Turnover Premium, Foreign Institutional Ownership, and Time-Varying Risk Premium in Taiwan Equity Markets

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Abstract

The low turnover premium documented in previous studies for U.S. equity markets is also found in Taiwan market, unlike the mixed evidence for other stylized effects such as size, book-to-market ratio and momentum. Consistent with investor overconfidence hypothesis proposed by Odean (1998, 1999), the percentage of foreign institutional shareholdings in a stock is found to vary inversely with turnover premium. This inverse relation is robust to the influence of other forces that may interact with turnover rate, such as market capitalization, book-to-market ratio and 6-month past returns, respectively. Time-varying risk premium, particularly in low turnover-low foreign institutional shareholdings percentage portfolio, provides partial explanation for the phenomenon, but the inverse relationship persists after risk adjustment by models such as unconditional CAPM, Fama-French three factor model

and conditional CAPM.

Key Words: Trading Volume, Turnover Premium, Foreign Institutional Investors, Time-Varying Risk Premium, Overcondifence.

JEL Classification: G12

I. Introduction

The role of trading volume in asset pricing has drawn attention from financial economists during at least the past two decades. Trading volume is often measured by dividing the trading volume of a stock to its number of shares outstanding, or the so called turnover ratio. Most researchers report a positive and significant turnover premium, defined as the average return to a strategy that is simultaneously long on low- and short on high-turnover stocks, in stock returns. See, for example, Datar, Naik and Radcliffe (1998), Chou et. al. (2013). The sources of the turnover premium, however, remain elusive.

Investor overconfidence has been advanced as a plausible explanation for excessive trading volumes. Odean (1998) investigates how overconfidence may influence security price changes and trading volumes under three market settings, namely, price-takers, insiders and marketmakers with costly information, that principally differ in how information is distributed. In all three market settings, the presence of overconfident trader increases expected trading volume, a result that provides the theoretical linkage between overconfidence and trading volume.

Using account data obtained from a discount broker, Barber and Odean (2000) document excessive trading by individual investors that eventually led to annual returns below the market. Gervais and Odean (2001) predict that investors who have

experienced high past returns will be more prone to overconfidence than otherwise, a prediction that is supported by the empirical evidence provided by Statman et. al. (2006). The latter study further reports that trading volume, as measured by turnover ratios, is more responsive to market-wide return shocks than to security return shocks, especially for small-cap stocks.

Some researchers investigate the patterns of behavior between institutional and individual investors, and how the diverging patterns between two types of investors may be related to the low turnover premium phenomenon. For example, Odean (1999) argues that, when making stock purchase decisions, investors tend to limit their search to attention-grabbing stocks due to the limitation of resource. The problem is more severe for individual than institutional investors, as the latter are endowed with more resource to conduct equity research than the former. Barber and Odean (2008) test this proposition empirically by examining the trading records of individual accounts at discount brokers and those of professional money managers respectively. They confirm that individual investors tend to be the net buyer of a stock that recently experienced high abnormal trading volume or extreme one-day return, while the investing decision of institutional investors is not sensitive to these attention-grabbing events. Using a complete trading history of both institutional investors and individual investors obtained from Taiwan Stock Exchange between

1995 and 1999, Barber et. al. (2009) document that, as a group, individual investors lose money, especially on aggressive trades, to institutional investors. Notably, about half of the trading loss by individual investors is earned by foreign institutional investors. The authors report annual turnover of 300% annually during this period, which implies that excessive trading leads to institutional gains at the expense of individual investors. Chordia et. al. (2011) examine the trends in trading activity in financial markets. They note that the average monthly turnover on the NYSE had increased from about 5% in 1993 to about 26% toward the end of 2008. The primary source of the surging turnover may be attributed to increased institutional trading, and the increased trades tend to be information-based.

Chuang and Susmel (2011) compare the trading behavior of both institutional and individual investors in Taiwan, as some psychological evidence, such as Yates et. al. (1996, 1997, 1998), suggests that Asians may be overconfident in general knowledge as well as in making probabilistic assessment. Although both institutional and individual investors are found to trade more aggressively following market gains, the latter are more prone to trade in riskier securities than the former. The evidence therefore support the notion that individual investors are more overconfident than their institutional counterpart. Using intra-day high frequency data obtained from Taiwan Stock Exchange, Hsieh (2013) reports that institutional

trades tend to reflect private information, while individual trades tend to be driven by emotion and behavioral reasons.

The research cited above has the following testable implication: The relationship between the trading volume and future return of a stock may be affected by the extent to which institutional investors is involved. When a stock is purchased by a high percentage of institutional investors relative to individual investors, a higher turnover rate will not necessarily results in lower future return than stocks with low turnover rate because institutional investors tend to trade on private information. In contrast, a high turnover stock with low institutional participation could mean that individual investors are herding to buy riskier stock due to overconfidence. As Odean (1998) points out, when price-takers such as individual investors are overconfident, their trades tend to push prices further away from true value. The eventual price reverse of high turnover stocks would then cause low future return relative to low turnover stocks. Consequently, one would expect low turnover premium to be more pronounced in stocks with low institutional participation than those with high institutional interest. In particular, this study will examine the role of foreign institutional investors in the relationship between turnover rate and expected return. Extant research suggests that the presence of foreign institutional investors in emerging markets tends to improve market efficiency, see, for example, Yang (2002),

Schuppli and Bohl (2010), He and Shen (2014), and Shiu et. al. (2014), which could help to tame the turnover premium when overconfidence is pungent.

