This is to certify that the

dissertation entitled

TAX MOTIVATED TRADING OF
AMERICAN DEPOSITARY RECEIPTS

presented by

Sandra Renfro Callaghan

has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Accounting

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Major professor

Date 10/23/98

TAX MOTIVATED TRADING OF AMERICAN DEPOSITARY RECEIPTS

By

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A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Accounting

1998

ABSTRACT

TAX MOTIVATED TRADING OF AMERICAN DEPOSITARY RECEIPTS

By

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This study investigates the impact of foreign withholding taxes on ex-dividend trading activity of American Depositary Receipts (ADRs). Examination of tax motivated ex-dividend day trading should enhance our understanding of how taxes, combined with other economic variables, impact investor behavior, particularly with respect to marketable securities.

For several reasons, studying ADR dividend distributions provide a unique setting to address this issue. First, the foreign and domestic tax structures related to these distributions allow a more direct measure of the magnitude of the related tax incentive than is possible in single jurisdiction studies. Furthermore, cross-sectional variation in tax rates exists and can be identified with respect to these distributions, making possible joint tests of the tax and non-tax factors affecting trading activity.

Two separate volume analyses are conducted on a sample of 940 ADR dividend distributions occurring between 1988-1995: (1) univariate daily analyses of trading activity in the week prior to and after the ex-dividend day, and (2) multivariate joint tests of the tax and non-tax factors affecting trading volume. In general, the daily analyses indicate abnormal increases in trading volume, for distributions subject to foreign withholding, beginning one day prior to and extending several days after the ex-dividend day. Non-taxable distributions do not exhibit the same increases in ex-dividend day trading volume.

The multivariate tests provide evidence that trading volume, for a short window around the ex-dividend day, is positively related to the magnitude of the foreign withholding tax and negatively related to transaction costs. Further investigation suggests these results are not sensitive to variable definition, exchange listing, country of origin, or year of distribution. Overall, the results provide evidence consistent with the hypothesis- foreign withholding taxes do impact ex-dividend day trading activity of ADRs and this activity is constrained by transaction costs.

Dedicated to Tom,
Kaitlyn, and Lauren

ACKNOWLEDGEMENTS

I am grateful to the many friends and faculty who provided support and guidance throughout my term as a Ph.D. student. In particular, I would like to thank my dissertation committee - Dr. Joe Anthony (chairman), Dr. Ed Outslay, Dr. Kathy Petroni, Dr. Mel O'Connor, and Dr. Jeff Wooldridge. I would also like to thank the Deloitte and Touche Foundation and Michigan State University for generously providing funding for my graduate studies.

Likewise, I appreciate the friendship and support of the members of my class – Elizabeth Connors, Andrea Drake, and Dan Heitger. A special thanks to Elizabeth who always offered to help when I needed it – and I needed it often!

I am forever indebted to my parents, Frank and Judy Renfro. Their support and commitment to my endeavers is obvious by the number of times they came to help where they could. Finally, and most importantly, I would like to send my love and thanks to my husband, Tom, for his constant love and reassurance during those happy and stressful times, and to my daughters, Kaitlyn and Lauren, for showing me what life is really all about!

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CHAPTER 1 – INTRODUCTION

This study investigates the impact of taxes on investor behavior in a multi-jurisdictional tax setting by examining the ex-dividend day trading patterns of investors in American Depository Receipts (ADRs). The primary question of interest is whether the combination of domestic and foreign taxes on ADR dividend income influences investors' decisions. This study will also begin to address what other economic factors may enhance or mitigate the effect.

ADRs are financial instruments traded in the United States that represent shares of foreign equity. To the U.S. investor, dividend payouts from ADRs are subject to the applicable U.S. tax laws as well as those of the foreign jurisdiction, while capital gains are subject only to U.S. taxation. The resulting "double tax penalty" on dividends creates an incentive for some investors to engage in tax motivated trading to avoid dividend income. Selling pressures, in turn, may create profitable arbitrage opportunities for other investors who do not face the same differential taxation.

Media attention focused on sharp increases in the trading volume around the ex-dividend day suggests the existence of this type of tax motivated trading:

> *". . . American investors such as pension funds are playing a different game that might be called a dividend dump. They are bobbing and weaving, darting in and out of emerging-market stocks to avoid collecting the dividends because the withholding tax is so high."*
>
> *Wall Street Journal, November 16, 1994, p. C1.*

"American depositary receipts of Rueters Holding Plc traded very heavily here, driven by dividend plays . . . . 'It's a dividend roll, plain and simple' said a trader. Goldman Sachs analyst Eric Philo said investors wanting to avoid taxation of the Rueter payout were selling shares . . . . and would likely buy back the shares after the ADRs go exdividend . . ."

Rueters, March 14, 1994

1.1 Motivation

This study enhances our understanding of how taxes, combined with other economic variables, impact investor behavior, particularly with respect to investment in marketable securities. Several studies have examined ex-dividend day trading activity of securities subject to single jurisdiction taxation and have failed to produce a consistent set of results. For several reasons, the multi-jurisdictional tax implications related to ADR income provides a more powerful setting to analyze the effect of taxation on investment behavior. Studying ADRs provides a situation where cross-sectional variation in tax rates exists and can be identified in U.S. securities.[1] This allows for more powerful joint tests of the tax and non-tax factors affecting trading behavior. Studying ADR dividend distributions also provides a more direct measure of the magnitude of the tax incentive than was possible in previous studies.

In addition to enhancing understanding of how taxes impact investor behavior, tax strategies, such as dividend dumping transactions, raise policy issues. While these trading strategies may be an efficient practice for investors, given the potential returns, they are a result of the applicable tax laws and not the economics of the underlying

[1] Technically, ADRs are a U.S. security. U.S. securities representing domestic equity will be referred to as "domestic securities" in this paper. "U.S. securities" refer to both ADRs and domestic securities.

security. The result is a potential distortion in the investment decision. For tax disadvantaged investors, trading solely to avoid dividends can dramatically increase transaction costs and risk associated with holding ADRs. This may place these tax penalized investors at a competitive disadvantage in the global marketplace. However, their disadvantage creates the potential for abnormal returns for tax advantaged investors. Thus, as the United States continues to negotiate tax treaties, it is important to understand the intended and unintended effects of cross-jurisdictional differences in taxation.

This study also complements the growing body of research examining the global capital market. Although ADRs are not the only vehicle for global investing, they have assumed an increasingly important role in cross border and global market development. ADRs maintain a significant and growing presence on the major U.S. exchanges, accounting for more than 6 percent of all trading volume in 1997.[2] As a means for allocating world capital, ADRs greatly enhance the potential for capital to flow to the locations of greatest return, irrespective of differences in currency, market developments, business practices, and foreign investment restrictions prevalent in some countries. The rapid expansion of global markets via ADRs raises questions about the role cross-border accounting and regulatory differences, including taxation, play in the valuation of these securities. Understanding how these factors affect the trading behavior of investors should enhance the understanding of investment in a global economy.

[2] Data provided by the NYSE.

1.2 Overview of Hypotheses

Using a sample of publicly traded ADRs, volume tests are employed to identify abnormal trading activity surrounding the ex-dividend day. In general, two types of trading strategies are predicted to result in abnormal increases in trading volume. The first represents traders engaging in short-term dividend strategies. These investors already hold the security but sell prior to the ex-dividend day to avoid dividend income. They likely resume a position in the security once the right to receive the dividend has passed. Other short-term traders, who do not face the same tax penalty on the dividend distribution, in turn, find it profitable to "capture" the dividend. The second source of abnormal trading activity is a result of long-term investors simply timing the purchase or sale of their investment, because of the expected distribution, to secure a more favorable tax consequence.

To test for the presence of abnormal trading activity, abnormal increases in trading volumes are estimated in the days surrounding the ex-dividend day. Increases in trading volume in this time frame are predicted to be a positive function of the level of foreign tax withholding associated with the distribution. Furthermore, the tax penalty on dividend income is amplified by the magnitude of the dividend yield. Therefore, abnormal volume is also predicted to be positively related to the tax cost measured as an interaction between the level of foreign withholding tax and the dividend yield. After controlling for taxes, dividend yield should be positively related to abnormal trading volume.

Non-tax factors, such as transaction costs and the size of the issuing company, may also mitigate or enhance the impact of taxes on trading behavior. Because profitable

strategies are constrained by transaction costs, abnormal trading volume is predicted to be a negative function of transaction costs. Size of the company, on the other hand, proxies for a variety of attributes in different settings. In this situation, it is likely that size may proxy for analyst following, availability of information, or even as another proxy for transaction costs. Therefore, no prediction is made with respect to the impact of size on ex-dividend day trading activity.

1.3 Overview of Research Design

Volume tests are conducted on a sample of 940 ex-dividend days representing 134 securities traded on the NYSE, AMEX, and NASDAQ over the period 1988-1995. These securities represent issuers from 31 foreign countries. Two types of analyses are performed: (1) daily analyses of trading activity in the week prior to and after the ex-dividend day and (2) multivariate joint tests of the tax and non-tax factors affecting trading volume. The first test is univariate, contrasting trading volume of distributions subject to foreign withholding with those not subject to withholding tax. Daily trading volumes are also presented by dividend yield for distributions subject to 15% withholding tax. Although this analysis provides insight into the events around the ex-dividend day, it is only univariate and does not simultaneously capture the tax and non-tax considerations related to investment.

The primary focus of this study is on the second analysis, a multivariate joint test of the tax and non-tax costs affecting trading behavior. Cross-sectional variation in the foreign withholding rate provides a unique setting that allows for this more powerful test

of abnormal trading volume. Various tests are conducted to discern the robustness of the results with respect to variable definition and alternative specifications of the multivariate test.

