

# Characteristics of Short-Term Equity Management of Property-Liability Insurers

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## Abstract

This paper investigates short-term equity trading practices of non-group affiliated P/L insurers in the U.S. Using the NAIC's Annual Statements, all trading records reported on the statements are utilized to identify short-term trading activities. This study documents that about one-third of the sample insurers report at least short-term equity trading, and financial characteristics of insurers are highly associated with the insurers' short-term equity trading activity than underwriting and firm characteristics.

## I. Introduction

U.S. property-liability (P/L) insurance companies manage their investment risk by maintaining diversified portfolio, mostly consisted of investment grade bonds and equities. Although the purchasing power of P/L insurance companies for equity in the U.S. stock markets is less significant than that of other institutional investors such as investment banks, pension funds and mutual funds (Jiao & Liu, 2008; Brancato & Rabimov, 2008), equity is an important investment component for P/L insurers. According to Brancato and Rabimov, all institutional investors in 2006 controlled assets totaling \$27.1 trillion. P/L insurers as a whole invest about \$240 billion in equity in 2007, which is about 25 percent of the insurers' total invested assets.

It is generally noted that the P/L insurers hold financial securities long-term, matching their expected claim payout patterns from their lines of business. The focus of the most extant studies of an insurance company's investment choices is to examine long-term perspective of the insurer's investment choices. Another line of research investigates how to create the insurer's portfolio to achieve surplus immunization to interest rate changes (i.e., Tzeng, Wang & Soo, 2000; Park & Choi, 2010). However, an actively managed asset portfolio may involve frequent portfolio adjustments for various reasons, resulting in more frequent trading, including day-trading. Yan and Zhang (2009) documented that institutional investors with a short-term investment horizon, called short-term institutions including banks and insurance companies, are better informed and they trade frequently to exploit their informational advantage.<sup>11</sup>

A large body of studies of institutional investors examines the extent of institutional investors' informational roles in the stock market (i.e., Piotroski & Roulstone, 2004; Yan & Zhang, 2009) and the extent of managerial influences such as capital structure and performance (i.e., Chaganti & Damanpour, 1991) and dividend payout policy (i.e., Grinstein & Michaely, 2005). Extant studies document mixed results regarding institutional investors' informational

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<sup>11</sup> A large body of literature also suggests more limited evidence of informed trading by institutional investors. For example, Bushee and Goodman (2007) document that informed trading is not as widespread as extant studies suggest.

roles in the stock market, and Yan and Zhang (2009) attribute the mixed results to studies not considering the investment horizon of institutional investors. They state that institutional investors “may have different investment horizons because of differences in investment objectives and styles, legal restrictions, and competitive pressures; in addition, their investment horizons may differ because of their different informational roles” (p894).

Understanding how the P/L insurers as institutional investors manage their equity portfolio, especially short-term investment horizon, is important due a few reasons. For insurance regulators, understanding the extent of the P/L insurers’ short-term investment management is important because the frequent equity trading can increase P/L insurers’ investment risk, which may jeopardize the insurers’ financial stability. This is particularly problematic, if equity (or asset) managers of the P/L insurers do short-term trading to earn a higher return and there is little supervision of those managers trading behavior. Although two regulatory tools to evaluate the financial condition of insurers by the National Association of Insurance Commissioners (NAIC) include a measure of the P/L insurers’ investment performance, no regulatory tool is available to accurately quantify the amount of investment risk, especially associated with short-term equity trading. The Insurance Regulatory Information System (IRIS), which has been used since 1973, includes a measure of investment yield. The Financial Analysis and Surveillance Tracking (FAST) is another solvency monitoring system used since 1993, which includes an investment yield deviation.

The purpose of this study is twofold. First, this study investigates short-term equity trading practices of fund managers of the P/L insurers. This study explores preferred and common stocks trading records reported on the NAIC’s Annual Statement filed by all P/L insurers in the U.S. The NAIC’s Annual Statement is the comprehensive report of the P/L insurers’ financial conditions and it is the only data source to have comprehensive trading records at the individual insurer’s level. Little research has documented to understand the short-term trading choices of the P/L insurers. Not only does this study add to the literature on investment behaviors of institutional investors and the P/L insurers, it also opens a new line of literature on the P/L insurer’s short-term trading behaviors. Short-term equity trading is defined as buy and sell of the same security in the same calendar year. This definition undermines actual short-term transaction activities since this definition does not include a short-term transaction involving buy and selling the same security in different years with a holding period less than a year. For example, an insurer buys a security in December of one year and dispose of it in January of a following year, and this study does not include this transaction. Second, this study attempts to identify factors affecting the P/L insurers’ short-term equity trading behavior using a logistic model. Factors studied include financial, operational and organizational factors of the P/L insurers.