Previous research typically employs Capital Asset Pricing Model (CAPM) or Fama-French three-factor model (FF) to risk adjust returns. The implicit assumption is that equity risk premium is constant through time. Since these unconditional risk adjustments fail to capture low turnover premium, researchers logically attribute this phenomenon to behavioral bias such as investor overconfidence. However, various researches have suggested that equity risk premium may be time-varying. See, for example, Ferson (1989), Ferson and Harvey (1991), Ferson and Harvey (1999), Lettau and Ludvigson (2001), and Kang et. al. (2011). In light of these findings, this paper will attempt to adopt the conditional CAPM framework proposed by Lettau and Ludvigson (2001) and Kang et. al. (2011), alongside the CAPM and FF, for risk adjustment purpose. The specifics of the conditional CAPM employed in this paper will be discussed in detail in due course.

The primary findings of this paper may be summarized as follows.

Lo and Wang (2000

II. Data and Methodology

The data used in this paper is obtained from Taiwan Economic Journal (TEJ) database. The time series of monthly return, turnover rate, foreign institutional investing percentage (FINI percentage henceforth), market capitalization and book-to-market ratio for all stocks listed on Taiwan Stock Exchange (TSE) and OTC market (GreTai), excluding TDR and foreign companies, are collected from January 1994 through June 2014. The series for Taiwan leading and coincident indicators are also collected.

A. Construction of Turnover Portfolios

The test portfolios for this paper are created by the following process. Initially, all stocks that are included in a given month are ranked on the basis of turnover rate. Stocks with turnover rate below the 30^{th} percentile are placed into the Low TO group, while those above the 70^{th} percentile in the High TO group, with the rest placed into the Medium TO camp. The returns of stocks in the following month in each portfolio are than value-weighted to arrive at the portfolio return for that month. These portfolio returns are updated monthly. In the second stage, a double-sort procedure is employed to examine potential interaction of each of the following variables with turnover premium: market capitalization, book-to-market ratio, past return and FINI percentage. Finally, a triple-sort procedure will be used to disentangle the joint influence of the following variables with FINI percentage on

turnover premium: market capitalization, book-to-market ratio, and past return.

After all required test portfolio are created, their returns must be adjusted for risk. The conventional CAPM and FF 3-factor models will be employed for this purpose. However, in light of the aforementioned time-varying risk premium literature, a conditional CAPM will be used alongside with the conventional risk-adjustment models, which will be discussed in detail in the next subsection.

B. Construction of Conditional CAPM and Conditioning Information

Lettau and Ludvigson (2001, LL2001 henceforth) proposed a framework to construct a conditional CAPM that provides reasonable description for the cross-sectional variation of expected returns. One key piece in their framework is the conditioning variable, the log-consumption to log-aggregate asset and income ratio, or simply "*cay*". The variable may be computed from the cointegrating vector in a Vector Error Correction Model (VECM) consisting of the three logged variables. However, these variables are available only at quarterly frequency, which renders them less useful when applied to countries with short historical data.

Kang et. al. (2011, KKLM 2011 henceforth) proposed to use business condition variables found to predict future equity market return, namely, short-term T-Bill rate, term premium, default premium and aggregate dividend yield. These variables are available monthly. The deviation from the cointegrating vector consisting of the

four variables are found to have significant explanatory power over the cross-sectional variation in expected returns, including the momentum effect that has troubled the FF 3-factor model.

The conditioning variable proposed by KKLM 2011 relies on the availability of a well-developed fixed-income market with sufficient history that supplies market information crucial to compute two key variables, namely, term premium and default premium through time. However, such conditions are rarely satisfactorily met outside the U.S. market, especially among emerging market countries such as Taiwan. To apply the conditional CAPM framework employed by LL2001 and KKLM2011, one must find conditioning variables that are capable of reflecting business conditions with sufficient length of historical time series. Therefore, this paper proposes to employ two variables that have been constructed by most countries to provide guidance on the future and current states of their respective economies, namely, the composite leading indicator and the composite coincident indicator. In the section that follows, some evidence of return predictability of the deviation from the cointegrating vector between the two series will be presented before the model is used to adjust risk.

Following the framework in LL2001 and JJLM2011, the following tests are performed to determine the existence of cointegrating relation between the business

indicators. Panel A of table I presents Augmented Dickey-Fuller and Engle-Granger cointegration test results for the economic indicators, while panel B presents Johansen cointegration tests to further discern the existence of cointegration relation between the indicators.

Table I

Panel A. Augmented Dickey-Fuller Test and Engle-Granger Cointegration Test

	ADF t-statistic	*P-value*
ln(Lead)	-1.3980	*0.5850*
ln(Coincident)	-1.6751	*0.4440*
Residuals	-5.8957	*0.0000*

Panel B. Johansen Cointegration Test

Rank	**Trace test**	***P value***	**Lmax test**	***P-value***
0	32.86	*0.0000*	30.65	*0.0000*
1	2.21	*0.1372*	2.21	*0.1372*

Panel C. Cointegrating Vector	***ln(Lead)***	***ln(Coincident)***
Cointegrating coefficient	1.0000	-0.9889

t-statistic	[0.0055]

The test results in panel A of table I indicate that the natural logarithm of both leading and coincident composite indicators are integrated, which is confirmed by those reported in panel B. The cointegrating vector, or the error correction term, is then computed from the error correction model that includes the pair of logged economic indicators with 12 lags. The conditioning variable, which will be simply called the *EC* term, used in the conditional CAPM is then constructed as follows.

$$EC_t = ln(Lead)_t - 0.9889 \cdot ln(Coin)_t \quad (1)$$

If the EC term so constructed is to be used as the conditioning variable in a conditional CAPM framework, it must exhibit some predictability of future market returns. Table II presents the forecasting regressions for various horizons, ranging from 1 month to 12 months ahead. The results indicate that the EC term constructed in this paper can predict future market returns of up to 3 months, which qualifies it as a conditioning variable.