1.4 Overview of Results

In general, the results indicate that when a dividend payout is expected, ADRs exhibit an abnormal increase in volume surrounding the ex-dividend day that is a positive function of the magnitude of the foreign tax withholding rate and a negative function of transaction costs. Together, these results are consistent with the expectation that the presence of a tax penalty for ADR dividend payouts creates an incentive for investors to engage in tax motivated trading and that this activity is constrained by transaction costs.

After controlling for tax, dividend yield alone is not significantly related to abnormal increases in trading volume. Furthermore, after controlling for size and transaction costs, the interaction between dividend yield and taxes is not significantly related to ex-dividend day trading volume. One possible explanation for this result is that there exists a threshold level of the dividend yield and tax rate for which trading strategies are profitable and all distributions in the sample may be of a sufficient level to encourage profitable trading strategies.

1.5 Organization of the Dissertation

The remainder of the dissertation is organized as follows. Chapter 2 discusses previous research related to this topic. This includes both (1) studies examining ex-dividend day trading behavior and (2) other studies specifically investigating the role of

taxes on investors' behavior. Chapter 3 describes the characteristics of ADRs and their presence in U.S. capital markets. This is followed by a discussion in Chapter 4 of the U.S. and foreign tax implications associated with income derived from investment in ADRs. Chapter 5 and Chapter 6, respectively, provide discussion of the research question and research design including a description of the sample. The results are presented in Chapter 7. Conclusions, along with a brief discussion about directions for further study, are included in Chapter 8.

CHAPTER 2 - RELATED RESEARCH

A significant body of research documents a relation between taxes and investor behavior in a variety of settings. As investors move toward a more global approach, research focused on investment behavior has also begun to capitalize on the opportunities and insights that studying multi-jurisdiction transactions can add. Several recent multi-jurisdictional tax studies have examined the impact of foreign taxes on investor behavior. However, most of these studies examine the corporate capital investment decision rather than the investment in securities decision that is the focus of this study.[3]

Given the limited quantity of related multi-jurisdictional tax research, it is a comprehensive set of single jurisdiction ex-dividend day studies that provide much of the theoretical and methodological basis for this paper. The focus on ex-dividend days stems from a study by Miller and Modigliani (1961), which suggests a clientele effect, the idea that each firm is assumed to have a body of shareholders who find its dividend policy optimal. The plausibility of tax clienteles is the impetus for many subsequent studies that scrutinize securities pricing surrounding the ex-dividend day in an effort to determine what role taxes play on the valuation of dividends and, ultimately, a firm's dividend policy.

Elton and Gruber (1970) present a model of long-term traders consistent with a clientele effect. The model predicts a positive ex-dividend day return due to a penalty on dividend income relative to capital gains. Elton and Gruber assert that this model provides a method of determining the tax brackets of marginal stockholders. Miller and

[3] Ke, Outslay, and Petroni (1998) is one exception.

Scholes (1982) and Kalay (1982) claim that the model is incomplete and introduce a second market participant, the short-term trader. Subsequently, a series of studies attempts to document the existence and relative importance of these two forces (the long-term and short-term trader) in the market. However, there has been little success in documenting a theoretically consistent set of empirical regularities. This may result from either a single jurisdiction approach, where the lack of or identifiable variation in tax status across investors limits analysis to weak univariate tests, or from the focus on ex-dividend day return, which requires assumptions about the identity of the marginal trader to make predictions regarding ex-dividend day returns.

Without much success in providing a complete understanding of ex-dividend day activity, considerable attention has been given to methodology in an attempt to find a more powerful setting or test of ex-dividend day activity. Two types of studies have emerged: those that examine the impact of shifts in the tax structure [for example, Robin (1991), Poterba and Summers (1984), Booth and Johnston (1984) and Lakonishok and Vermaelen (1983)] and those that focus on trading volume rather than ex-dividend day returns [for example, Richardson, Sefcik and Thompson (1988), Booth and Johnston (1984), Lakonishok and Vermaelen (1986) and Athanassakos (1996)]. Most studies investigating shifts in tax structure examine activity in the United Kingdom and Canada, where several changes in tax legislation have occurred in recent years. It is unclear whether these results can be generalized to U.S. markets. Robin (1991) investigates the impact of the 1986 Tax Reform Act on ex-dividend day returns, but he documents shifts in trading behavior that do not coincide directly with the effective date of the legislation.

Volume studies provide more insight into ex-dividend day activity primarily because they overcome the issue of identifying the marginal trader. Instead of averaging investors' beliefs (as in security pricing), volume reflects investors' activity by summing all trades. The summation process preserves differences between investors' relative valuation of the dividend that may be suppressed by the averaging process reflected in the price of the security. Thus, it is not necessary to identify the relative market forces or, in other words, identify the tax incentive among various clienteles. Lakonishok and Vermaelen (1986) and Athanassakos (1996) are two of the most comprehensive volume studies. While both find evidence generally consistent with tax induced short-term trading, they also document activity that cannot be completely explained by the current structure of the tax law.

Limited by an inability to identify cross-sectional variation in the tax variable, most prior studies have employed univariate analysis to test for a tax effect. This makes it difficult to simultaneously consider the tax and non-tax factors that affect ex-dividend day trading activity. Cross-sectional variation in the tax variable is one of the benefits of studying ADRs. Similarly, Geisler (1997) identified a sample of life insurance companies where the marginal tax rate applicable to dividend income earned on stock portfolios can be inferred. Thus, cross-sectional variation in the tax variable is identified and tax clienteles can be tested. The results suggest that investment behavior can be explained by the presence of tax-induced clienteles.

The following sections provide a more detailed discussion of related research, with particular emphasis on the multi-jurisdictional tax and ex-dividend day studies described above.

2.1 Multi-jurisdictional Tax Studies

In recent years, investors and researchers, alike, have shown increased interest in economic factors that affect cross-border investment. Several studies have used multi-jurisdictional settings to examine firms' investment decisions. One subset of papers addresses the investment decision by investigating how taxes impact firms' capital investments. (See Hartman (1985), Hines (1994), Harris (1993) and Petroni and Shackelford (1995), for example.) However, the specific focus of this study is another subset of the investment decision, the investment in securities decision. Very limited evidence exists with regard to the role of multi-jurisdictional taxes in this setting. One recent study, Ke, Outslay and Petroni (1998) does use a multi-jurisdictional setting to examine cross-border investment in U.S. securities.

Ke et al. specifically look at the influence of home country tax systems (worldwide or territorial) on foreign-owned insurance companies' investment strategies in U.S. tax exempt securities. Under a territorial system, income from U.S. investments that are exempt from U.S. taxation is also exempt in the insurer's home country, regardless of whether it is earned through a U.S. branch or subsidiary. Under a world-wide system, the result is different depending on whether income is earned through a U.S. branch or subsidiary. U.S. branch income is subject to home country taxation less any credit available for U.S. taxes paid on such income, while U.S. subsidiary income is generally not subject to home-country taxation until repatriated. Therefore, given the taxation differences on U.S. income due to the form of entity generating such income and the home-country system of taxation, Ke et al. make predictions regarding these foreign-owned insurance companies' relative tendency to hold U.S. tax exempt assets.

Consistent with expectations, they find that world-wide branches invest significantly less in tax-exempt assets than territorial branches and subsidiaries and U.S. owned insurers who benefit from the tax-exempt status both in the domestic and foreign tax jurisdiction. Furthermore, Ke et al. find no difference in the investment practices of world-wide subsidiaries (who may defer taxation until repatriation) from exempt and U.S. owned insurers. These results suggest that tax deferral may be the equivalent of tax exemption. Overall, the findings are consistent with foreign and domestic taxes jointly affecting investment in securities. While the sample provides a powerful setting in which the tax incentive can be clearly defined, it is unclear how the results generalize to other investor types. Further research in this area can help to build on the determinants of investment across a broader group of investors.

2.2 Ex-Dividend Day Studies

Although this study focuses on a *multi-jurisdiction* tax issue, the theoretical and methodological bases lay primarily in a series of papers examining ex-dividend day trading activity for securities subject to a single tax jurisdiction. This section provides a review of selected papers that focus on dividend clienteles and short-term trading around the ex-dividend day.

2.2.1 Dividend Clientele Hypothesis and Short-term Trading

The tax clientele hypothesis was suggested by Miller and Modigliani (1961) in an effort to explain firms' dividend policies. They establish that dividend policy is irrelevant to shareholders under the assumptions that firms' investment decisions are

fixed and perfect markets exist. This includes the assumption of no transaction costs, perfect information, rational investors, and no taxes. Thus, each firm has a body of stockholders who find its dividend policy optimal. It can be inferred that stockholders will include the tax consequences of an investment (and dividend payout) in their investment decision. Subsequent to Miller and Modigliani, a body of research developed that attempted to further explain investors' valuation of securities and dividends. Much of this research focused on trading behavior surrounding the ex-dividend day. One of the most notable ex-dividend day studies is Elton and Gruber (1970). This study spurred a three-decade long dialog among researchers about dividend clienteles and ex-dividend day trading behavior.

Elton and Gruber (1970) present hypotheses consistent with tax clienteles to explain trading activity surrounding the ex-dividend day. A model is developed that suggests a method in which it is possible to estimate marginal stockholders' tax brackets. Specifically, under this hypothesis it is assumed that investors buy and sell securities for reasons unrelated to the dividend. Thus, all investors are long-term investors. Shareholder clienteles do not change; rather the ex-dividend day return includes a premium to compensate those who hold the stock through the ex-dividend day. They observe that when there is a tax penalty on dividends (relative to capital gains), the price drop on the ex-dividend day is less than the dividend amount. Using 4,148 observations between April 1, 1966, and March 31, 1967, Elton and Gruber (1970) document an average price decline as a percentage of dividends paid of 77.7%. This is consistent with the view that investors value dividends less than capital gains under the tax structure applicable to the study.

