Bilinski method explained in the next subsection.

2. Ohlson-Bilinski Methodology

Ohlson and Bilinski (2015) propose a simple method to distinguish risk from anomaly. Their method is based on two logit regressions, as follows:

$$P(High.Return) = \alpha_1 + \beta_1 \cdot X + \Gamma_1 \cdot Risk.Controls(H)$$
$$P(Low.Return) = \alpha_2 + \beta_2 \cdot X + \Gamma_2 \cdot Risk.Controls(L).$$

High.Return and *Low.Return* mean the stock returns higher and lower than cut-off returns respectively. *X* is the variable that we are interested in, whether it is related with anomaly or risk (e.g. tax expense surprise). *Risk. Controls* are vectors of variables that capture the risk of a stock (e.g. stock return volatility, beta, firm size, etc.).

Ohlson and Bilinski argue that the opposite sign of β_1 and β_2 supports an anomaly explanation for the relation between X and returns. It is because the opposite sign of the two coefficients indicates that investors can earn abnormal returns by increasing possibility of high returns and decreasing possibility of low returns, which is unlikely to result from risk. In other words, a negative product of the two coefficients points toward anomaly. However, if β_1 and β_2 have the same signs, one cannot determine whether the relation between X and returns can be attributed to risk or anomaly.

More precisely, there are two versions of test results supporting an anomaly explanation. A strong version of it is that a sign of product of β_1 and β_2 is negative, and its weak version is that one coefficient of the two is negative, and the other one is zero. However, note that if product of the two coefficients is negative but both coefficients are statistically insignificant, the Ohlson and Bilinski methodology cannot be used to determine whether the relation between X and returns is attributable to risk or anomaly. This methodology has several advantages. First, it does not have to specify expected returns models. Second, it is not likely to be sensitive to cut-off values for high returns and low returns. Third, it is not easily influenced by a few extreme returns. Fourth, it is not easy to falsely reject the risk explanation hypothesis because it requires opposite sign of the two regression coefficients and their statistical significances. Fifth, this methodology is easy to implement. However, there are two weaknesses of the Ohlson and Bilinski methodology. First, as mentioned above, the methodology cannot distinguish between the risk vs. anomaly explanation when either the product of the estimated coefficients is positive or both coefficients are statistically insignificant. Second, an anomaly variable could be positively correlated with risk. Nevertheless, given several advantages of the framework and importance of our research question, applying the Ohlson and Bilinski framework to the tax-expense momentum effect is an important contribution.

Ⅲ. Analysis

1. Data

Our sample period is 1977:1Q to 2013:4Q. The accounting data are from the quarterly Compustat. Stock market data are from CRSP. Our independent variable of interest is *tax expense surprise*, defined as 'tax expense per share in quarter *q*' minus 'tax expense per share in quarter *q*-4', scaled by 'assets per share in quarter *q*-4' (Thomas and Zhang, 2011). Tax expense per share is TXTQ/(AJEXQ×CSHPRQ). Asset per share is ATQ/(AJEXQ ×CSHPRQ).

Our primary dependent variables are *High_return* and *Low_return*. High_return takes 1 if three-month buy-and-hold market adjusted returns are higher than 12.5 percent, and 0 otherwise. *Low_return* is 1 if three-month buy-and-hold market adjusted returns are lower than -12.5 percent, and 0 otherwise. Ohlson and Bilinski (2015) define the cut-off points as +/- 50 percent because these are four times higher than annual equally weighted return on CRSP index. Similarly, we use one quarter of the 50 percent as our benchmark to assess whether the quarterly returns of firms are high or low. We compute market adjusted returns as the difference between three-month buy-and-hold raw returns, starting from the fourth month after the end of quarter q, and value-weighted CRSP market return.

Following Ohlson and Bilinski (2015), we control for return volatility (*Vol*), firms' systematic risk (*Beta*), and market value of firms (*MV*). *Vol* is estimated over past 36 months ending three months after the fiscal year-end. *Beta* is estimated from the market model over the same period as *Vol*. *MV* is the market value of equity at the end of fiscal quarter *t*. We exclude firm-quarters without the above variables. Our final sampleconsists of 663,401 firm-quarters. Variables except returns are allwinsorized at the top and bottom 1 percent levels to remove potentialeffect of outliers.

