行政院國家科學委員會專題研究計畫　成果報告

子計畫四：除權日的下單行為和下單原因

計畫類別：整合型計畫
計畫編號：NSC92-2416-H-002-048-EF
執行期間：92 年 09 月 01 日至 93 年 08 月 31 日
執行單位：國立臺灣大學財務金融學系暨研究所

計畫主持人：胡星陽

計畫參與人員：共同主持人：曾雲蘭講師

報告類型：精簡報告

處理方式：本計畫可公開查詢

中　華　民　國 93 年 12 月 8 日

一、中文摘要

本計畫以台灣證券交易所上市公司做為樣本，檢視除權日附近的委託單流量。這一樣本的優點在於可以區分所得稅假說和其他文獻上所提供的假說，另一優點在於利用委託單可以探討投資人的異質性。我們發現，課稅與不課稅的兩個樣本，在除權日當日的報酬率上非常相似，小額投資人的下單行為也很類似：除權日之前賣出，除權日及之後買進。這部分證據支持小額投資人偏好低股價的股票。但是對其他投資人來說，課稅與不課稅的樣本在委託單流量上有很大的差異。在不課稅的樣本，其他投資人在除權日附近的交易行為和平常沒有顯著的差異。在課稅的樣本，機構投資人扮演著套利者的角色：在除權日之前買進，除權日及之後賣出；外資和大額投資人主要在除權日才買進，這和所得稅假說是一致的。

關鍵詞：除權日，股票股利，稅，雜訊，買賣單不平衡

Abstract

This paper examines order flows around ex-dividend dates on the Taiwan Stock Exchange. Not only does Taiwan's tax code allow us to separate the tax hypothesis from other explanations, but Taiwan's data also permits us to examine the heterogeneity of investors' behavior around ex-dividend dates. We find that, despite a similar stock return behavior for both taxable and non-taxable distributions, the order behavior is very different across the two distributions. We find strong evidence that small investors sell before the ex-date and start to buy from the ex-date, which suggests that small investors prefer low-priced stocks. We find weaker evidence consistent with the tax hypothesis: foreigners and large domestic investors who are tax-disadvantaged avoid participating in dividends. We also find strong evidence that institutions play the role of short-term arbitrageurs around ex-dividend dates.

Keyword: ex-date, stock dividend, tax, noise, order imbalance

二、緣由與目的

This paper examines order flows around ex-dividend dates (ex-dates) on the Taiwan Stock Exchange. Not only does Taiwan's tax code allow us to separate the tax hypothesis from other explanations, but Taiwan's data also permits us to examine the heterogeneity of investors' behavior around ex-dates.

Taiwanese companies pay stock dividends as well as cash dividends. There are two types of stock dividends, which differ for both accounting and tax purposes. For accounting, the source of stock dividends can come from capital surplus or retained earnings. If the source is capital surplus, then the stock dividend is non-taxable; if the source is retained earnings, then the stock dividend will be taxable, just like cash dividends. Given that the accounting method has no real effect, the tax consequence is the only difference between the two types of stock dividends. Therefore, Taiwan's data can offer a good pair of samples to separate the tax hypothesis from the others. If we look at a sample of stock dividends with capital surplus as the source, then tax has no role to play. If we contrast the non-taxable capital surplus sample with the taxable retained earnings sample, then any differences should be due to taxes.

It has been well documented that on ex-dates, stock returns are significantly greater than zero (Campbell & Beranek, 1955; Durand & May, 1960). This ex-dividend day phenomenon occurs in many countries (Kato & Lowenstein, 1995; Frank & Jagannathan, 1998). It also occurs for various distributions; for example, cash dividends, stock dividends, and stock splits (Eades, Hess, & Kim, 1984).

Researchers have offered many explanations for the abnormal return. Given that dividends are taxable, Elton and Gruber (1970) propose a tax clientele effect:

investors with high marginal tax rates will sell their stock before the ex-date and buy afterwards, and the price change on the ex-date will reflect the tax rate of the marginal investors.

Aside from taxes, dividends can be a nuisance for some investors. If investors take cash dividends, then they need to cash the check and do something with it; if they take stock dividends, then they might end up with odd lots and a higher transaction cost (Grinblatt, Masulis, & Titman, 1984). Because of this, market makers tend to buy before a stock goes ex-dividend and sell on the ex-date. If we calculate returns using transaction prices, then we are likely to observe a positive return (Frank & Jagannathan, 1998).