Elton and Gruber (1970) further contend that the marginal tax rate of the average investor can be inferred from the relative price decline. They estimate a marginal tax bracket of 36.4% for stockholders on the New York Stock Exchange (NYSE). They believe this estimate is reasonable given the tax structure for the sample period and is consistent with previous estimates. Furthermore, the estimated tax rate declines with dividend yield. Elton and Gruber interpret their results as providing evidence of a clientele effect; investors with a relatively high marginal tax rate on dividends hold low dividend yield stocks and investors with a relatively low marginal tax rate on dividend income gravitate toward high dividend yield stocks. Green (1980) extends the clientele hypothesis. Similar to Elton and Gruber (1970), Green (1980) assumes that investors do not trade solely because of the dividend, but adds that they may time a transaction differently, if there is an appropriate tax incentive.

One problem with the clientele hypothesis is that it models positive ex-dividend day trading profits for various short-term traders. Consequently, Miller and Scholes (1982) and Kalay (1982) offer a complementary explanation. They argue that while the clientele hypothesis may predict a positive ex-dividend day return, it cannot exist in equilibrium. Not all investors face the same marginal tax rate. Therefore, arbitrage by short-term traders or tax-exempt institutions, who do not face the same differential taxes on dividends versus capital gains, should eliminate the presence of abnormal positive returns. This is known as the short-term trading hypothesis. Kalay (1982) further adds that profitable trading by short-term traders is constrained by transaction costs. Thus, the ex-dividend day abnormal return may reflect transaction costs rather than a tax effect.

Empirical evidence on these two hypotheses has yielded mixed results. One reason is that most of these studies focus on abnormal returns around the ex-dividend day. However, ex ante predictions regarding price change require identification of the marginal investor and the marginal tax rate. Prior research has not identified the marginal investor, only speculated. Furthermore, it is difficult to isolate a tax effect when examining the relation between dividend yields and ex-dividend day returns. In fact, Miller and Scholes (1982, p. 1131) present evidence contrary to a tax effect and contend that "after correcting . . . for information effects, we find no significant remaining relation between returns and expected dividend yields – certainly nothing that could be considered a yield-related effect." To avoid this difficulty with ex-dividend day returns, some researchers have attempted alternative approaches such as volume studies and examination of ex-dividend day price behavior around changes in tax legislation.

2.2.2 Studies Examining Shifts in Tax Structure

Because a relation between dividend yields and ex-dividend day returns may be a result of some omitted factor in the model or the failure to adequately model ex-ante returns rather than a tax effect, the question of how taxes effect the market valuation of dividends remains controversial. Focusing on changes in the applicable tax rate may allow us to distinguish between these hypotheses.

Most studies that focus on changes in tax legislation have used data from Canada or the United Kingdom markets, where several changes in the tax structure have provided a unique setting for studying this issue. Examination of the relation between dividend

yields and ex-dividend day returns across tax regimes provides an alternative method of isolating a tax effect.

Poterba and Summers (1984) use British data to examine the effects of dividend taxes on investors' relative valuations of dividends and capital gains. During the sample period, 1955 to 1981, there were two significant and several minor changes to the tax structure. Poterba and Summers (1984) provide evidence that changes in dividend taxes affect the ex-dividend day premium on the stock price that shareholders require when receiving income in the form of dividends. Specifically, they find that when dividends are tax disadvantaged relative to capital gains, price drops on ex-dividend days are smaller than the dividend per share. They interpret this as consistent with a clientele effect. However, estimated marginal tax brackets, as suggested by Elton and Gruber (1970), appear unreasonably high.

While Poterba and Summers (1984) use British data to document results supportive of a tax-clientele effect, studies using Canadian data have not been supportive of the tax clientele hypothesis. Instead these studies suggest that tax induced short-term trading dominates ex-dividend day investor behavior. Lakonishok and Vermaelen (1983) use changes in the Canadian tax structure to assess the relative importance of these two forces. In 1971, tax reform in Canada increased the value of a dollar of dividend income relative to capital gains. Therefore, the tax-clientele hypothesis predicts an increased ex-dividend day price decline after 1971. Furthermore, complex changes in the tax structure decreased short-term trading profits for certain members of the exchange. Thus, the dominance of a short-term trading hypothesis would lead to the opposite prediction – a

decrease in the ex-dividend day price drop. This provides a unique setting to compare the plausibility of the two ex-dividend day trading theories.

Consistent with tax-induced short-term trading (and inconsistent with a tax clientele hypothesis), Lakonishok and Vermaelen (1983) observe a larger ex-dividend day price change in 1971 relative to 1972. However, they are puzzled by the observation that the price change is considerably smaller than expected, given what has been documented in U.S. markets.

Booth and Johnston (1984) also attempt to document a tax-clientele effect by examining the price behavior of stocks listed on the Toronto Stock Exchange during the period 1970 to 1980. They do find ex-dividend day price ratios less than one, but are unable to show a consistent relation with dividend yield as the clientele hypothesis predicts. Moreover, estimated marginal tax brackets [using the method suggested by Elton and Gruber (1970)] appear unreasonably high. Booth and Johnston (1984) also examine the plausibility of short-term trading. However, the observed ex-dividend day price ratios were not consistent with changes in the tax structure and imply unreasonably small transaction costs. Thus, the data also fail to support the short-term trading hypothesis. Not only do these studies provide conflicting results with respect to the clientele and short-term trading hypotheses, it is unclear, given differences in the investor base, how evidence from Canadian and U.K. markets translates into expectations of U.S. financial markets.

Using data from U.S. capital markets, Robin (1991) investigates the impact of the 1986 Tax Reform Act (TRA 86) on ex-dividend day returns. TRA 86 eliminated the explicit tax differential between dividend income and capital gains for the ordinary

investor. This has implications for both the clientele and short-term trading hypotheses. Because TRA 86 eliminated the preference for capital gains relative to dividend income, the clientele hypothesis predicts a decrease in the ex-dividend day return post-TRA 86. The hypothesized reduction in the ex-dividend day premium reduces the opportunity for profitable short-term trading opportunities. Because these are theoretically constrained by transaction cost, the relation between ex-dividend day abnormal returns and transaction costs should be weaker after TRA 86.

Robin (1991) finds some support for dividend clienteles, the study yields several unexpected results that cannot be explained by the U.S. Tax Code. In particular, while Robin (1991) finds evidence that TRA 86 impacted ex-day returns in the expected direction, the shift appears to have occurred before the provisions of the new tax legislation became effective. A significant relation between transaction costs and abnormal return is documented. However, contrary to expectation, the relation is stronger post-TRA 86. Therefore, Robin (1991) is unable to provide evidence of short-term trading strategies. It is also important to note that the theoretical basis for Robin (1991) relies on changes in the tax structure of the personal income tax. Thus, an assumption is made with respect to the relative importance of this type of market participant in U.S. capital markets. However, Robin (1991) provides no evidence with respect to the investor base.

Overall, it appears that studying shifts in tax legislation has done little to settle the controversy regarding the valuation of dividend income and ex-dividend day trading behavior.

2.2.3 Volume Studies

Volume studies may provide a more sensitive means of detecting investor behavior because trading volume reflects investor behavior by summing all market trades rather than an aggregation of the market's valuation of dividends. Thus, detecting abnormal activity is not dependent on identification of the marginal investor. Bamber (1986) and Bamber (1987) rely on this approach in evaluating market reaction to earnings announcements.

In addition to documenting price behavior surrounding the ex-dividend day, Booth and Johnston (1984) examine the relation between ex-dividend day trading volume and dividend yield. The Booth and Johnston study is based on data from the Toronto Stock Exchange over the period 1970-1980. While increased trading volume is observed in the days immediately preceding the ex-dividend day, volume is inversely related to dividend yield, which is contrary to what we would expect given tax induced trading.

In two more comprehensive ex-dividend day studies, Lakonishok and Vermaelen (1986) and Athanassakos (1996) find evidence of short-term trading. Lakonishok and Vermaelen (1986) study taxable and non-taxable distributions (NYSE and AMEX) over the period 1970 to 1981. Profitable short-term trading is constrained by transaction costs. On May 1, 1975, brokerage commissions became negotiable resulting in reduced transaction costs to larger (e.g. institutional) traders. For taxable distributions, they observe that trading volume increases in the days before the ex-dividend day. Furthermore, the increased trading volume is more pronounced in the period following negotiated brokerage commissions. Lakonishok and Vermaelen (1986, p. 317) conclude "short-term traders have a significant impact on ex-day behavior." Trading volume and

dividend yield exhibit a weak relation in the predicted direction, but, contrary to expectations, the observed trading volume for certain (low) dividend yield quartiles is abnormally negative.

Eades, Hess, and Kim (1984) and Grinblatt, Masulis, and Titman (1983) report abnormal return behavior around ex-dividend days for non-taxable distributions similar to that documented for taxable distributions. They suggest this similarity might be the results of a general "ex-day anomaly" unrelated to the tax argument. Thus, Lakonishok and Vermaelen (1986) also test non-taxable distributions.

Like these previous studies, price behavior was similar for the sample of taxable and non-taxable distributions. However, patterns of ex-dividend day trading volume were very different for the two types of distributions. Unlike taxable distributions, non-taxable distributions exhibit decreased trading volume in the days surrounding the ex-dividend day. The decrease is statistically significant only on the ex-dividend day ($t = -3.22$). Lakonishok and Vermaelen (1986, p. 317) provide the following conclusion: "The difference in trading activity . . . also demonstrates that the economic explanation (if any) of the abnormal returns around non-taxable distributions is possibly very different from the explanation of security prices around taxable distributions."