Table II

	1 Month	***3 Month***	***6 Month***	***12 Month***
Intercept	-0.0152	-0.0260	-0.0032	0.0767

t-statistic	[-1.84*]	[-1.08]	[-0.07]	[1.12]
EC Term	0.5529	1.1857	1.1920	0.3746
t-statistic	[3.64***]	[2.57**]	[1.28]	[0.3]
Adjusted R^2	0.0396	0.0396	0.0162	-0.0017

The resulting conditional CAPM is specified as follows.

$$r_t = \beta_0 + \beta_1 \cdot EC_{t-1} + \beta_2 \cdot r_{M,t} + \beta_4 \cdot EC_{t-1} \cdot r_{M,t} + \varepsilon_t \quad (2)$$

, where r_t denotes the excess return of portfolio I in month t, or the return on the hedge portfolio formed by buying low turnover and selling high turnover stocks. The risk-free rate used in this paper is the average 1-month certificate deposit rate provided by the five major banks in Taiwan. This model, along with the following unconditional CAPM and FF 3-factor models, will be used for risk adjustment.

$$r_t = \beta_0 + \beta_1 \cdot r_{M,t} + \varepsilon_t \quad (3)$$

$$r_t = \beta_0 + \beta_1 \cdot r_{M,t} + \beta_2 \cdot SMB_t + \beta_3 \cdot HML_t + \varepsilon_t \quad (4)$$

III. Empirical Findings

The descriptive statistics of initial sorts are reported in table III. The statistics for portfolios sorted by the top and bottom 30% are reported in panel A, while those for the quintile sort in panel B. In panel A, the average return for the low turnover

portfolio was 1.14% per month, which is significant at less than 1% level. The average return for the portfolio comprising the middle 40% stocks was 1.08% per month, but only significant at less than 10% level. In contrast, the average return for the top 30% turnover stock was insignificantly different from zero at 0.31% per month. Consequently, the average turnover premium was 0.83% per month, which is significant at less than 1% level. A similar but stronger pattern is observed when stocks are sorted into turnover quintiles as shown in panel B. The average return for stocks with the lowest turnover rate was 1.16% per month, while that for the highest turnover stocks was 0.13% per month. This produces a monthly turnover premium of 1.03% that is significant at less than 1% level. Therefore, the statistics reported in table III clearly established the existence of low turnover effect in Taiwan equities. This is quite different from other stylized market anomalies that were documented for most developed markets, but have been absent in Taiwan equity market, for example, book-to-market effect, momentum effect, size effect, etc.

Table III. Descriptive Statistics of Turnover Rate-Sorted Portfolios

	Mean	t-statistic	No. Sample	Maximum	Minimum	Skewness	Kurtosis
Panel A. Turnover Portfolios Formed by Top-Bottom 30%							
Low	0.0114	[2.59**]	245	0.2995	-0.1919	0.5523	1.19
Medium	0.0108	[1.93*]	245	0.3686	-0.2446	0.5320	1.47
High	0.0031	[0.49]	245	0.4064	-0.2970	0.2842	1.01
L-H	**0.0083**	**[2.31**]**	**245**	**0.1637**	**-0.2500**	**-0.7017**	**2.41**
Panel B. Portfolios Formed by Quintile Sort							
Low	0.0116	[2.72***]	245	0.2927	-0.1833	0.5909	1.22
2	0.0116	[2.27**]	245	0.3225	-0.2196	0.5597	1.17
3	0.0107	[1.88*]	245	0.3711	-0.2447	0.5284	1.52
4	0.0083	[1.38]	245	0.3661	-0.2674	0.3966	1.10
High	0.0013	[0.20]	245	0.4300	-0.3076	0.2980	1.20
L-H	**0.0103**	**[2.38**]**	**245**	**0.2019**	**-0.2969**	**-0.6216**	**2.20**

A. Turnover Rate Double-Sort Portfolios

The influence of foreign institutional investors, or FINI, will be examined next. To discern the extent to which turnover effect is affected by the presence of FINI, a double-sort procedure is applied to produce 9 portfolios. Panel A of table IV below reports the descriptive statistics of the portfolios along with their respective average turnover rates and FINI investing percentages in a public company.

Table IV. Summary Statistics: FINI- and Size-Turnover Rate Double Sort Portfolios

Panel A		***Turover Rate***			**Panel B**		***Turover Rate***		
FINI	***Low***	***Medium***	***High***	***L-H***	***Size***	***Low***	***Medium***	***High***	***L-H***
Low	1.36	1.40	0.11	1.24	**Small**	1.46	1.69	0.64	0.83
t-statistic	[2.96***]	[2.47**]	[0.17]	[3.07***]	*t-statistic*	[3.01***]	[2.82***]	[0.93]	[1.99**]
TO%	2.46	10.28	39.09		*TO%*	2.01	8.71	31.92	
FINI%	0.25	0.29	0.32		*FINI%*	6.57	6.74	6.18	
Medium	1.06	1.01	0.23	0.83	**Mid**	1.04	0.83	0.30	0.74
t-statistic	[2.20**]	[1.70*]	[0.35]	[2.36**]	*t-statistic*	[2.30**]	[1.42]	[0.45]	[2.11**]
TO%	4.18	14.61	49.01		*TO%*	4.31	15.25	48.81	
FINI%	5.63	5.95	6.12		*FINI%*	10.08	9.64	9.50	
High	0.80	1.02	0.72	0.08	**Big**	0.72	0.65	0.45	0.27
t-statistic	[1.80*]	[2.00**]	[1.12]	[0.20]	*t-statistic*	[1.72*]	[1.25]	[0.67]	[0.61]
TO%	3.81	13.54	46.70		*TO%*	4.18	14.89	50.84	
FINI%	33.08	32.04	29.52		*FINI%*	20.81	20.77	18.21	

The 5th column in table IV shows the turnover premium associated with three levels of FINI%, which is monotonically decreasing from 1.24% per month for low FINI%, to 0.08% per month for high FINI%. The average FINI% for the three low FINI portfolios range from 0.25% to 0.32%, while those for the three medium FINI% portfolios range from 5.63% to 6.12%. In contrast, the average FINI% for the three high FINI portfolios are much higher, ranging from 33.08% to 29.52%. The initial evidence therefore supports the notion proposed by this paper earlier, that the presence of foreign institutional investors, who tend to trade on private information, help to eliminate the turnover premium. Although the evidence is also consistent with the view that the turnover premium may have arisen from overconfidence in individual investors, it is nevertheless premature to jump to such conclusion before any risk adjustment is made to the returns reported in panel A of table IV.