2. Results

<Table 1> shows descriptive statistics. Panel A shows mean, median, and standard deviations. Panel B and C show some interesting patterns. In Panel B, we compare the average of explanatory variables for stocks

<Table 1> Descriptive Statistics

〈Table 1〉 represents descriptive statistics. Panel A reports the basic descriptive statistics for our main variables. Panel B (C) report the difference in explanatory variables between *High_return* (*Low_return*) and non *High_return* (*non Low_return*) firms. *High_return* is defined as an indicator variable, taking 1 if three-month buy-and-hold market adjusted returns are larger than 12.5 percent, and 0 otherwise. Market adjusted returns are the difference between three-month buy-and-hold raw returns, starting from the fourth month after the end of quarter q, and value-weighted CRSP market return. *Low_return* is defined asan indicator variable, taking 1 if three-month buy-and-hold market adjusted returns are lower than -12.5 percent, and 0 otherwise. Tax expense surprise is estimated as tax expense per share (TXTQ/(AJEXQ×CSHPRQ) in quarter q minus tax expense per share in quarter q-4, scaled by assets per share (ATQ/(AJEXQ×CSHPRQ)) in quarter q-4 (Thomas and Zhang, 2011). *Vol* is stock returns' volatility, estimated over past 36 months ending three months after the fiscal year-end. *Beta* is estimated from the market model over the same period as *Vol*. *MV* is the market value of equity at the end of fiscal quarter t.

Panel A: Descriptive Statistics

	N	Mean	Median	Std.
High_return	663,401	0.22	0.00	0.41
Low_return	663,401	0.26	0.00	0.44
Tax expense surprise	663,401	0.00	0.00	0.01
Vol	663,401	1.10	1.00	0.88
Beta	663,401	0.14	0.12	0.08
MV	663,401	1460.54	138.02	5265.33

Panel B: The Difference in Explanatory Variables between High_return and non High_return Firms

	High_return = 1	*High_return = 0*	Difference	% Difference	t-test
Tax expense surprise	0.0007	0.0004	0.0004	103.0%	11.37
Vol	0.1608	0.14	0.0208	14.9%	81.8
Beta	1.1853	1.0821	0.1032	9.5%	39.29
MV	981.67	1592.29	-610.62	-38.3%	-38.9

Panel C: The Difference in Explanatory Variables between Low_return and non Low_return Firms

	Low_return = 1	*Low_return = 0*	Difference	% Difference	t-test
Tax expense surprise	0.0002	0.0005	-0.0004	-70.2%	-12.31
Vol	0.1772	0.133	0.0442	33.2%	174.16
Beta	1.2334	1.0593	0.1741	16.4%	70.83
MV	813.50	1687.09	-873.59	-51.8%	-59.4

that earn extreme high returns with the average for other stocks. Intuitively, the stocks in the right tail of stock return distribution should be riskier than the others. The results are consistent: Vol and Beta are higher, but MV is lower in the right tail. Tax expense surprise is higher in the right tail, meaning that high-return stocks tend to exhibit high tax-expense surprise.

In Panel C, we report averages of the explanatory variables for stocks that earn extreme low returns. We again predict that the left tail of return

<Table 2> Predicting Model for *High_return* and *Low_return* using Risk Controls

〈Table 2〉 reports test results of predicting model for *High_return* and *Low_return* using risk controls. The dependent variable in Panel A is *High_return*, and the dependent variable in Panel B is *Low_return*. Model 1 and Model 2 are cross-sectional regression models with standard errors clustered by firm. Model 3 is based on quarterly Fama-MacBeth regressions. Industry effects and Year/quarter effects are controlled for in the model. Variables are defined in 〈Table 2〉.

Panel A: Predicting *High_return* using Risk Factors

	Model 1		Model 2		Model 3 (Fama-MacBeth)	
	Estimate	Z-stat	Estimate	Z-stat	Estimate	T-stat
Intercept	-1.2226	-17.59	-1.1166	-16.12	0.2921	18.85
Vol	1.0215	20.25	0.5066	9.08	0.2194	8.00
Beta			0.0857	19.15	0.0181	7.56
ln MV	-0.0716	-32.98	-0.0831	-37.10	-0.0124	-11.79
Industry effects	YES		YES		YES	
Year/quater effects	YES		YES			
n	663,401		663,401		152	
Pseudo R^2(Adj R^2)	3.03%		3.10%		4.86%	

Panel B: Predicting *Low_return* using Risk Factors

	Model 1		Model 2		Model 3 (Fama-MacBeth)	
	Estimate	Z-stat	Estimate	Z-stat	Estimate	T-stat
Intercept	-0.3645	-5.82	-0.3180	-5.07	0.3608	19.95
Vol	4.7273	79.94	4.5224	69.92	1.0610	33.37
Beta			0.0349	7.50	-0.0004	-0.15
ln MV		-45.25	-0.1088	-45.30	-0.0167	-17.50
Industry effects	YES		YES		YES	
Year/quater effects	YES		YES			
n	663,401		663,401		152	
Pseudo R^2(Adj R^2)	7.79%		7.80%		9.63%	

distribution should include risky stocks such as high Vol, high Beta, and low MV. The results are consistent with this conjecture. However, tax expense surprise is lower in the extreme low-return stocks. Hence, extreme low-return stocks tend to exhibit low tax expense surprise.