In another trading volume study, Athanassakos (1996) provides evidence of tax-induced short term trading using Canadian data over the period 1970 to 1984. Similar to the abnormal returns studies by Booth and Johnston (1984) and Lakonishok and Vermaelen (1983), Athanassakos (1996) focuses on changes to the Canadian system of taxation to provide evidence of a tax effect. In general, Athanassakos (1996) finds abnormal increases in trading activity in days surrounding the ex-dividend day for all

sub-periods with the largest increases occurring after 1976 when changes to tax legislation resulted in decreased transaction costs.

The main focus of Athanasakkos (1996) is an attempt to identify the dominant investor. Athanasakkos infers that in sub-periods where dividend yield is related to trading volume, taxable investors are the dominant investor. Conversely, when dividend yield is unrelated to trading volume, non-taxable and/or short-term investors dominate. Athanassakos (1996) also examines ex-dividend day returns and is unable to document observed returns around the ex-dividend day that support this conclusion. Thus, conclusions regarding the investor base may be premature given the ex-dividend day price patterns and the inability for this and previous studies to conclusively document a tax effect.

2.3 Other Related Studies

As indicated in previous sections, simply studying ex-dividend day returns or trading volume continues to generate controversy regarding the role taxes play in the valuation of dividend income and, more generally, dividend policy. The next sections describe several studies that use other approaches to document the existence of dividend clienteles or tax-induced trading.

2.3.1 Taxable and Non-taxable Distributions

In an attempt to control for the tax effect, Eades, Hess, and Kim (1984) examine the ex-dividend day return for taxable and non-taxable distributions on U.S. markets. As expected, they present evidence for the taxable distributions consistent with the tax

interpretation of ex-dividend day pricing behavior. However, distributions in the non-taxable control sample were also priced as if fully taxable. They investigate several possible explanations, such as errors in ex-dividend dates, day of the week effects, dividend announcement effects, proximity of the ex-dividend date to the announcement, strength of the announcement, and the effect of thinly traded securities. However, they are unable to provide a plausible explanation for the similarity in pricing of taxable and non-taxable distributions. Grinblatt, Masulis, and Titman (1983) also document an abnormal ex-dividend day return for non-taxable distributions (stock splits and stock dividends)

2.3.2 Changes to Dividend Policy

Richardson, Sefcik, and Thompson (1986), Richardson, Sefcik, and Thompson (1988) and Seida (1997) focus directly on changes in dividend policy to document the existence of dividend clienteles. These studies examine trading volume surrounding new dividend initiations and/or dividend increases to provide evidence supporting dividend clienteles.

Richardson et al. (1986) investigate trading volume following dividend initiations by 192 U.S. securities. In an attempt to control for any information imparted by a dividend initiation, they examine trading volume in the announcement week and in the period between the announcement week and ex-dividend day. They observe significant increases in trading volume in the week of the announcement and attribute it to information content of the dividend announcement. Increases in trading volume in the latter period are only marginally significant, which they attribute to a "weak clientele

effect." As noted by Richardson et al. (1988, p. 303) "a potential weakness of the . . . model is its sensitivity to an incorrect modeling of the information effects."

Richardson et al. (1988) use Canadian data in an attempt to control for the information effects. As with other tax related studies, Richardson et. al. attempt to document a tax effect by exploiting changes to the Canadian tax structure during the period 1972 to 1982. Specifically, they document declines in trading volume for first time dividend initiators as the tax structure moved towards tax neutrality. This is consistent with dividend clienteles in Canada. It is unclear to what extent this can generalize to U.S. capital markets.

Seida (1997) extends Richardson et al. (1986) and has more success in documenting a clientele effect in the United States by (1) extending the focus to include dividend increases and (2) measuring number of transactions rather than trading volume. Including dividend increases has two benefits. First, he increases the overall sample size, and second, Seida increases the average dividend level. This does more to insure that a tax-based incentive is present. With respect to the unit of measurement, Cready and Ramana (1995) suggest that the ability to detect increases in trading activity is greater with transaction data. Consistent with the presence of dividend clienteles, Seida (1997) finds that after controlling for the information content of dividend increases, the number of transactions is positively correlated with the magnitude of the dividend increase.

In yet another approach, Dhaliwal, Erickson, and Trezevant (1996) provide direct evidence of the existence of tax clienteles by documenting a shift in institutional ownership around dividend initiations. They observe significant increases in the institutional equity ownership of firms that initiate cash dividends. This increase is not

observed for dividend initiators in the period preceding dividend initiations and is not present in a control sample of firms that do not pay dividends.

2.4 Summary

Although a significant body of research has attempted to document the relation between taxes and investor behavior, this research has yielded conflicting results, particularly with regard to the findings in ex-dividend day studies. Much of the difficulty can be attributed to using a setting that limits tests to weak univariate analysis. Examining ex-dividend day trading activity of ADRs provides an alternative setting to re-examine the impact of taxes on investor behavior. In particular, cross-sectional variation in the tax variable can be identified and, thus, multivariate joint tests can be applied. This provides a potentially more powerful setting to document ex-dividend day activity and any relation between tax and non-tax factors affecting trading behavior.

CHAPTER 3 - AMERICAN DEPOSITARY RECEIPTS (ADRs)

An American Depositary Receipt (ADR) is a certificate issued by a U.S. depositary, usually a bank, that represents a number of shares of a particular foreign security. More than 1,400 depositary receipts exist[4] representing over 40 countries, making ADRs a viable means by which American investors can hold foreign equity. Technically a U.S. security, an ADR allows investors to diversify their portfolio internationally while avoiding costs associated with directly purchasing foreign shares. To the issuer, an ADR is a marketable security by which foreign companies can access large amounts of capital in U.S. financial markets.

3.1 General Information

The ADR itself is not a security in the same manner a U.S. stock certificate exists under state corporate law. Rather, an ADR represents evidence of ownership in the foreign equity held by a depositary (bank) in some predetermined ratio. In other words, an ADR is a dollar-denominated financial instrument issued by an American bank (depositary) verifying that offsetting shares are held in the depositary's foreign custodial bank.

A typical ADR can represent as many as ten shares of the foreign equity or as little as 1/40 of such security, depending on whether the foreign equity trades at a relatively low or relatively high market price. The conversion factor is generally set at a level that allows the security to trade at a market price attractive to U.S. investors and

[4] This includes both exchange and non-exchange listed securities.

similar to other U.S. exchange traded securities. Table 1 illustrates the conversion ratio and market price for a small sample of ADRs traded on the New York Stock Exchange. Note that the market price (July 1, 1998) is well within a typical range for U.S. traded securities.

Table 1
Conversion Factors

Security	Conversion Factor	Market Price (July 1, 1998)
British Petroleum Plc	12/1	$89.875
Empresa Nacional de Electicidad SA	1/1	21.125
Hitachi	10/1	67.750
Honda Motor Corp.	2/1	72.250
Hong Kong Telecommunications	30/1	19.500
Novo-Nordisk	1/1	38.750
Unilever Plc	4/1	79.625

At the investor's discretion, an ADR can be converted into the appropriate number of shares of the underlying foreign equity.

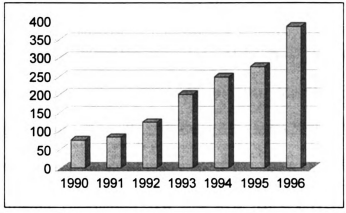
3.2 ADR Issuance

The first ADR was issued in 1927 by a predecessor of Morgan Guaranty Trust in response to a law passed in the United Kingdom that prevented British companies from registering shares overseas without a British-based transfer agent. U.K. shares were not allowed to physically leave the United Kingdom. Therefore, to accommodate U.S. investor demand for these securities, a U.S. instrument (an American Depositary Receipt) was created. In recent years, ADRs have become an increasingly visible source of

activity on the U.S. stock exchanges. Over the past decade, the number of ADRs listed on the three major exchanges has increased by 187%. This represents a 157% increase in the countries represented by ADR programs (Barron's, March 23, 1998, p. MW10). Figure 1 illustrates the rapid growth of ADRs in U.S. financial markets. Their growing presence in U.S. capital markets has been perceived as another step towards the globalization of financial markets.

Figure 1

Annual Trading Volume of Listed[5] ADRs
(Billions of U.S. Dollars)



There are generally two types of ADRs, sponsored and unsponsored, depending on whether the foreign company participates in the issuance. The issuance of sponsored ADRs is initiated by the foreign company, while unsponsored ADRs are issued by the depositary in response to market demand. Unlike sponsored ADRs, unsponsored ADRs

[5] The statistics represent ADRs traded on the NYSE, NASDAQ and the AMEX. Data were obtained from the respective exchanges.

have no formal agreement between the company and the depositary. Although unsponsored ADRs used to dominate, more recently new issuances have been primarily limited to sponsored ADRs.

The key agent in the ADR issuance is the depositary. In general, a foreign company will deposit shares of the foreign equity in a U.S. depositary. At the direction of the foreign company, the depositary then issues ADRs representing these foreign securities. Among the largest depositaries are Bank of New York, Citibank, Bankers Trust Company and Morgan Guaranty Trust. In most respects, the depositary acts as an agent to the investor and to the issuer (in the case of a sponsored issuance). The intermediary role performed by the depositary in creating and servicing ADRs provides benefits to both suppliers and demanders of capital.

Increasing interest in ADRs has generated a desire among investment managers for a benchmark to track the market performance of ADRs. Merrill Lynch began publishing an index, the Merrill Lynch ADR Composite Index, in late 1993. It compiles performance information for 360 exchange-listed ADRs. In March, 1998, The Bank of New York began offering The Bank of New York ADR Index(SM) consisting of 431 companies from 36 countries with a total market capitalization of over $3.1 trillion. Unlike the Merrill index, it contains real-time pricing and is weighted by the issuers' market capitalization. The Merrill index gives equal weight to each issuance. Some analysts have voiced concern over the usefulness of such an index. Eduard van Raay of J.P. Morgan asserts that "an index of ADR programs by themselves represents no particular universe of interest to U.S. investors. ADRs are not an asset class and the

collection of existing ADR programs today does not reflect any particular market, country or sector as tracked by investment managers (Investment Dealers' Digest, September 1, 1997, p.5)."