Another attribute of a stock dividend is that the stock price on the ex-date will drop significantly. Practitioners think that the price drop can attract investors of small means to buy stocks in round lots (Lakonishok & Lev, 1987). Black (1986) conjectured that noise traders might prefer low-priced stocks.

Despite the fact that all these explanations have similar implications on the ex-date returns, they have very different predictions regarding who wants to trade around the ex-date. This paper explores these predictions and tests them using the intraday order data from the Taiwan Stock Exchange.

Taiwan's data allows us to examine the heterogeneity of investors' behavior around ex-dates. Utilizing intraday order data, we can divide investors into four groups: foreigners, institutions, large individual investors, and small individual investors. Different investor groups have drastically different patterns of order submission under alternative hypotheses, even though these hypotheses have similar implications on returns. Therefore, studying the pattern of order submission across investor groups provides a powerful test for alternative hypotheses and improves our

understanding of the ex-date phenomenon.[1]

三、結果與討論

Our hypotheses make specific predictions about order behaviors from foreign investors, domestic institutions, and large and small individual investors. Table 1 reports the average standardized abnormal order imbalance from day –2 to day 2. Panels A and B give the average order imbalances from aggressive orders for non-taxable and taxable samples; Panels C and D give the average from conservative orders.

For the non-taxable capital surplus sample, our only predictions are for small individual investors: they want to sell before the ex-date and buy afterwards due to the nuisance hypothesis (Hypothesis 1) and the price drop hypothesis (Hypothesis 2). The evidence is consistent with our predictions. For small investors, we find that the imbalances from their aggressive orders on days –2 and –1 are both negative, although neither is significant at a 0.1 level (Column 4 in Panel A of Table 1). Moreover, small investors turn into net buyers on the ex-date: their average order imbalance is a positive 0.48 on day 0, which is significant at a 0.05 level.

Corroborative evidence for the nuisance and the price drop hypotheses comes from the taxable retained earnings sample. Small investors sell more and sell aggressively before the ex-date (Panel B in Table 1): the averages of order imbalances are –0.41 and –0.56 for day –2 and –1, both are significant at a 0.05 level. Then they become net buyers from the ex-date: the averages are all positive from day 0 to day 2, and the average on day 0 is 0.56, which is statistically significant. The evidence from

[1] Some of the previous studies analyze trading data. Lakonishok and Vermaelen (1986) examine aggregate trading volume around various distributions. Kryzanowski and Zhang (1996) examine transactions of large and small trade sizes for a stock split sample on the Toronto Stock Exchange. Koski and Scruggs (1998) look at transactions of corporations and securities dealers. The only study using order data, as far as we know, is Jacob and Ma (2003), in which they study the aggregate order imbalance around ex-dividend dates for over 63 trading days for NYSE-listed companies.

small investors does not support the tax hypothesis. If small investors are in low tax-brackets, they should buy before and sell after the ex-date to capture the dividend tax credit. The evidence says otherwise.

It seems that small investors are very determined not to receive the stock dividend. Compared with aggressive orders, the evidence is much weaker for conservative orders submitted by small investors (Panel C and D in Table 1). The only significant result occurs on the ex-date for the taxable sample; where we find that, similar to aggressive orders, small investors submit a significantly higher number of conservative buy orders. The aggressiveness of small investors does not appear to be rational. The timing of the ex-date and its effect on prices are matters of public knowledge. Rational investors should spread their orders to reduce the price impact rather than concentrate their orders.

Our tax hypothesis (Hypothesis 3) argues that foreigners and large investors (if they are in high-tax brackets) should sell before the ex-date and buy afterwards. Table 1 presents some weak evidence to support the tax hypothesis. Both foreigners and large investors submit significantly more conservative buy orders than sell orders on the ex-date: the average order imbalances are 0.37 for foreigners and 0.45 for large investors (Columns 1 and 2 in Panel D of Table 1). In contrast to aggressive trading by small investors, large investors and foreigners do not trade aggressively around the ex-date relative to the estimation period. This lack of aggressiveness may be a rational choice by investors. Sophisticated investors would know the exact timing of the ex-date and its tax implications long before day 0; they would be able to adopt an order strategy that spreads their orders over this period to minimize the price impact. Therefore, it will be more difficult to detect the changes in trading behavior.