However, turnover premium could also conceivably vary with market

capitalization, or size, of a stock, as individual investors herd into small-cap issues with limited private information relative to their institutional counterparts. This issue is especially acute in Taiwan, since foreign institutional investors prefer to invest in large-cap issues for better liquidity. Therefore, the absence of turnover premium in the high FINI% portfolio may also arise from the fact that foreign institutional investors happen to concentrate in large-cap issues with weaker turnover premium to begin with. The descriptive statistics presented in Panel B of table IV substantiate this concern. The turnover premium monotonically decreases from small- to large-cap stocks, with monotonically increasing presence of foreign institutional investors.

The influence of foreign institutional investors on turnover premium may also be seen, although to a lesser degree, when the turnover rate is double sorted with both BM ratio and 6-month past return, respectively, as evidenced in table V below.

Table V. Summary Statistics: BM- and Past Return-Turnover Rate Double Sort Portfolios

Panel A		**Turover Rate**			**Panel B**		***Turover Rate***		
BM Ratio	**Low**	**Medium**	**High**	***Low-High***	***Past Return***	***Low***	***Medium***	***High***	***L-H***
High	2.73	2.22	1.29	*1.43*	**Loser**	1.36	1.10	-0.01	1.37
t-statistic	[5.09***]	[3.69***]	[1.90*]	[3.75***]	*t-statistic*	[2.37**]	[1.63]	[-0.02]	[4.00***]
TO%	5.06	16.54	41.94		*TO%*	2.97	10.86	35.89	
FINI%	8.07	8.98	8.03		*FINI%*	9.85	10.68	11.02	
Medium	1.62	1.79	1.27	*0.35*	**Medium**	1.06	1.11	0.21	0.85
t-statistic	[3.81***]	[3.41***]	[2.05**]	[1.11]	*t-statistic*	[2.52**]	[2.14**]	[0.35]	[2.55**]
TO%	5.65	19.49	54.39		*TO%*	3.12	11.38	39.08	
FINI%	11.93	12.55	11.45		*FINI%*	12.05	12.39	12.05	
Low	1.62	1.42	0.84	*0.78*	**Winner**	1.30	0.92	0.37	0.93
t-statistic	[3.48***]	[2.64***]	[1.33]	[2.12**]	*t-statistic*	[2.93***]	[1.68*]	[0.57]	[2.40**]
TO%	5.59	21.95	65.52		*TO%*	5.34	19.84	60.64	
FINI%	16.81	15.85	14.40		*FINI%*	13.43	14.32	13.27	

In panel A of table V, the turnover premium associated with both high BM and Low BM ratios are all positive and significant at less than 5% level. However, the magnitude of turnover premium for the low BM portfolio is only about half of that for the high BM portfolio. This pattern is accompanied by higher FINI% in low BM portfolio than that in its high BM counterpart. A similar pattern may be observed in panel B of table V, although the FINI% in past winner portfolio is only slightly higher than that in past loser portfolio. One potential explanation is that momentum effect has never been documented conclusively in Taiwan equity market, unlike the positive and significant returns that have been documented in most developed markets and some emerging markets. See, for example, […citations plz…].

B. Turnover Rate Triple-Sort Portfolios

The evidence in the previous section suggests that the influence of foreign institutional investors on Taiwan turnover premium may be intertwined with the stylized market anomalies examined therein. In the next section, this issue will be

dealt with by a triple-sort procedure that will reveal the extent to which foreign institutional influence turnover premium in Taiwan. In addition, the risk-adjusted returns derived from the models discussed in Section I are reported along with the excess returns, so that the influence from systematic risk on turnover premium may also be examined together with that from foreign institutional investors.

The summary statistics of size-FINI-turnover sorted portfolios are reported in table VI. The statistics associated with small-, mid- and large-cap portfolios are reported in panel A, B and C respectively. Each panel contains four tables that report the excess return, CAPM, FF3 and CCAPM risk-adjusted returns of the portfolios, respectively.

Table VI. Summary Statistics: Size-FINI-Turnover-Sorted Portfolios

	Low	Medium	High	L-H	Low	Medium	High	L-H
FINI	**Excess Returns**				**Risk-Adjusted Returns - CAPM**			
Low	1.66	1.71	0.70	*0.96*	1.53	1.49	0.44	*1.08*
t-statistic	[3.02***]	[3.00***]	[1.02]	[1.89*]	[3.05***]	[3.44***]	[0.91]	[2.25**]
Medium	1.01	1.59	-0.20	*1.21*	0.72	1.27	-0.66	*1.38*
t-statistic	[1.84*]	[2.32**]	[-0.28]	[2.71***]	[1.64]	[2.60***]	[-1.37]	[3.39***]
High	0.96	1.15	0.78	*0.19*	0.80	0.88	0.36	*0.44*
t-statistic	[1.80*]	[1.83*]	[1.05]	[0.39]	[1.80*]	[2.06**]	[0.71]	[1.01]
	Risk-Adjusted Returns - FF3				**Risk-Adjusted Returns - (C)CAPM**			
Low	1.20	1.15	0.07	*1.13*	-0.52	0.39	-0.27	*-0.24*
t-statistic	[3.05***]	[4.08***]	[0.24]	[2.37**]	[-0.69]	[0.59]	[-0.37]	[-0.33]
Medium	0.36	0.83	-1.05	*1.41*	-0.59	0.39	-1.44	*0.85*
t-statistic	[1.26]	[3.30***]	[-3.43***]	[3.45***]	[-0.89]	[0.52]	[-1.95*]	[1.35]
High	0.43	0.51	0.03	*0.40*	-0.68	0.32	0.63	*-1.32*
t-statistic	[1.52]	[2.30**]	[0.09]	[0.93]	[-1.02]	[0.48]	[0.82]	[-2.02**]