Park & Query (2009) document an organizational difference among P/L insurers engaging in short-term trading with any type of financial securities, and they report that about 62 percent of all P/L insurers in 2000 engage in short-term trading with bonds or stocks. Unlike they study of Park & Query, this study focuses on non-group affiliated P/L insurers’ short-term equity trading practices. Although many insurers in the U.S. are group affiliated and dominate in certain lines of business, there is a potential benefit of limiting the study to non-group affiliated P/L insurers. Investment decision for a group affiliated insurer is most likely affected by its

parent company, and fund managers at the parent company may manage all funds held by all companies within the group. That is, the decision making unit for managing assets for group affiliated P/L insurers would be the group rather than individual company. Analyzing a group as a decision making unit complicates the use of the NAIC's Annual Statement when equity trading information of all individual insurers under the same group has to be merged to create a group level data. Limiting the sample to non-group affiliated P/L insurers simplifies the study design without weakening the purpose and findings. Among insurers that are not group affiliated, about 37 percent of them engage in short-term equity trading.

The rest of the paper is organized as follow: The logit model used in the study is explained in the next, followed by Data section, which describes the NAIC data and samples used in the study. Finding and Discussion section presents findings of study and the conclusion section concludes.

## II. Econometric Model

When it comes to identifying factors affecting the insurers decision to engage in short-term equity trading, logistic regression analyzes binomially distributed data of the form

$$Y_i \sim B(N_i, P_i) \text{ for } i = 1, \dots, k,$$

where the numbers of  $N_i$ , Bernoulli trials, are known and the probabilities of event  $P_i$  are unknown. Given a set of explanatory variables,  $X_i$ , the logistic regression model is written as;

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 X_{1,i} + \dots + \beta_k X_{k,i}.$$

If an insurer engages in short-term trading, the probability of event  $P_i = 1$ , where we obtain  $L_i = \ln\left(\frac{1}{0}\right)$  and  $L_i = \ln\left(\frac{0}{1}\right)$  otherwise.

In the logit regression, this study examines demographic, financial, and underwriting variables. Demographic variables include an insurer's organizational structure (stock or mutual corporation) and group affiliation; financial variables include cash holdings, amount of total assets, amount of risk based capital, amount of invested assets, and measures of investment performance; and underwriting variables include each insurer's mix of lines of business.

## III. Data

The main source of the data used in this study is Schedule D of the National Association of Insurance Commissioners' (NAIC) Annual Statement reports comprehensive records of the P/L insurers' bond and stock holdings in detail and whether the financial securities are sold or held by the end of a fiscal year. Some examples of what are reported on the various parts of Schedule D of the NAIC Annual Statements include:

- stocks and bonds owned at the end of year
- stocks and bonds acquired during the year
- stocks and bonds sold, redeemed or otherwise disposed of during the year
- long-term stocks and bonds acquired and fully disposed of during the year
- various financial derivatives owned, open at the end of year
- various financial derivatives owned, opened during the year

- various financial derivatives owned, terminated open at the end of year
- counterparty exposure for derivative instruments open at the end of year

Most stocks and bonds reported on the NAIC statements have very comprehensive information about the securities, including CUSIP, date acquired and disposed of, cost to acquire, book value, number of shares, dividends and interest, adjustment for foreign exchange, if applicable, and transaction partner, to name a few.

#### IV. Findings and Discussion

Out of 774 non-group affiliated P/L insurers, 689 insurers of them (89 percent) are used in this study. Criteria to eliminate insurers include negative surplus (equity), negative risk based capital (RBC), or no insurance transaction. About 37.3 percent (257 insurers) of 689 insurers report at least one short term equity transaction in 2001.<sup>1</sup> As shown in Table 1, non-group affiliated P/L insurers with short-term equity trading (Trading Insurers) are larger in absolute size than non-group affiliated P/L insurers with no short-term equity transaction (No-trading Insurers). The mean value of Trading Insurers' total assets is \$111.2 million, while that of No-trading Insurers' is \$29.4 million. However, in terms of surplus to total assets ratio<sup>2</sup> and cash to total assets ratio, No-trading Insurers have a higher surplus ratio (52.7%) and cash ratio (28.8%) than Trading Insurers (43.9% for the surplus ratio and 12.7% for the cash ratio). If practicing short-term equity transaction is considered risky (or aggressive), the descriptive statistics is consistent with the view that conservative insurers (No-trading Insurers) are likely to hold more assets in very liquid assets such as cash and have a higher surplus ratio than other less conservative or aggressive insurers (Trading Insurers).