3.2.1 Benefits to Investor

From an investor perspective, ADRs offer several advantages over purchasing the underlying shares in a foreign market. In general, they simplify trading of the foreign equity because they resemble U.S. securities in most respects. They are purchased from a U.S. broker in U.S. currency and dividends are paid by the depositary in U.S. currency, net of foreign withholding. Without ADRs, a single overseas transaction can involve several brokers, foreign currency translation, delayed dividend payments, delayed settlement, and difficulties with registration. With as many as ten parties involved in an overseas trade, two out of five trades are never completed, compared to one out of every 100 U.S. executions that fail (Lappen1987). Even when the settlement process fails to occur, losses are minimized because ADRs are subject to the American three-day requirement for settlement of trades.

Another important characteristic of sponsored ADRs is that they are subject to registration in the United States. Thus, a record of ownership exists. This often provides increased protection of ownership rights and allows investors to avoid insurance costs necessary to protect securities abroad (Coyle1995). In an attempt to minimize any relative disadvantage U.S. investors have due to reduced or more costly access to

information about the foreign firm, the SEC mandates certain disclosure requirements. First, foreign firms issuing ADRs traded on the NYSE, AMEX, or NASDQ must provide a reconciliation of their annual reports to U.S. GAAP in English. Furthermore, they must provide U.S. investors in a timely manner with any informative disclosure released in their home market. Generally, it is the role of the depositary to assist in the distribution of information.

From a portfolio perspective, ADRs can provide diversification benefits in the form of reduced risk for any desired level of return (Officer and Hoffmeister 1988). Foreign investment opportunities in the form of ADRs can be particularly desirable for certain institutional investors. In particular, because they are technically a U.S. security, they provide certain entities such as pension funds, which are otherwise precluded by charter from holding foreign securities, with a means to participate in foreign investment.

3.2.2 Benefits to Issuer

On the issuer side, the marketability of ADRs provides firms with an efficient means of raising capital in the highly liquid U.S. capital markets. Because they standardize a variety of foreign security requirements and possess most of the characteristics of U.S. securities, ADRs provide U.S. investors with an increased level of comfort in foreign investment. Consequently, ADR issuances have been well received in U.S. markets. Some multinational firms have successfully used ADRs to obtain a global market valuation of firm value. For example, in 1984 Norsk Data issued ADRs because of the belief that only the U.S. markets possessed the expertise necessary to accurately price high-technology stocks (Haar, Dandapani, and Haar 1990).

Recently, there has been a surge in issuances due to the large number of privatizations seen in foreign economies. ADRs are attractive to these foreign governments because of the potential to raise large amounts of capital that may not be readily available in local markets. They are also a means by which to broaden and diversify the shareholder base, establish brand name awareness, facilitate U.S. acquisitions, and activate stock-based compensation plans for U.S. employees of foreign firms. In general, "foreign firms . . . are looking for cash; American investors have been looking for yield and diversity; and Wall Street has been only too happy to step in and marry the two needs"(Investment Dealers' Digest, August 12, 1996, p. 12).

3.3 Statistics for Exchange Listed ADRs

In recent years, ADRs have become an increasingly visible financial vehicle for international investment. In 1997, investment in ADRs traded on U.S. exchanges reached a record trading level over $380 billion.[6] Most experts predict continued growth and increasing importance of ADRs in the U.S. capital markets.

3.3.1 Total Population of ADRs

Table 2 shows the number of ADRs listed on each of the three major U.S. exchanges (NYSE, NASDAQ, AMEX), the number of countries they represent, as well as the average daily trading volume in shares and U.S. dollars, compiled by the individual exchange for the first quarter of 1998. Although the New York Stock Exchange clearly dominates the ADR market, the NASDAQ has become a "specialty market" for certain

[6] Data provided by the NYSE.

industries, such as high tech. As illustrated in the table, on average, ADRs listed on the NYSE exhibit significantly higher trading volumes, both in terms of dollar value and number of shares.

Table 2
ADRs Listed on the Major Exchanges
(Statistics based on first quarter, 1998)

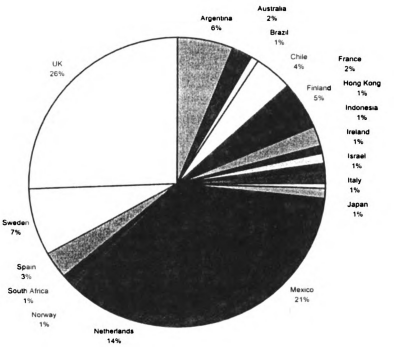
	Countries Represented	Number of Securities Listed	Average Daily Volume[7] (in thousands)	
			Shares	Dollar
NYSE	17	292	35,100	$2,100,000
NASDAQ	31	154	17,074	479,754
AMEX	4	7	536	3,409

Figure 2 details the relative dollar trading volume by country for the three major U.S. exchanges in 1996. As illustrated, Mexico, the Netherlands, and the United Kingdom were dominant forces in the ADR market in 1996. This remains true in 1998. There appears to be a discrepancy in the number of countries that issued ADRs as noted in Table 2 versus that in Figure 2. Recall that Table 2 contains data for the first quarter of 1998, while the country survey in Figure 2 is based on 1996 figures. The discrepancy is due, in part, to a surge in new issuances not represented in Figure 2 and the fact that those

[7] Average daily share volume is computed based on the first quarter, 1998. Dollar volume represents an estimate as it is calculated based upon daily closing price.

representing less than one percent of the total dollar trading volume of ADRs is too insignificant to appear in Figure 2. See Table 6 for an indication of securities included in the study sample whose countries are not represented in Figure 2.

Figure 2
Dollar Trading Volume Percent by Country (1996)
(data provided by the individual exchanges)



3.3.2 Study Sample Versus Total Population of ADRs

Table 3 provides information that contrasts the study sample with the total population of ADRs. The study sample is divided into the "initial" and "final" samples. To be included in the initial sample, the ADR must meet certain criteria. (See Table 6 for more detail.) For example, it must pay dividends, be listed on the exchange a minimum

of six months, and the (CRSP) database must contain all required data items for the equity. (See Chapter 6 for a more detailed discussion of sample selection.) Further screening was applied to eliminate thinly traded securities. The application of two size requirements, specifying a lower boundary for book value of assets and daily trading volume, resulted in a final sample as described in Table 6.

Both the initial and final sample have an average daily trading volume, measured in shares and dollars, that is significantly larger than the median volume. This is due to the influence of a few securities exhibiting significantly greater trading activity relative to others traded on the same exchange. This should be considered when testing trading activity to guard against the influence of outliers in inferences made about the population as a whole.

With respect to share trading volume, the initial sample is comprised 56%, 40%, and 7% of the total population of ADRs traded on the NYSE, NASDAQ, and AMEX exchanges, respectively. By applying the size criteria, those percentages are reduced to 27%, 14%, and 4%. With respect to share trading volume, the initial sample is comprised 82%, 65%, and 31% of the total population of ADRs traded on the NYSE, NASDAQ, and AMEX exchanges, respectively. Once again, by applying the size criteria, those percentages are reduced to 22%, 10%, and 6%. The initial sample contains a high percentage of the total ADR trading volume (82% on the NYSE). However, this is drastically reduced (to 22% for NYSE) by applying the screen for thinly traded securities.

Table 3
Total Pool of Dividend Distributions and Final Sample Relative to All Exchange listed ADRs

	Countries Represented	Number of Securities	Average Daily Volume* (in hundred thousands)				edian Daily Volume* (in hundred thousands)	
			Shares	Percent of all exchange listed ADRs	Dollar	Percent of all exchange listed ADRs	Shares	Dollar
Initial Sample								
NYSE	27	163	22,687	56%	$1,331,469	82%	10,581	$372,341
NASDAQ	19	92	6,306	40%	310,735	65%	2,778	106,968
AMEX	2	6	105	7%	2,930	31%	67	687
Final Sample								
NYSE	22	98	10,984	27%	$353,588	22%	7,644	$261,085
NASDAQ	12	34	2,314	14%	49,568	10%	1,300	32,775
AMEX	1	2	54	4%	589	6%	25	290

* Due to data limitations, average and median daily trading volume for "all exchange listed ADRs" are based on data from the first quarter, 1996. Average and median daily trading volume for the samples are based on data representing the entire year.

Closer investigation of the data reveals that a few equities, that exhibit infrequent but extremely high dollar volume, have been eliminated as thinly traded because of this inconsistent trading pattern. This may be the result of equities trading in large blocks to effect some other business purposes such as funding of pension plans or reorganization.

3.4 Summary

ADRs have maintained a significant presence in U.S. capital markets. Because ADRs possess most of the characteristics of U.S. securities, U.S. investors are comfortable with this form of foreign investment. They provide an attractive alternative for investors who want to diversify internationally and prefer the direct selection of a foreign security rather than a mutual fund, but who wish to avoid the problems of direct ownership of the foreign equity. Foreign corporations continue to raise large amounts of capital on U.S. exchanges through ADR issuances. As a result, U.S. investors have an ever-increasing choice of ADRs available to them.

CHAPTER 4 - TAXATION ISSUES

The tax rules in both the United States and the country of an ADRs underlying equity have important implications for the valuation of ADR dividends, and are predicted to impact observed ex-dividend day trading activity. In particular, foreign withholding taxes applicable to dividend income create a situation where, across all investors, capital gains are preferred (to varying degrees) to dividend income. Because of this, certain classes of investor find it profitable to engage in trading strategies to avoid dividend income. The resulting downward price movement of the security allows other investors, for whom the tax disparity between capital gains and dividend income is not as great, to capitalize on depressed security prices.