Panel B: Mid

	Excess Returns				**Risk-Adjusted Returns - CAPM**			
Low	0.87	0.50	-0.34	*1.21*	0.69	0.13	-0.77	*1.46*
t-statistic	[1.90*]	[0.86]	[-0.50]	[2.97***]	[2.22**]	[0.41]	[-2.13**]	[4.08***]
Medium	0.94	0.63	0.26	*0.68*	0.67	0.31	-0.32	*0.99*
t-statistic	[1.85*]	[1.02]	[0.38]	[1.85*]	[2.11**]	[0.93]	[-0.92]	[2.98***]
High	0.68	0.80	0.36	*0.32*	0.39	0.38	-0.14	*0.53*
t-statistic	[1.47]	[1.39]	[0.56]	[0.83]	[1.29]	[1.27]	[-0.43]	[1.57]
	Risk-Adjusted Returns - FF3				**Risk-Adjusted Returns - (C)CAPM**			
Low	0.46	-0.11	-0.96	*1.42*	0.34	-0.50	-0.66	*0.99*
t-statistic	[2.02**]	[-0.68]	[-3.93***]	[4.20***]	[0.71]	[-1.04]	[-1.18]	[1.81*]
Medium	0.37	0.03	-0.50	*0.87*	0.06	0.09	-0.20	*0.25*
t-statistic	[2.23**]	[0.16]	[-2.14**]	[2.84***]	[0.12]	[0.18]	[-0.37]	[0.50]
High	0.13	0.16	-0.28	*0.41*	-0.65	0.01	-0.55	*-0.09*
t-statistic	[0.74]	[0.90]	[-1.14]	[1.28]	[-1.42]	[0.03]	[-1.09]	[-0.18]

Panel C: Big

	Excess Returns				**Risk-Adjusted Returns - CAPM**			
Low	0.60	0.31	-0.16	*0.76*	0.42	-0.11	-0.75	*1.17*
t-statistic	[1.26]	[0.52]	[-0.23]	[1.53]	[1.38]	[-0.41]	[-2.29**]	[2.73***]
Medium	0.34	0.40	0.18	*0.16*	0.02	-0.02	-0.46	*0.48*
t-statistic	[0.74]	[0.73]	[0.27]	[0.38]	[0.11]	[-0.11]	[-1.78*]	[1.29]
High	0.43	0.81	0.70	*-0.27*	0.17	0.46	0.19	*-0.02*
t-statistic	[1.07]	[1.68*]	[1.04]	[-0.56]	[0.74]	[2.89***]	[0.62]	[-0.05]
	Risk-Adjusted Returns - FF3				**Risk-Adjusted Returns - (C)CAPM**			
Low	0.15	-0.29	-0.81	*0.96*	0.39	-0.13	-0.31	*0.71*
t-statistic	[0.70]	[-1.51]	[-2.74***]	[2.57**]	[0.84]	[-0.34]	[-0.63]	[1.08]
Medium	-0.13	-0.08	-0.42	*0.29*	-0.03	-0.08	-0.57	*0.53*
t-statistic	[-0.79]	[-0.50]	[-1.74*]	[0.88]	[-0.11]	[-0.29]	[-1.42]	[0.92]
High	0.05	0.44	0.27	*-0.22*	-0.15	0.18	0.13	*-0.27*
t-statistic	[0.24]	[2.73***]	[0.93]	[-0.57]	[-0.42]	[0.72]	[0.28]	[-0.42]

Comparing the tables entitled “Excess Return” across three size groups, it is

evident that the degree of foreign institutional participation in a stock inversely affects the magnitude and statistical significance of turnover premium, regardless which size group is examined. The turnover premiums for both low- and mid-level FINI% in the small-cap group are 0.96% and 1.21% per month, respectively. In contrast, the turnover premium for high FINI% among small-cap stocks is 0.19% per month that is not significantly different from zero. The same pattern persists, if not stronger, in the mid-cap group. Even in the large-cap group where none of the turnover premiums is significant, those quantities still exhibit a monotonically decreasing pattern from low to high FINI%. Therefore, it is safe to state that the influence of foreign institutional presence on turnover premium does not arise from its participation in large-cap stocks.

The turnover premiums observed in table VI survive the conventional risk adjustment using both unconditional CAPM and Fama-French three-factor model. For example, the CAPM-adjusted turnover premiums for low- and mid-level FINI% portfolios are 1.08% and 1.38% per month, respectively, and both are significant at less than 5% level. The FF-3-adjsuted turnover premiums for low- and mid-level FINI% portfolios are highly significant at 1.13% and 1.41% per month, respectively. However, the turnover premiums disappear when adjusted by the conditional CAPM. These patterns are observed consistently across all size groups. In fact, the

(C)CAPM-adjusted turnover premium for the small-cap group is now negatively significant at -1.32% per month. This negative risk-adjusted turnover premium is consistent with the findings reported in Chuang and Susmel (2011) that institutional investors tend to herd into stocks based on their private information instead of being driven by emotional and behavioral urges. This phenomenon should be easier to observe in the small-cap universe, where institutional investors possess the greatest informational advantage over their retail counterparts as information regarding small-cap issues is normally scant due to less analyst coverage.