To summarize the univariate results in <Table 1>, the higher the risk

<Table 3> Predicting Model for *High_return* and *Low_return* using Tax Expense Surprise and Risk Controls

〈Table 3〉 reports test results of the predicting model for *High_return* and *Low_return* using *Tax expense surprise* and risk controls. The dependent variable in Panel A is *High_return*, and the dependent variable in Panel B is *Low_return*. Model 1 and Model 2 are cross-sectional regression models with standard errors clustered by firm. Model 3 is based on quarterly Fama-MacBeth regressions. Industry effects and Year/quarter effects are controlled for in the model. Variables are defined in 〈Table 2〉.

Panel A: Predicting High_return using risk controls

	Model 1		Model 2		Model 3 (Fama-MacBeth)	
	Estimate	Z-stat	Estimate	Z-stat	Estimate	T-stat
Intercept	-1.9563	-31.04	-1.1125	-16.06	0.2966	18.93
Tax expense surprise	3.5135	12.53	3.6637	13.40	1.1558	6.95
Vol			0.4921	8.83	0.2107	7.62
Beta			0.0863	19.32	0.0182	7.63
ln MV			-0.0837	-37.48	-0.0128	-12.19
Industry effects	YES		YES		YES	
Year/quater effects	YES		YES			
n	663,401		663,401		152	
Pseudo R^2(Adj R^2)	2.51%		3.12%		4.99%	

Panel B: Predicting *Low_return* using risk controls

	Model 1		Model 2		Model 3 (Fama-MacBeth)	
	Estimate	Z-stat	Estimate	Z-stat	Estimate	T-stat
Intercept	-0.8899	-11.96	-0.3243	-5.17	0.3567	19.61
Tax expense surprise	-3.0413	-11.60	-2.9110	-11.36	-1.0956	-8.94
Vol			4.5340	70.07	1.0683	33.73
Beta			0.0345	7.41	-0.0005	-0.20
ln MV			-0.1083	-45.06	-0.0164	-17.23
Industry effects	YES		YES		YES	
Year/quater effects	YES		YES			
n	663,401		663,401		152	
Pseudo R^2(Adj R^2)	4.04%		7.82%		9.72%	

of a stock, the more likely they are included in the tails the more the tax-expense surprise of a firm, the more its stock is in the right tail of return distribution (less in the left tail). This result is consistent with anomaly view about tax-expense momentum effect, but inconsistent with risk view.

<Table 2> examines the relationship between extreme returns and risk controls. The coefficients are mostly significant and in the same direction. These results confirm that the Ohlson and Bilinski framework is in line with the prediction of the standard risk control variables in our sample. The results are robust to whether we consider market beta jointly (model 2) or not (model 1), or whether we use extreme high or low returns. The results in the Fama-MacBeth column are also consistent with other results, although the coefficient for Beta is weaker in Low_return stocks. The Fama-MacBeth regression uses pooled regressions.

In <Table 3>, we examine how tax expense surprises behave. If tax-expense momentum effect is an anomaly, its coefficients should be positive in the high return group, but negative in the low return group. The results support the anomaly view. For instance, in Model 2 in Panel A and B, when tax expense surprise increases by one standard deviation, its stock is 3.7% more likely to be included in the extreme high return group, but 2.9% less likely to be included in the extreme low return group. The results for other risk variables are consistent with those of <Table 2>. The Fama-MacBeth column shows similar results.

Ⅳ. Conclusion

We apply the Ohlson and Bilinski (2015) method to examine whether the tax-expense momentum effect results from anomaly or a risk. The results show that the larger the tax expense surprise, the higher the likelihood of high returns and the lower the likelihood of low returns. This suggests that tax-expense momentum is more in line with an anomaly view than a risk view.

Ohlson and Bilinski (2015) argue that their method is intuitive, "easy to implement," and hardly "reject[s] falsely the null hypothesis." Nevertheless, we do not believe that our analysis will fully resolve the debate on the anomaly versus risk view of tax expense surprise. While our results are valuable and novel, future research can build on our results to better understand the tax expense momentum effect.

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