A more detailed discussion of the tax implications related to ADR income is presented in the following sections. Understanding the specific application to various types of investors helps in understanding the motivation for tax induced trading and the resulting abnormal trading activity surrounding the ex-dividend day.

4.1 General Tax Implications for ADR Income

Investment in ADRs can generate two types of income, dividend income and capital gains. Dividend income is taxable in both the U.S. and foreign jurisdiction, while capital gains are taxable only in the U.S. when realized. As an agent of the issuer, the depositary distributes the dividend payments. These dividends are paid in U.S. currency net of foreign, non-resident, withholding tax.

This difference in the taxability of dividend income and capital gains, combined with differential foreign withholding rates, can result in a relative tax advantage for capital gains. Although withholding rates can vary substantially across countries, treaties often exist to reduce the adverse effects of double (two country) taxation. See Table 4 for withholding rates applicable to securities contained in the study sample.

As of January 1993, over 40 income tax treaties between the United States and foreign countries were in effect (West's Federal Taxation 1996). As noted in Table 4, the majority of these treaties reduce the withholding rate on dividends to 15 percent. However, there are still several countries for which no treaties exist and dividends are subject to withholding at a rate greater than a U.S. taxpayer's marginal tax rate. This is especially true in emerging markets, which have recently exhibited a considerable increase in ADR activity (Wall Street Journal, November 16, 1994, p. C1).

To further reduce or eliminate the effect of double taxation, a taxpayer is entitled to a foreign tax credit for taxes withheld by the foreign tax jurisdiction. Although the credit provides a dollar-for-dollar reduction of the U.S. income tax liability, the amount is subject to the limitations of Section 904 of the Internal Revenue Code. In general, as long as the foreign withholding rate does not exceed the investor's U.S. marginal tax rate, the credit will directly offset the U.S. tax liability, thus resulting in a single level of taxation equivalent to the investor's U.S. marginal tax rate. When the foreign withholding rate exceeds the investor's U.S. marginal tax rate, the excess is not available to offset the U.S. tax liability in the current year, resulting in an effective tax rate greater

Table 4
1995 Foreign Withholding Rates for Countries Represented in Sample

Foreign Withholding Rate	Country
35%	Chile
25%	Israel Portugal
15%	Australia Denmark Finland France Germany Indonesia Italy Japan Korea Netherlands New Zealand Norway Philippines South Africa Spain Sweden UK
10%	China
8%	Columbia
7.5%	Luxembourg
0%	Argentina Bermuda Brazil Hong Kong Ireland Mexico Peru Venezuela

than the investor's U.S. marginal tax rate. This creates a tax penalty on dividends relative to capital gains, which are subject only to U.S. taxation.

The most striking example of a penalty on dividend income is observed with investors who are exempt from U.S. taxation. Pension funds are perhaps one of the most represented investors in this category. While many pension funds are not permitted to directly hold foreign equity, ADRs provide an alternative means to participate in global capital markets. However, as illustrated below, the generation of foreign income requires a careful assessment of the resulting tax implications.

4.2 Illustration of Dividend Strategy

The following example contrasts a dividend strategy used by a U.S. tax exempt investor with the tax implications of receiving a dividend payout. Assume an investor initially purchases an ADR at a $10 share price. At a later date, a dividend distribution of $3 is declared. The investor must evaluate the desirability of receiving the dividend, considering both the tax and non-tax implications.

Original purchase price of ADR	$10
Price prior to ex-dividend day	$15
Price after ex-dividend day	$12
Dividend	$ 3
Foreign withholding rate	15%

In a theoretical world, once the right to receive the dividend has passed (the ex-dividend day) the price of the shares should fall by the value of the dividend, resulting in a share price of $12 ($15 - $3 = $12). The investor can consider two options: (1) hold the investment through the ex-dividend day or (2) sell the investment prior to the ex-dividend

day, followed by a repurchase once the right to receive the dividend has passed. The first investment option results in dividend income while the second effectively converts dividend income to capital gains. Whether or not an investor chooses to receive the dividend, the investor will own a security with a value of $12 after the ex-dividend day.

If the investor receives the dividend, it has an increase in wealth of $5 ($3 dividend and $2 unrealized capital gains). However, the dividend will be subject to foreign withholding of $0.45 (15% of $3). Alternatively, assume the investor chooses to hold the security for the long-term but engages in a dividend strategy. Thus, the investment is sold prior to the ex-dividend day and repurchased once the stock goes ex-dividend. This investor will have no tax liability because the $5 increase in wealth (all capital gains) is taxed only in the United States where the entity is tax exempt. For this strategy to be beneficial, the tax savings must exceed the relevant non-tax costs. These costs include, but are not limited to, the risk in the returns process and fees directly associated with settlement of the transaction.

The magnitude of the penalty is primarily a result of the level of foreign withholding levied on the dividend relative to an investor's U.S. marginal tax rate on dividend income and capital gains. Although, the foreign jurisdiction does not distinguish between the type of investor in determining the tax treatment of the dividend income, the U.S. tax law does provide differential tax treatment depending on the class of taxpayer. Thus, to understand predictions regarding ex-dividend day behavior of investors in ADRs, it is useful to separately consider the tax implications for the U.S. tax exempt and U.S. taxable investor.

4.3 Taxable Investor

In this paper, "taxable investor" refers to investors who are subject to U.S. income taxes (i.e., individual and corporate taxpayers). A preference for capital gains relative to dividend income can arise from several aspects of the tax law. The most obvious is the tax rate structure. The carryback/carryforward rules applicable to capital gains and administrative costs may also provide an incentive for investors to alter their investment decision.

4.3.1 Tax Rate Structure

For the *individual* taxpayer, dividend income is taxed in the U.S. at the rate applicable to ordinary income. During the period studied, 1988-1995, the top marginal tax rate on ordinary income ranged from 28% in 1988 to 39.6% in 1995. The applicable top U.S. rate on capital gains was 28% over the entire period studied. Thus, individuals faced an incremental U.S. tax on dividends relative to capital gains that ranged from no difference in 1988 to a maximum 11.6% in 1995. Considering only U.S. taxes, this differential creates a "tax penalty" on dividend income.

Dividend income from ADRs is also subject to taxation by the foreign tax jurisdiction. In general, as long as the foreign withholding rate does not exceed a taxpayer's marginal rate on ordinary income, the total tax liability is not altered by the applicable foreign taxes. However, to the extent the foreign withholding rate exceeds the U.S. marginal tax rate, the penalty on dividend income is inflated by these additional taxes. As demonstrated in Table 4, this is not the case in many jurisdictions where

treaties have served to minimize the tax disadvantage placed on foreign income by reducing the rate to 15%.

With respect to *corporations*, the tax rules make no rate distinction between dividends and capital gains. Although the dividend received deduction makes corporations a natural clientele for dividend income, this deduction is not available to ADR dividends because they represent foreign equity. Therefore, considering only the rate structure, no apparent reason for preferring capital gains exists for this class of taxable investors.

4.3.2 Other Potential Benefits to Capital Gains

In addition to the rate structure, there are other potential factors that may create a preference for capital gains relative to dividend income. Among these is the carryforward/carryback rule applicable to capital losses. While a corporation is not permitted to currently deduct net capital losses, IRC Section 1212 permits a three-year carryback and five-year carryforward of these losses to offset net capital gains in that period. Thus, these losses are suspended and can be carried forward/back to an appropriate period with net capital gains.

Individuals, on the other hand, are permitted a $3,000 deduction for capital losses and any remaining loss is subject to carrryforward/carryback to a year in which net capital gains are realized. However, no time limitation is placed on individual taxpayers. Theoretically, avoiding the dividend by selling prior to the ex-dividend day will result in greater capital gains. This ability to offset the recognition of income in the current period may be desirable to an investor with suspended losses.

Investors may also wish to avoid foreign withholding levied on dividend income by the foreign taxing jurisdiction. Dividends are distributed by the depositary net of foreign withholding. Therefore, the withheld funds are not currently available to the investor. Investors who avoid the dividend may be able to defer or avoid paying taxes on this income altogether depending on the investors' cumulative tax position. Finally, the administrative costs associated with foreign income (currency translation, additional tax reporting costs, etc.) may make dividend income from ADRs less desirable. However, one can only speculate whether or not these costs are significant.

4.4 Institutional Investor

Institutional investors, for the purpose of this study, include pension and mutual funds. While other factors may affect their investment decisions, as illustrated in Section 4.1, it is the tax rate structure that presents an obvious incentive for institutional investors to avoid ADR dividend distributions.

Pension funds and mutual funds are two types of institutional investors having distinct implications with regard to the taxability of the income they generate. In general, pension fund earnings are not subject to U.S. income tax. These earnings will be taxed to the beneficiary upon distribution. However, foreign jurisdictions do not recognize the tax-exempt status of the institution. Therefore, while capital gains remain non-taxable in the foreign jurisdiction, dividends are subject to withholding (and taxation) at the applicable non-resident tax rate.

As discussed in the previous sections, the U.S. tax law provides a foreign tax credit to mitigate the effect of two-country taxation. In other words, a taxable entity is

entitled to claim a foreign tax credit against its U.S. tax liability for foreign taxes paid. However, this benefit does not apply to a pension fund because, as a tax-exempt entity, it has no U.S. income tax liability. Therefore, the foreign investment results in a level of taxes that could otherwise be avoided by maintaining a domestic portfolio or converting dividend income to capital gains.