The statistics in table VI yield another interesting observation regarding the source of low turnover premium. Looking at the average excess returns for portfolios across different trading intensity, it is evident that none of the excess return associated with high-turnover portfolios is economically and statistically significant. However, the excess returns associated with low-turnover portfolios with low foreign institutional participation rates within small- and mid-cap groups are both economically and statistically significant at 1.66% and 0.87% per month, respectively. These returns are still significant after risk-adjustment by unconditional CAPM and FF-3 models, but cease to retain their significance when adjusted by the conditional CAPM. The resulting (C)CAPM-adjusted turnover premiums are therefore rendered insignificant.

The evidence presented in table VI generally supports the main proposition of this paper, namely, the presence of foreign institutional investors helps to remove the turnover premium that may have in part arisen from overconfidence on the part of individual or retail investors in Taiwan. However, turnover premium disappear after it is risk-adjusted by (C)CAPM. Therefore, one cannot rule out the role of time-varying risk premium in explaining the turnover premium. In order to see if the empirical findings documented in table VI are robust to other market anomalies, the same triple sort procedure is applied to BM ratios and 6-month past returns. The results are summarized in table VII and VIII, respectively.

Table VII. Summary Statistics: BM-FINI-Turnover-Sorted Portfolios

	Low	Medium	High	L-H	Low	Medium	High	L-H
FINI	**Excess Returns**				**Risk-Adjusted Returns - CAPM**			
Low	1.68	2.00	0.42	*1.26*	1.51	1.73	-0.06	*1.57*
t-statistic	[3.06***]	[2.98***]	[0.55]	[2.95***]	[3.38***]	[3.43***]	[-0.11]	[4.09***]
Medium	1.23	1.28	0.26	*0.97*	0.92	0.90	-0.20	*1.12*
t-statistic	[2.16**]	[1.81*]	[0.34]	[2.72***]	[2.13**]	[1.85*]	[-0.39]	[3.61***]
High	0.84	1.10	0.95	*-0.10*	0.54	0.67	0.34	*0.20*
t-statistic	[1.54]	[1.71*]	[1.24]	[-0.27]	[1.37]	[1.61]	[0.72]	[0.62]
	Risk-Adjusted Returns - FF3				**Risk-Adjusted Returns - (C)CAPM**			
Low	1.12	1.22	-0.64	*1.76*	0.07	0.67	-0.75	*0.82*
t-statistic	[3.78***]	[4.70***]	[-2.56**]	[4.94***]	[0.10]	[0.87]	[-0.89]	[1.40]
Medium	0.47	0.36	-0.78	*1.25*	0.36	0.67	-0.37	*0.73*
t-statistic	[2.06**]	[1.77*]	[-3.91***]	[4.28***]	[0.55]	[0.89]	[-0.46]	[1.53]
High	0.14	0.22	-0.14	*0.28*	-0.05	0.62	0.18	*-0.23*
t-statistic	[0.66]	[1.14]	[-0.53]	[0.87]	[-0.08]	[0.96]	[0.25]	[-0.47]
Panel B: Medium BM Ratio								
	Excess Returns				**Risk-Adjusted Returns - CAPM**			
Low	0.71	0.87	0.17	*0.54*	0.63	0.55	-0.24	*0.86*
t-statistic	[1.75*]	[1.64]	[0.25]	[1.23]	[1.96*]	[1.70*]	[-0.62]	[2.47**]
Medium	0.57	0.76	0.12	*0.45*	0.32	0.41	-0.46	*0.78*
t-statistic	[1.31]	[1.31]	[0.17]	[1.23]	[1.29]	[1.43]	[-1.33]	[2.63***]
High	0.43	0.63	0.48	*-0.05*	0.20	0.32	-0.08	*0.28*
t-statistic	[1.05]	[1.25]	[0.72]	[-0.12]	[0.83]	[1.34]	[-0.27]	[0.95]
	Risk-Adjusted Returns - FF3				**Risk-Adjusted Returns - (C)CAPM**			
Low	0.44	0.36	-0.47	*0.91*	-0.22	-0.04	-0.23	*0.01*
t-statistic	[1.77*]	[2.06**]	[-1.90*]	[2.65***]	[-0.45]	[-0.08]	[-0.40]	[0.02]
Medium	0.12	0.20	-0.67	*0.79*	-0.49	0.05	-0.20	*-0.29*
t-statistic	[0.77]	[1.16]	[-2.83***]	[2.73***]	[-1.31]	[0.12]	[-0.39]	[-0.65]
High	-0.01	0.12	-0.26	*0.26*	-0.46	0.24	0.05	*-0.51*
t-statistic	[-0.04]	[0.71]	[-1.13]	[0.88]	[-1.28]	[0.67]	[0.12]	[-1.17]
Panel C: Low BM Ratio								
	Excess Returns				**Risk-Adjusted Returns - CAPM**			
Low	0.65	0.65	-0.53	*1.18*	0.42	0.22	-0.89	*1.30*
t-statistic	[1.45]	[1.03]	[-0.76]	[2.52**]	[1.29]	[0.62]	[-2.17**]	[3.14***]
Medium	0.38	0.56	0.06	*0.33*	0.08	0.22	-0.46	*0.55*
t-statistic	[0.78]	[0.90]	[0.08]	[0.81]	[0.32]	[0.68]	[-1.23]	[1.41]
High	0.42	0.63	0.61	*-0.18*	0.20	0.21	0.13	*0.07*
t-statistic	[1.06]	[1.18]	[0.87]	[-0.40]	[0.94]	[0.93]	[0.36]	[0.17]
	Risk-Adjusted Returns - FF3				**Risk-Adjusted Returns - (C)CAPM**			
Low	0.32	0.19	-0.90	*1.22*	-0.81	-0.53	-1.00	*0.20*
t-statistic	[1.20]	[0.82]	[-2.73***]	[2.99***]	[-1.66*]	[-1.00]	[-1.62]	[0.31]
Medium	0.07	0.26	-0.34	*0.41*	-0.53	0.00	-1.03	*0.50*
t-statistic	[0.33]	[1.11]	[-1.16]	[1.10]	[-1.31]	[-0.00]	[-1.78*]	[0.83]
High	0.17	0.30	0.24	*-0.07*	-0.22	-0.40	-0.14	*-0.09*
t-statistic	[0.83]	[1.61]	[0.75]	[-0.20]	[-0.69]	[-1.15]	[-0.24]	[-0.14]