Both groups of insurers are relatively similar and dissimilar in several aspects. The proportion of premiums from automobile insurance to all insurance both groups of insurers is very comparable at 19.5% for No-trading Insurers vs. 21.9% for Trading Insurers. However, if the lines of business are dichotomized into property and liability, Trading Insurers underwrites more in liability lines of business (41.3% vs. 44.9%), while its counterpart underwrites more in property lines of business (24.1% vs. 18.3%). Assuming short-term equity trading is a risky activity and Trading Insurers are more risk taker (or less risk averse) than its counterpart, this difference in lines of business is also consistent with the findings of insurance literature. Property lines of insurance is known as "short-tail," which means the length of time between a claiming triggering incident and the settlement of the resultant claim is relatively short; typically a few days to a few months. In addition, property lines of insurance are less uncertain about claims payout pattern to insurance companies. On the other hand, liability lines of insurance are known as "long-tail" and more uncertainty about the payment amount and pattern is associated with the lines. Trading-Insurers have higher premiums earned from liability lines of insurance, but lower from property lines of insurance, than its counterpart. Another similarity between the groups of insurers is the organizational structure. The proportion of stock incorporated insurers is 47.4% for No-trading Insurers and 45.9% for Trading insurers. Two main organizational

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<sup>1</sup> The purposes of the study and implications of findings will not be undermined by the age of the dataset.

<sup>2</sup> Insurers are required to report their financial statements following Statutory Accounting Principles (SAP) to state department of insurance, and the term "surplus" is used in lieu of the "equity." Total Assets used in this study also follows the definition of SAP, known as total admitted assets, which is smaller than total assets if it is reported using Generally Accepted Accounting Principles (GAAP).

structures in the insurance industry are stock and mutual incorporation. When it comes to profitability measures, mixed results are documented. Trading Insurers have higher ROE, but lower ROA than No-trading Insurers. ROI for both groups is comparable at 4.36% and 4.25% for No-trading Insurers and Trading Insurers, respectively.<sup>3</sup>

Table 2 summarizes short-term equity trading activities in detail for insurers reporting short-term equity trading by type of stock issuer. Out of 689 insurers, over one-third (257 insurers) of them report at least one short-term equity transaction. Not surprisingly, over 98% (4,369 out of 4,455 transactions) of short-term transactions is with common stocks, and Trading Insurers on average report 17.34 short-term transactions.<sup>4</sup> The mean holding period in days for all short-term transactions is about just over three months (96 days)<sup>5</sup>. Table 2 shows that on average, the holding period for both preferred and common stocks are almost the same (93.7 days and 96.3 days, respectively). However, preferred stocks of public utility companies are held the longest (133.7 days) followed by preferred stocks of financial institutions with 133.1 days. The insurers more frequently trade stocks of industrial and miscellaneous companies. In terms of the trading size, the mean acquiring cost of a preferred stock is about 3.5 times larger than that of a common stock (\$1.25 million for preferred stock vs. \$372,000 for common stock). By type of stock issuer, the mean acquiring cost of a preferred stock of public utility companies is \$1.8 million while that of common stock of public utility companies is mere \$150,000. For common stocks of industrial and miscellaneous companies, the mean acquiring cost is \$386,000.

A logistic regression is performed to identify factors associated with the P/L insurer's short-term equity trading behavior, where the dependent variable is a binomial variable with 1 for Trading Insurers and 0 for No-Trading Insurers. Three separate logistic regressions are performed to study factors affecting different short-term equity trading behaviors; (1) insurers with any short-term stock trading activity, (2) insurers with short-term common stock trading only, and (3) insurers with short-term preferred stock trading only. Since over 98 percent of short-term equity trading is with common stocks, the results between Regression (1) and (2) are almost identical.

The regression results are reported in Table 3. For insurers with short-term common stock trading, financial variables are statistically significant, while none of demographic and underwriting variables are statistically significant. The variables that are positively associated with Trading Insurers are total assets (*Log of Total Assets,  $t-1$* ), the invested asset ratio (*Invested Assets to Total Assets,  $t-1$* ), and returns on security trading (*Net Realized Capital Gain to Invested Assets,  $t-1$* ) from the previous year. This result shows that the larger the P/L insurer, the greater the chance that the insurer will engage in short-term equity trading. There are two plausible explanations for this. One explanation is that the larger the insurer, the greater the insurer's ability to absorb risk, so it can engage in a risky investment activity. Another explanation is that

<sup>3</sup> ROI is calculated as Net Investment Income Earned to Invested Assets.