Technically, mutual funds are taxable entities. However, by virtue of Internal Revenue Code Section 852, they can, and do, avoid taxation by distributing their current earnings to shareholders. Therefore, if we assume mutual funds are concerned with maximizing shareholders' wealth, the incentive to engage in tax motivated trading varies across funds depending on each fund's shareholder base. Like that of the general population of investors, the incentive for the fund's shareholder base can range from indifference to a very strong preference for capital gains. In a recent inquiry, *Financial World* (March 25, 1996, p. 84) asserts that over 40% of mutual funds are held by pension funds. Therefore, considering the substantial proportion of mutual funds controlled by tax exempt entities, mutual fund preference is likely to mirror that of pension funds.

Even if maximization of shareholders' wealth is not a primary objective of the fund, administrative and compliance costs related to foreign dividends may provide sufficient incentive to convert dividends to income that is only domestically taxed.

4.5 Summary of Tax Implications

The impact of taxes related to dividend payouts varies significantly across investors. For institutional investors, foreign tax withholding creates an obvious and potentially substantial tax penalty on dividend income. For the taxable investor, the

preference for capital gains relative to dividend income, when it exists, is not as apparent. This is due to the large number of tax treaties that reduce the foreign tax rate on dividends to a rate below the U.S. investors' marginal tax rates.

Certain tax implications not directly related to the statutory rate can also impact investors' decisions. For instance, foreign taxes can lead to increased administrative and compliance costs. Furthermore, some entities may prefer capital gains because of the ability to offset accrued capital losses. This may be particularly important to corporate taxpayers because these losses have a relatively short carryforward/carryback period. Finally, foreign withholding on dividend payouts prevents the investor from using the funds immediately.

Although a penalty on dividend income may not exist for all taxable entities, from a tax perspective, *there are no clear situations when dividend income is preferred to capital gains*. This one-directional incentive is important to this study. In general, across *all* taxpayers, the incentive to avoid dividend income ranges from indifference to a strong preference that is predicted primarily for, but not limited to, institutional investors.

CHAPTER 5 – RESEARCH QUESTIONS

Identification of the dominant investor and their tax status is important in understanding the overall incentive to engage in tax motivated trading strategies. For this sample, institutional investors hold approximately 72% of the outstanding shares.[8] In a 1991 article in *Pension and Investments* (February 4, 1991, p. 25) institutional holdings is estimated at 80%. Although all investors are either indifferent or possess a tax incentive to engage in short-term trading strategies, it is likely that a predominance of institutional investors creates arbitrage opportunities for various classes of investors who face a lesser tax differential between foreign dividends and capital gains. To model the differential tax treatment of foreign dividends and capital gains that leads to dividend strategies, assume the existence of two types of traders, "investors" and "arbitrage traders."[9]

The following sections provide models of ex-dividend day buying and selling strategies. Although these models have direct implications regarding securities pricing, the tests included in this study do not examine ex-dividend day returns. Rather, the focus is on trading volume. This is due to the fact that precise predictions regarding price behavior are highly dependent on assumptions regarding the identity of the marginal trader. Furthermore, given arbitrage traders, any abnormal ex-dividend day return should simply reflect transaction costs and not necessarily variation due to a tax penalty. These

[8] This estimate was derived from examination of the form 20-F filed with the SEC and information provided by the Spectrum database. Due to data constraints, this estimate is likely biased downward.

[9] This builds on previous work by Kalay (1982, 1984), Miller and Scholes (1982), Lakonishok and Vermaelen (1983, 1986) and Karpoff and Walking (1990).

models are presented to illustrate the conditions under which buyers and sellers would find it profitable to engage in trading strategies. A testable volume hypothesis is presented later in this chapter.

5.1 Selling Strategies

Elton and Gruber (1970) build on a theory known as the clientele hypothesis. According to this theory, investors are long-term traders who enter the market for reasons unrelated to the dividend. These investors have decided to buy or sell, and only the timing of the transaction is of concern (Green 1980). Therefore, transaction costs are irrelevant. The effects of discounting, uncertainty in the return process, and the possibility of short-term strategies are ignored. In equilibrium, market prices are modeled such that the marginal seller is indifferent between selling stock j before or after the ex-dividend day if the after-tax returns are equal. Therefore:

$$p_{jb} - (p_{jb} - p_{j0})t_{jg} = p_{ja} - (p_{ja} - p_{j0})t_{jg} + d_j\,(1-t_{jf}) \qquad (1)$$

Where p_{j0} is the original purchase price of security j, p_{bj} is the price per share cum dividend, p_{ja} is the expected price per share ex-dividend, d_j is the dividend amount, t_{jg} is the marginal tax rate on capital gains, and t_{jf} is the applicable foreign withholding tax on the dividend.

Implicit in equation (1) is the assumption that $t_{jf} \geq t_{jus}$ where t_{jus} is the U.S. marginal tax rate on dividend income. Thus, dividend income is effectively taxed at the foreign tax rate because of the availability of the foreign tax credit to mitigate the effect

of two-country taxation on dividend income. Defining the observed rate of return as $r_j = (p_{ja} - p_{jb} + d_j)/p_{jb}$, equation (1) implies that in equilibrium:

$$r_j = [\ 1 - (1-t_{jf})/(1-t_{jg})](d_j/p_{jb}) \equiv R_{pj} \qquad (2)$$

R_{pj} is the equilibrium rate of return with only long-term traders. Given that *across all investors* t_{jf} is always greater that t_{jg}, equation (2) implies a positive ex-dividend day return that is a function of an interaction between the tax rate and dividend yield. In other words, in the current environment where the foreign tax withholding rate is greater than the tax rate applicable to capital gains, the model predicts a positive ex-dividend day return that is a function of the tax costs (interaction between dividend yield and tax rate). The greater the tax costs associated with ADR dividend income, the more a shareholder must be compensated to collect the dividend. Therefore, the higher the tax costs associated with a distribution, the greater the ex-dividend day return.

Now consider the introduction of a second type of market agent, "dividend dumpers." These arbitrage traders are subject to foreign withholding rates on dividend income that is high relative to the U.S. tax rate on capital gains. They will engage in dividend dumping under the following situation where T_j is the related two-way transaction costs associated with the strategy.

$$p_{jb} - (p_{jb} - p_{j0})\ t_{jg} - p_{ja} - T_j > d_j\ (1-t_{jf}) \qquad (3)$$

Rearranging equation (2) we can see that the opportunity for profitable dividend dumping is bounded from above by the investors' expectations of the ex-dividend day return, R_{dj}:

$$r_j \equiv R_{dj} > dt_{jf}/p_{jb} - [t_{jg} (p_{jb} - p_{j0}) / p_{jb}] - T_j/p_{jb} \qquad (4)$$

Overall, the ability for short-term traders to engage in profitable arbitrage is a function of the tax rates, transaction costs, and dividend yield, as well as the potential tax liability from the recognition of capital gains. Implicit in this model are expectations regarding the pricing process. Therefore, risk is also a factor.

5.2 Buying Strategies

Another type of market agent, dividend capture traders, exploit the existence of these positive ex-dividend day returns up to the cost of a two-way trade. These traders are investors who do not face the same undesirable tax effect related tax differential on foreign dividends and capital gains. With regard to ADRs, this would include various types of taxable investors for whom the availability of the foreign tax credit makes foreign dividends and capital gains subject to the same level of taxation. Similar to the dividend capture hypothesis presented by Karpoff and Walkling (1990), these investors can profitably buy the stock cum-dividend and sell it ex-dividend when:

$$p_{ja} + d_j (1 - t_{fd}) - p_{jb} - (p_{ja} - p_{jb}) t_{jg}) > T_j (1 - t_{jg}) \qquad (5)$$

Equation (5) implies the maximum ex-dividend day return with dividend capture traders, R_{cj}, is bounded from above by:

$$r_j \leq 1/p_{jb} \left[T_j + (dt_{jf} - dt_{jg}) / (1 - t_{jg}) \right] \equiv R_{cj} \qquad (6)$$

Because $dt_{jf} \geq dt_{jg}$ across all investors, the ex-dividend day return is positive as long as transaction costs are present. This strategy is most profitable for those investors for whom $dt_{jf} = dt_{jg}$. Ultimately, these investors will exploit the existence of a positive ex-dividend day return up to their two-way transaction costs. Setting $dt_{jf} = dt_{jg}$ in equation (6):

$$r_j \leq 1/p_{jb} (T_j) \equiv R_{cj} \qquad (7)$$

This implies that dividend capture traders will eliminate the existence of a positive ex-dividend day return up to the value of their transaction costs. Combining the clientele hypothesis, dividend dumping hypothesis, and the dividend capture hypothesis, the equilibrium ex-dividend day return is:

$$r_j = \min (R_{pj}, R_{dj}, R_{cj}) \qquad (8)$$

Both R_{pj} and R_{dj} predict a positive ex-dividend day return. If min (R_{pj}, R_{dj}, R_{cj}) = R_{cj}, then dividend capture trading drives down the ex-dividend day return to the relevant transaction costs. On the other hand, if min (R_{pj}, R_{dj}, R_{cj}) = max (R_{pj}, R_{dj}), transaction costs prohibit dividend capture trading from being profitable. The price nature of the relation between R_{pj} and R_{dj} is unknown, other than both the clientele and dividend dumping hypotheses predict a positive ex-dividend day return. Thus, overall predictions based on return are dependent on assumptions made regarding the marginal trader.

5.3 Testable Hypothesis – Trading Volume

The focus of this study is on trading volume around the ex-dividend day. To develop a testable trading volume hypothesis, a more intuitive explanation regarding ex-dividend day price expectations follows. The tax differential between dividends and capital gains creates a clear incentive, proportional to the applicable foreign withholding taxes, for tax-exempt investors to "dump" dividends. Subsequent downward price pressure results in profitable arbitrage opportunities (i.e., dividend capture) for other investors who are not subject to the same tax differential. Investors who trade around the ex-dividend day can be either short-term or long-term traders. However, this type of trading activity is representative of short-term traders.