For stocks with high and low BM ratios, the turnover premiums with low FINI%

are all positive and significant at less than 5% level. Stocks with medium BM ratios do not exhibit statistically significant turnover premiums, although their magnitude still monotonically declines with increasing FINI%. The risk adjustment made by either unconditional CAPM or FF3 model fails to explain, and in most cases even exacerbates, turnover premium. Only the (C)CAPM-adjusted turnover premiums are rendered insignificant across all spectrum of BM ratios.

The potential source of turnover premium, as with the size-FINI%-turnover rate-sorted case, appears to arise from portfolios with low turnover rates and low-to-medium FINI% within the high BM ratio group, where the monthly average excess returns were highly significant at 1.68% and 1.23% respectively. The average excess return to the portfolio with medium BM ratio, low FINI% and low turnover rate was also significant, although to a lesser degree, at 0.71% per month. These premiums are not explained by unconditional CAPM and FF-3 model, but (C)CAPM captures them quite nicely.

Table VIII. Summary Statistics: Past Return-FINI-Turnover-Sorted Portfolios

Panel A: Loser								
	Low	**Medium**	**High**	**L-H**	**Low**	**Medium**	**High**	**L-H**
FINI	**Excess Returns**				**Risk-Adjusted Returns - CAPM**			
Low	1.36	1.20	-0.66	*2.01*	1.17	0.84	-1.11	*2.28*
t-statistic	[2.28**]	[1.75*]	[-0.87]	[4.39***]	[2.43**]	[1.75*]	[-2.20**]	[5.21***]
Medium	1.09	0.99	-0.16	*1.25*	0.74	0.56	-0.74	*1.49*
t-statistic	[1.78*]	[1.33]	[-0.23]	[3.40***]	[1.84*]	[1.16]	[-1.76*]	[4.15***]
High	0.80	0.51	0.24	*0.55*	0.50	0.09	-0.36	*0.86*
t-statistic	[1.32]	[0.79]	[0.34]	[1.37]	[1.20]	[0.25]	[-0.91]	[2.24**]
	Risk-Adjusted Returns - FF3				**Risk-Adjusted Returns - (C)CAPM**			
Low	0.80	0.41	-1.50	*2.31*	0.41	0.87	-0.85	*1.26*
t-statistic	[2.29**]	[1.41]	[-4.18***]	[5.24***]	[0.56]	[1.19]	[-1.11]	[1.89*]
Medium	0.38	0.15	-1.02	*1.41*	0.55	0.36	-0.16	*0.72*
t-statistic	[1.45]	[0.46]	[-3.10***]	[3.98***]	[0.90]	[0.49]	[-0.26]	[1.31]
High	0.15	-0.15	-0.53	*0.68*	0.41	0.58	-0.04	*0.45*
t-statistic	[0.51]	[-0.50]	[-1.51]	[1.91*]	[0.65]	[1.04]	[-0.06]	[0.76]
Panel B: Medium Past Return								
	Excess Returns				**Risk-Adjusted Returns - CAPM**			
Low	0.86	1.04	0.02	*0.84*	0.69	0.85	-0.36	*1.06*
t-statistic	[1.96*]	[1.92*]	[0.03]	[2.28**]	[2.17**]	[2.43**]	[-1.05]	[3.44***]
Medium	0.87	0.78	-0.11	*0.98*	0.69	0.40	-0.66	*1.35*
t-statistic	[1.90*]	[1.41]	[-0.17]	[2.65***]	[2.40**]	[1.44]	[-2.18**]	[4.37***]
High	0.77	0.79	0.23	*0.53*	0.50	0.40	-0.18	*0.68*
t-statistic	[1.79*]	[1.58]	[0.38]	[1.42]	[1.89*]	[1.81*]	[-0.68]	[2.05**]
	Risk-Adjusted Returns - FF3				**Risk-Adjusted Returns - (C)CAPM**			
Low	0.43	0.53	-0.61	*1.04*	-0.13	-0.36	-0.87	*0.74*
t-statistic	[2.01**]	[3.11***]	[-3.11***]	[3.54***]	[-0.27]	[-0.68]	[-1.64]	[1.57]
Medium	0.41	0.15	-0.83	*1.24*	-0.01	0.28	-0.47	*0.47*
t-statistic	[2.68***]	[0.98]	[-3.86***]	[4.30***]	[-0.01]	[0.65]	[-1.02]	[1.02]
High	0.26	0.22	-0.27	*0.54*	-0.06	0.50	0.22	*-0.28*
t-statistic	[1.46]	[1.38]	[-1.12]	[1.74*]	[-0.15]	[1.48]	[0.55]	[-0.58]
Panel C: Winner								
	Excess Returns				**Risk-Adjusted Returns - CAPM**			
Low	1.14	1.05	-0.17	*1.31*	0.91	0.81	-0.66	*1.57*
t-statistic	[2.27**]	[1.79*]	[-0.27]	[2.83***]	[2.35**]	[2.10**]	[-1.82*]	[3.65***]
Medium	0.90	0.46	0.27	*0.63*	0.66	0.15	-0.31	*0.97*
t-statistic	[1.79*]	[0.78]	[0.39]	[1.57]	[1.98**]	[0.47]	[-0.88]	[2.67***]
High	1.00	0.75	0.72	*0.29*	0.74	0.39	0.27	*0.48*
t-statistic	[2.36**]	[1.40]	[1.03]	[0.64]	[2.80***]	[1.53]	[0.73]	[1.26]
	Risk-Adjusted Returns - FF3				**Risk-Adjusted Returns - (C)CAPM**			
Low	0.69	0.60	-0.84	*1.53*	-0.80	-0.27	-1.34	*0.54*
t-statistic	[2.12**]	[2.17**]	[-3.12***]	[3.61***]	[-1.39]	[-0.45]	[-2.41**]	[0.83]
Medium	0.45	-0.02	-0.36	*0.81*	-0.70	-0.99	-1.07	*0.37*
t-statistic	[1.90*]	[-0.07]	[-1.24]	[2.37**]	[-1.41]	[-2.11**]	[-2.01**]	[0.67]
High	0.61	0.33	0.26	*0.35*	-0.25	-0.62	-0.33	*0.08*
t-statistic	[2.62***]	[1.46]	[0.77]	[0.96]	[-0.65]	[-1.65]	[-0.60]	[0.13]