Institutional investors behave very differently from other types of investors. For the taxable sample, institutions buy aggressively before the ex-date (the average order

imbalance is 0.4 on day –1) and start to sell aggressively from day 0 (averaged –0.34), and most abnormal order imbalances are significant. This result is consistent with Hypothesis 5 that institutions delay their sale or pursue a long arbitrage strategy, because dividend taxes are irrelevant for them and the expected return is positive. Lending credence to the tax story is the sharp contrast between the negative order imbalances in the taxable sample from day 0 to day 2 and the positive order imbalances in the non-tax sample.

Institutions prefer to submit aggressive orders around the ex-date. Although the sign of order imbalances is the same, numbers from conservative orders are not significant except on day 1. To be aggressive is reasonable if institutions are acting as short-term arbitrageurs. Arbitrage is risky and aggressive orders can reduce the uncertainty of failing to trade.

Table 1. Standardized abnormal relative order imbalances across investor types

The relative daily order imbalance is the difference between daily buy and sell values divided by the sum of buy and sell values. Orders submitted by investors are divided into aggressive and conservative ones. Buy (sell) orders are aggressive if their limit prices are higher (lower) than the best ask (bid), and are conservative if their prices are lower (higher) than the best bid (ask). To calculate normal order imbalance, we use a market model for order imbalance estimated from day –50 to –6. Large individuals are individuals whose daily order value is at most NT$200,000. There are 45 stocks for the capital surplus sample and 67 for the retained earnings sample. ** and * denote significance at levels of 5% and 10%, respectively.

Panel A: Aggressive orders for the non-taxable capital surplus sample

	Foreigners	Large individuals	Institutions	Small individuals
-2	0.173	-0.173	0.067	-0.325
-1	0.090	-0.084	0.059	-0.088
0	0.249	0.081	0.189	0.477**
1	-0.074	0.128	-0.027	0.072
2	-0.139	-0.356**	0.025	-0.210

Panel B: Aggressive orders for the taxable retained earnings sample

	Foreigners	Large individuals	Institutions	Small individuals
-2	-0.117	-0.223	0.235	-0.405**

-1	-0.085	0.093	0.400**	-0.564**
0	0.040	0.038	-0.340*	0.560**
1	-0.226	0.173	-0.018	0.129
2	0.001	0.213	-0.244*	0.077

Panel C: Conservative orders for the non-taxable capital surplus sample

	Foreigners	Large individuals	Institutions	Small individuals
-2	-0.181	0.057	0.217	0.176
-1	0.159	-0.084	0.420*	0.328
0	-0.153	0.096	0.075	-0.051
1	0.064	-0.015	0.251	-0.112
2	-0.079	0.265	0.253	-0.062

Panel D: Conservative orders for the taxable retained earnings sample

	Foreigners	Large individuals	Institutions	Small individuals
-2	0.133	-0.239	0.400	0.287
-1	0.175	-0.077	0.149	0.227
0	0.371*	0.446**	-0.095	0.388**
1	0.219	0.206	-0.271*	0.054
2	0.219	0.010	-0.073	0.157

四、成果自評

This paper is the first one of its kind to examine order flows around ex-dividend dates on the Taiwan Stock Exchange. Not only does Taiwan's tax code allow us to separate the tax hypothesis from other explanations, but Taiwan's data also permits us to examine the heterogeneity of investors' behavior around ex-dividend dates. We find that, despite a similar stock return behavior for both taxable and non-taxable distributions, the order behavior is very different across the two distributions. We find strong evidence that small investors sell before the ex-date and start to buy from the ex-date, which suggests that small investors prefer low-priced stocks. We find weaker evidence consistent with the tax hypothesis: foreigners and large domestic investors who are tax-disadvantaged avoid participating in dividends. We also find strong evidence that institutions play the role of short-term arbitrageurs around ex-dividend dates. At this stage, what is not clear is how trading is related to return behavior, which will be pursued in future research.

五、參考文獻

Andrews, Arthur W., and Lawrence R. Wilson, 1971, Stock dividend taxation under the Tax Reform Act of 1969: Expansion of an ominous past, Arizona Law

Review 13, 751-796.