<sup>4</sup> Because some transactions result in significantly high or low annualized returns, which distort the mean return from short-term transactions, reporting the annualized returns is less meaningful. However, the results are available upon request.

<sup>5</sup> About 14% of all preferred stock transactions are the same day transactions. That is, buy and sell are recorded on the same day. On the other hand, about 3.5% of all common stock transactions are the same day transactions. The result of the holding period distribution by type of stock is available by author upon request.

it's more difficult to monitor fund managers investment activities as the organization is bigger. Although it is difficult to conclude from the finding that the short-term equity trading results in a higher investment yield, reflecting the greater risk the insurers have taken, the probability that non-group affiliated P/L insurers will engage in short-term equity trading increases as non-group affiliated P/L insurers had higher returns from previous years security transactions.

Not surprisingly, insurers with more cash holding are negatively significant to the short-term equity trading activity. This is consistent with the view that the more conservative a P/L insurer is, the more safe assets it holds and the less risky activity it engages. When it comes to the insurer's short-term preferred stock trading activity, two financial variables, *Log of Total Assets*<sub>*t-1*</sub> and *Net Realized Capital Gain to Invested Assets*<sub>*t-1*</sub> are positively associated.

## V. Conclusion

This study investigates a short-term equity trading behavior of 689 non-group affiliated P/L insurers in the United States in 2001, and finds that over one-third of the sample insurers report at least one short-term equity trading activity. Stocks issued by industrial and miscellaneous companies are most frequently traded, followed by financial institution's stocks. This is simply because more number of stocks falls under these two categories. However, in terms of the mean transaction size, the average acquisition cost of preferred stock is 3.5 times larger than that of common stocks. This finding suggests that the insurers may engage in short-term trading with preferred stocks to earn dividends. The mean holding period for short-term equity transaction is about 96 days.

This study also identifies a few factors associated with short-equity term trading activity of non-group affiliated P/L insurers. Logistic regressions show that financial variables, especially total assets, are more strongly tied to insurers' short-term equity trading behavior than underwriting and demographic variables.

Future research should investigate the short-term equity and/or fixed income security trading behavior of group affiliated insurers and compare the trading behavior between them. Another improvement to the study can be made by incorporating market data from CRSP to further explore the insurer's motivation to engage in short-term equity trading. With the CRSP data, study can document whether the P/L insurers are selling stocks to capture extraordinary short-term returns, to limit excessive losses, to increase dividend yield, or something else.

Table 1. Descriptive Statistics for Selected Variables  
(figures are in \$ millions except ratios in %, and N is the number of insurers)

	No-trading Insurers (N=430)				Trading Insurers (N=257)			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Cash	4.2	9.0	-0.6	134	7.6	17.2	-1.2	187
Bonds	15.5	35.3	0.0	352	65.8	186.5	0.0	2,087
Stocks	1.6	6.4	0.0	95	23.4	144.1	0.0	2,189
Invested Assets	23.9	68.9	0.0	1,119	99.8	332.2	0.9	3,927
Total Assets	29.4	77.5	0.1	1,127	111.2	344.8	1.0	3,965
Cash to Invested Assets, %	35.8	33.0	-43	100	15.3	15.7	-6.2	100
Cash to Total Assets, %	28.8	28.1	-5	110	12.7	12.5	-5	71
Bonds to Invested Assets, %	50.9	32.7	0.0	100	61.5	21.9	0.0	100
Stocks to Invested Assets, %	9.2	16.1	0.0	100	20.0	17.3	0.0	90
Invested Assets to Total Assets, %	82.2	18.4	0	110	85.1	10.0	48	100
Surplus to Total Assets, %	52.7	24.5	0.3	100	43.9	19.4	3.2	100
Direct Premium Written	14.8	28.9	0.0	247	34.7	50.7	0.0	319
Net Premium Written	10.3	22.4	-0.1	299	29.1	46.4	0.0	316
Earned Premium	9.6	21.1	0.0	287	27.7	45.5	0.0	315
Auto Lines Ratio, %	19.5	35.8	0	100	21.9	33.5	0	100
Personal Lines Ratio, %	29.2	38.1	0	100	31.6	37.1	0	100
Liability Lines Ratio, %	41.3	42.9	0	100	44.9	40.8	0	100
Property Lines Ratio, %	24.1	32.2	0	100	18.3	23.8	0	100
Net Realized Capital Gain	0.11	0.6	-1.4	7	1.48	14.2	-9.5	216
Net Investment Gain	1.30	4.4	-1.2	75	5.81	23.8	-2.7	338
Net Income	0.13	3.6	-22.8	54	0.92	7.3	-47.5	72
ROI, % <sup>a</sup>	4.36	1.7	-1.7	145	4.25	1.2	0.9	86
ROE, %	-2.13	37.2	-48.8	181	-1.42	21.0	-126	55
ROA, %	0.81	9.5	-98.5	45	0.29	5.8	-31.1	17
RBC to Surplus, %	84.7	35.5	0.0	106	94.2	23.3	0.0	115
Stock, %	47.4	50	0.0	100	45.9	50	0.0	100

Note <sup>a</sup> ROI is calculated as Net Investment Income earned to Invested Assets.