Similarly, table VIII shows that lower FINI% tends to produce larger and more

significantly positive turnover premiums for stocks with low to medium past 6-month cumulative returns, but the turnover premium for high FINI% stocks are insignificant. Risk adjustments made by unconditional CAPM and FF-3 model do little to explain the patterns observed in these premiums, but the (C)CAPM risk adjustment successfully account for the observed premiums. This is true across all past returns groups. The significant average excess returns from most low-turnover rate portfolios across past-returns groups signal the potential source of turnover premiums. Within the loser group, the excess returns associated with the low turnover rate, low-to-medium FINI% portfolios are 1.36% and 1.09% per month each. Within the medium past-return group, the monthly excess returns range from 0.77% to 0.87%, which are all significant regardless of FINI%. Within the winner group, the average monthly excess returns range from 0.90% to 1.14%, which are all statistically significant. These returns disappear when time-varying risk premium is accounted for, as with the cases for other triple-sort portfolios.

Again, even though the (C)-adjusted turnover premiums are now insignificant, but their magnitude still changes inversely with the degree of FINI%. For example, the turnover premiums for the winner group range from1.31% to 0.29% per month as FINI% increases from low to high level. The (C)CAPM-adjusted turnover premiums for the same group range from 0.54% to 0.08% per month as FINI%

increases. Whether turnover premiums are risk adjusted or not, the increasing presence of foreign institutional investors almost always significantly reduces the magnitude of turnover premiums. These findings provide evidence supporting the view that turnover premium arises in large part from overconfident retail investors. Foreign institutional investors, who tend to trade on private information, to some extent attenuate the premium.

In a nutshell, the findings in table VII and VIII basically reflect similar observation to that in table VI that have been discussed in depth in previous passages. To reiterate, the level of foreign institutional investors strongly affect the magnitude and significance of turnover premium, causing them to decrease monotonically from low- to high-level FINI% portfolios. The (C)CAPM risk-adjustment captures the low turnover premium completely in our data, but the increasing presence of foreign institutional still cause the magnitude of turnover premium to decrease monotonically. These patterns are observed regardless which stylized market anomaly is used in the triple-sort procedure, be it size, BM ratios, or 6-month past returns.

IV. Conclusion

The extent research has found that stocks with lower turnover rate tend to outperform their high-turnover counterparts by a wide and statistically significant margin. The persistence of this phenomenon, even after conventional risk

adjustment such as unconditional CAPM and Fama-French three factor model, makes most researchers lean toward behavioral explanations. Odean (1998) theorizes that the overconfident traders tend to drive up expected trading volume. Some empirical findings document that individual, or retail, investors tend to be overconfident after experiencing recent gains, which in turn leads to below market returns subsequently. Other empirical evidence suggests that institutional investors tend to herd on private information, while herding in individual investors tends to be driven by overconfidence. Therefore, this paper sets out to test the possibility that turnover premium may vary inversely with the degree of foreign institutional investing in Taiwan stocks. The possibility of time-varying risk premium is accounted for, in the form of (C)CAPM framework proposed by Lettau and Ludvigson (2001) and Kang et. al. (2011), to see if the persistence of low turnover premium is due to inappropriate risk adjustment.

The current study reports the following findings. First, the low turnover premium is strong and positive in Taiwan equity market. Since Taiwan equity market has been a peculiar market place where the evidence concerning many of the stylized effects, for example, size, book-to-market ratio, and momentum, is dubious at best, a significant turnover premium makes it arguably one of the few, if not the only one, phenomena that is consistent with other developed markets by far. Second, the

notion that the degree of foreign institutional participation in a stock varies inversely is supported by the data. In general, low turnover premium is confined to those stocks with little interest from foreign institutional investors. Further, the source of turnover premium appears to arise from low turnover stocks that exhibit positive and significant average excess returns. In contrast, the average excess returns for high turnover stocks are often indistinguishable from zero. This distinction persists even when turnover rate is paired with FINI%, market capitalization, BM ratios and 6-month past returns.

The low turnover premium does not disappear with risk adjustment such as unconditional CAPM and Fama-French three factor model, which is consistent with what previous studies focusing on U.S. market had found. However, when the (C)CAPM is employed for risk adjustment, the low turnover premium vanishes. Consistent with the previous passage, the disappearance of turnover premium stems from the low turnover portfolios, which saw their positive excess returns drop significantly once the possibility of time-varying risk premium is accounted for. Nevertheless, the magnitude of (C)CAPM-adjusted turnover premium still monotonically decreases with increasing foreign institutional interest. Therefore, this paper concludes that insufficient risk adjustment may be an important factor in explaining turnover premium, but the influence of investor overconfidence cannot be

completely ruled out, at least for the data studied herein.

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