Bali, R., and G. L. Hite, 1998, Ex-dividend day stock price behavior: discreteness or tax-induced clienteles?, *Journal of Financial Economics* 47, 127-159.

Belsley, D.A., E. Kuh, and R.E. Welsch, 1980, *Regression Diagnostics*, New York: John Wiley & Sons, Inc.

Black, Fisher, 1986, Noise, *The Journal of Finance* 41, 529-543.

Boyd, John H., and Ravi Jagannathan, 1994, Ex-dividend price behavior of common stocks, Review of Financial Studies 7, 711-741.

Campbell, James A., and William Beranek, 1955, Stock price behavior on ex-dividend dates, *The Journal of Finance* 10, 425-429.

Chan, K. and W. Fong, 2000, Trade size, order imbalances, and the volatility-volume relation, *Journal of Financial Economics* 57, 247-273.

Chordia, T., R. Roll, and A. Subrahmanyam, 2002, Order imbalances, liquidity, and market returns, *Journal of Financial Economics* 65, 111-130.

Cohen, Stephen B., 1974, Taxing stock dividends and economic theory, Wisconsin Law Review, 142-175

Dubofsky, David A., 1992, A market microstructure explanation of ex-day abnormal returns, *Financial Management* 21, 32-43.

Durand, David, Alen M. May, 1960, The ex-dividend behavior of American telephone and telegraph stock, *The Journal of Finance* 15, 19-31.

Eades, Kenneth M.; Hess, Patrick J.; Kim, E. Han, 1984, On Interpreting Security Returns During the Ex-Dividend Period, *Journal of Financial Economics* 13, 3-35.

Elton, Edwin J. and Martin J. Gruber, 1970, Marginal stockholder tax rates and the clientele effect, *Review of Economics and Statistics* 52, 68-74.

Elton, Edwin J. and Martin J. Gruber and Christopher R. Blake, 2002, Marginal stockholder tax effects and ex-dividend day behavior - thirty-two years later, working paper.

Frank, Murray, Ravi Jagannathan, 1998, Why do stock prices drop by less than the value of the dividend? Evidence from a country without taxes, *Journal of Financial Economics* 47, 161-188.

Grinblatt, M., R. Masulis, and S. Titman, 1984, The valuation effects of stock splits and stock dividends, *Journal of Financial Economics* 13, 461-490.

Jakob, Keith and Tongshu Ma, 2003, Order imbalance on ex-dividend days, *The Journal of Financial Research* 26, 65-75.

Jakob, Keith, and Tongshu Ma, 2004, Tick size, NYSE rule 118, and ex-dividend day stock price behavior, *Journal of Financial Economics* ***72***, 605-625.

Johnson, Norman J., 1978, Modified t tests and confidence intervals for asymmetrical populations, *Journal of the American Statistical Association* 73, 536-544.

Kalay, Avner, 1982, The ex-dividend day behavior of stock prices: a re-examination of the clientele effect, *The Journal of Finance* 37, 1059-1070.

Kato, Kiyoshi, and Uri Loewenstein, 1995, The ex-dividend-day behavior of stock prices: the case of Japan, *The Review of Financial Studies* 8, 817-847.

Koski, Jennifer Lynch, and John T, Scruggs, 1998, Who trades around the ex-dividend day? Evidence from NYSE audit file data, *Financial Management* 27, 58-72.

Kryzanowski, Lawrence, and Hao Zhang, 1996, Trading patterns of small and large traders around stock split ex-dates, Journal of Financial Research 19, 75-90.

Lakonishok, Josef, and Baruch Lev, 1987, Stock splits and stock dividends: why, who, and when, *The Journal of Finance* 42, 913-932.

Lakonishok, Josef, and Theo Vermaelen, 1986, Tax-induced trading around ex-dividend days, *Journal of Financial Economics* 16, 287-319.

McDonald, Robert L., 2001, Cross-border investing with tax arbitrage: The case of German dividend tax credits, *Review of Financial Studies* 14, 617-657.

Ohlson, James A.; Stephen H. Penman, 1985, Volatility increases subsequent to stock splits: an empirical aberration, *Journal of Financial Economics* 14, 251-266.

Stoll, H., 1978, The supply of dealer services in securities markets, *The Journal of Finance* 33, 1133-1151.