Table 2. Short-Term Equity Transactions, Holding Period and Acquiring Cost by Type of Stock Issuer (N = # of transactions.)

	Insurer	Transaction			Holding Period (Days)		Acquiring Cost (\$000)	
		N	Mean	Max.	Mean	Max	Mean	Max
<u>Preferred Stocks</u>								
Public Utilities	5	12	2.40	4	137.1	272	1,804	7,845
Banks, Trust & Insurance	6	10	1.67	3	133.1	316	803	3,501
Industrial & Miscellaneous	26	63	2.42	10	80.6	317	1,210	10,990
Total - Preferred Stocks	33	86	2.61	15	93.7	317	1,246	10,990
<u>Common Stocks</u>								
Public Utilities	57	132	2.32	17	106.2	329	158	3,663
Banks, Trust & Insurance	81	296	3.65	35	104.1	343	276	14,861
Industrial & Miscellaneous	238	3,940	16.55	288	95.3	362	386	147,127
Total - Common Stocks	252	4,369	17.34	294	96.3	362	372	147,127
Total – Stocks	257	4,455	17.33	294	96.2	362	389	147,127



Table 3. Logistic Regression of Short-Term Equity Transactions  
(Total number of insurers used in the regressions is 687 insurers)

	Insurers with Transaction with		
	Any Stock (N = 257) <sup>a</sup>	Common Stock Only (N = 252) <sup>a</sup>	Preferred Stock Only (N = 33) <sup>a</sup>
Intercept	-7.93 (1.553)	*** -8.05 (1.564)	*** -12.75 (2.993)
<i>Organization Structure</i> ( <i>Stock = 1</i> )	-0.00833 (0.200)	0.00716 (0.201)	0.1706 (0.416)
<i>Log of Total Assets, <sub>t-1</sub></i>	0.4012 (0.083)	*** 0.3836 (0.082)	*** 0.4872 (0.142)
<i>Cash to Total Assets, <sub>t-1</sub></i>	-2.7913 (0.641)	*** -2.84 (0.651)	*** -1.0721 (1.460)
<i>Invested Assets to Total Assets, <sub>t-1</sub></i>	1.5845 (0.796)	** 1.8365 (0.816)	** 1.9659 (2.006)
<i>Surplus to Total Assets, <sub>t-1</sub></i>	-0.4302 (0.536)	-0.471 (0.539)	-0.3416 (1.147)
<i>RBC to Total Assets, <sub>t-1</sub></i>	0.1696 (0.350)	0.3884 (0.360)	-0.5356 (0.699)
<i>Net Realized Capital Gain to</i> <i>Invested Assets, <sub>t-1</sub></i>	14.5631 (4.232)	*** 14.6042 (4.218)	*** 14.5763 (5.963)
<i>Return on Assets, <sub>t-1</sub></i>	-1.432 (1.494)	-1.4225 (1.499)	-3.235 (3.439)
<i>Net Premium Written,</i> <i>Auto Insurance</i>	0.1215 (0.423)	0.0489 (0.426)	-0.3494 (0.948)
<i>Net Premium Written,</i> <i>Personal Insurance</i>	0.00622 (0.359)	-0.0426 (0.361)	0.7426 (0.822)
<i>Net Premium Written,</i> <i>Liability Insurance, <sub>t-1</sub></i>	-0.252 (0.289)	-0.2901 (0.290)	0.303 (0.646)
<i>Net Premium Written,</i> <i>Property Insurance, <sub>t-1</sub></i>	-0.3 (0.411)	-0.2395 (0.412)	0.1091 (1.047)
Chi-Square			
Likelihood Ratio	155.62	155.14	33.78
Wald Test	100.72	99.73	29.07

Note <sup>a</sup> The N refers to the number of insurers who engage in short-term equity trading, and the insurers with a transaction is coded 1, otherwise 0, for the binomial dependent variable.

Figures in parenthesis are standard errors. Statistical significance at the 1, 5, and 10 percent levels is denoted by \*\*\*, \*\*, and \*, respectively.

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