A second type of trader, the long-term trader, trades irrespective of the dividend (Elton and Gruber 1970). However, the long-term trader may accelerate or delay their trade to effect more favorable tax consequences (Green 1980). For example, U.S. tax-exempt investors will delay the inevitable purchase of ADRs to avoid the dividend. Conversely, taxable investors, depending on their particular tax status, may opt to

accelerate a purchase to exploit any downward price pressure created by the trading activity of institutional investors.

While security price reflects an aggregate of investors' beliefs, trading volume reflects a summation of each investor's desire to trade. The net result of both long-term and short-term trading activity predicts increased trading volume positively related to the tax costs in the days surrounding the ex-dividend day. The tax costs are an interaction of the foreign withholding rate and the dividend yield.

For the short-term trader, profitable arbitrage is constrained by transaction costs [Eades, Hess and Kim (1984), Lakonishok and Vermaelen (1986) and Karpoff and Walkling (1988)]. Heath and Jarrow (1988) and Grammatikos (1989) further add that unless short-term traders can engage in riskless arbitrage, the ex-dividend day return must include a risk premium, another dimension of transaction costs. Thus, both risk and other transaction costs impact the trading behavior of the short-term trader. For the long-term trader, the uncertainty in the returns process also impacts the decision to engage in tax motivated trading. However, transaction costs are irrelevant because these investors have already made the decision to trade and are only adjusting the timing of the trade.

In general, across all investors, abnormal volume is predicted to be negatively related to transaction costs and risk in the return process. In operationalizing these non-tax costs to trading, risk is a component of the transaction cost measure. Thus,

$$\text{Abnormal Trading Volume} = f\{(\text{tax}*\text{dividend yield}), \text{transaction costs}\},$$

where tax represents the differences between the taxes associated with dividend income

and the taxes associated with capital gains. Because the magnitude of the tax incentive is jointly dependent on the tax rate and dividend yield, an interaction between the tax differential and dividend yield is predicted to be positively related to abnormal volume. Transaction costs are predicted to have a negative relation to trading volume, and dividend yield, after controlling for taxes, should exhibit a positive relation to abnormal volume.

5.4 Summary

Analyzing securities returns or trading volume are two methods that can be used to detect abnormal ex-dividend day trading activity. This study focuses on trading volume because inferences about trading activity are not as highly dependent on assumptions regarding the tax status of the investor as is true with related returns studies. In the presence of tax motivated trading, abnormal ex-dividend day volume should be a function of the tax costs and dividend yield.

CHAPTER 6 – RESEARCH DESIGN

Volume tests are conducted on a sample of ADR dividend distributions to identify abnormal ex-dividend day trading activity. Several screens are applied to the total population of ADR distributions to ensure that only those distributions representing "typical" trading activity of "actively traded" securities are included in the sample. The time period (1988-1995) was selected to maximize the number of observations while avoiding major shifts in the domestic (U.S.) tax rate structure. Two types of analyses are performed, including two univariate tests based on daily trading activity and several multivariate analyses that examine an event window centered on the ex-dividend day. The multivariate analyses allow a joint test of the tax and non-tax factors that affect trading. Thus, they provide more complete tests of the investment decision. This chapter includes a detailed description of the initial and final samples, as well as a more thorough discussion of the research methods employed to identify abnormal trading activity.

6.1 Sample Selection

To study ex-dividend day trading activity, a sample of ADRs was formed consisting of all regular cash distributions of ADRs included in the 1996 Center for Research in Security Prices (CRSP) database. The sample was trimmed to include only those distributions occurring over the period 1988-1995 on the NYSE, AMEX, and NASDAQ. The 1988-1995 time period was selected to avoid the influence of the Tax Reform Act of 1986. The data were obtained from several sources. The Center for Research in Security Prices (CRSP) database provided information necessary to identify

the events (ex-dividend days), all volume data, and price information. Asset information was obtained from Worldscope Global database, and tax information was obtained from the W*orld Corporate Tax Guide* (*Ernst and Young*), *IRS Publication 901,* and the applicable tax treaties.

6.1.1 Initial and Final Sample

Each distribution (or ex-dividend day) is treated as a single observation. Observations were eliminated if (1) the security was listed on the exchange less than six months prior to the distribution, (2) the data necessary to compute dividend yield were missing, or (3) the book value of assets was not available. Of the total pool of 2,285 regular cash dividend distributions, 172 were dropped because of these requirements. The impact of these screens is detailed in Table 5. The resulting pool is summarized in Table 6 as the *initial* sample.

Despite growing popularity, a significant number of ADRs trade infrequently or at low volumes relative to domestic securities traded on U.S. markets. The sample was further screened to focus only on actively traded ADRs,. Observations were eliminated if (1) the median trading volume during the estimation period fell in the bottom 50th percentile (median volume < 6,275 shares) or (2) the security traded less than 90 percent of the trading days during that same period. Most observations that failed to meet one of these criteria failed to meet both criteria. Only 116 of the total 1,173 observations eliminated failed to meet only one criterion. Once again, the impact of these screens is

Table 5
Formation of Final Sample

	Number of Distributions	Percentage of Total Pool
Total pool of dividend distributions	2,285	100%
Eliminations to form Initial Sample		
Data not available to compute dividend yield	23	1%
Listed less than six months on exchange[1]	2	<1%
Book value of assets not available	147	6%
Initial Sample	2,113	93%
Eliminations to form final sample		
Categorized as thinly traded[2]	1,173	51%
Final Sample	940	41%

[1] Six additional observations would have been deleted because of the six month listing requirement. However, they were previously deleted because the data necessary to compute dividend yield was not available. Thus, they were counted as an elimination in the previous category.

[2] The median trading volume during estimation period fell in the bottom 50th percentile (median volume < 6,275 shares), or the security traded less than 90% of the trading days during the same period.

detailed in Table 5. The resulting pool is summarized in Table 6 as the *final* sample.

As indicated in Table 6, the final sample consists of 167 ADRs with 940 cash distributions. Sixty-eight percent are traded on the NYSE, three percent on the AMEX and 29 percent on the NASDAQ. The sample securities represent 27 countries and six dividend withholding rates.

A significant portion of the sample is subject to the 15% withholding rate

Table 6
Sample

Foreign With-holding Rate	Country	Initial Sample		Deletions	Final Sample	
		Securities	Dividend Distributions	Dividend Distributions	Securities	Dividend Distributions
35%	Chile	15	79	14	12	65
25%	Israel	1	34	14	1	20
	Portugal	1	3	1	1	2
15%	Australia	15	170	131	6	39
	Denmark	3	10	5	2	5
	Finland	1	8	8	0	0
	France	6	41	25	5	16
	Germany	2	10	7	2	3
	Indonesia	2	1	1	0	0
	Italy	8	28	19	5	9
	Japan	25	341	272	9	69
	Korea	3	5	5	0	0
	Netherlands	8	64	42	3	22
	New Zealand	3	18	8	1	10
	Norway	3	11	2	2	9
	Philippines	1	5	2	1	3
	South Africa	18	223	120	10	103
	Spain	8	114	45	7	69
	Sweden	9	52	33	5	19
	UK	87	735	361	34	374
10%	China	2	6	1	2	5
8%	Columbia[10]	1	5	5	0	0
7.5%	Luxembourg	2	16	1	1	15
0%	Argentina	9	24	9	5	15
	Bermuda	2	10	7	1	3
	Brazil	1	3	0	1	3
	Hong Kong	2	17	4	1	13
	Ireland	4	27	27	0	0
	Mexico	17	48	4	15	44
	Peru	1	1	0	1	1
	Venezuela	1	4	0	1	4
Total Sample		261	2113	1173	134	940

[10] Prior to 1994, the withholding rate was 12%. It was reduced to 10% and 8% in 1994 and 1995, respectively. The indicated distributions were from 1995. Thus, an 8% rate is noted.

(92 securities representing 750 observations, or 80 percent). This is because the United States, in an effort to reduce the adverse effect of two-country taxation, has negotiated bilateral tax treaties with many foreign governments that reduce the withholding rate on dividend income to 15%.

6.1.2 Testing Issues Related to the Sample

While the use of a multi-jurisdictional tax setting can provide a unique and potentially more powerful setting to examine many accounting and taxation issues, data issues often present challenges to the researcher. This can be particularly problematic in a multinational setting.

This study relies on observations subject to a variety of tax consequences for multivariate analysis. Although there appears to be sufficient variation in the foreign withholding rates to perform statistical analyses on the final sample, lack of variation may limit the ability to partition the final sample and perform such tests on sub samples. In particular, if taxes are not found to be a significant factor in the investment decision for a specific sub sample, it may be difficult to discern whether taxes are not important or whether this particular finding is simply due to lack of variation.

Another issue is proper classification of tax status. In particular, the tax classification of Mexican ADRs may introduce a significant amount of noise into the tests. This is because the tax status of these distributions varies depending on the source of the distribution. In general, if the distribution was (not) previously taxed at the corporate level, it will (not) be exempt from tax, and withholding, at the shareholder

level. These distributions have been conservatively classified as "not subject to withholding" due to the lack of specific knowledge regarding the source of the dividend. An additional test is performed to test the sensitivity of this classification in the results reported.

6.2 Volume Tests

Economic information and events can lead to both trading and price changes. Thus, volume and price behavior are two potential means for investigating abnormal activity surrounding specific events in capital markets. Volume studies may provide a more sensitive means of detecting investor behavior because trading volume reflects investor behavior by summing all market trades rather than an aggregation of the market's valuation of dividends. Thus, detecting abnormal activity is not dependent on assumptions regarding the identity of the marginal investor.

To test for abnormal trading activity, volume data are used in both univariate daily analyses and multivariate short-window event analyses. Although univariate tests limit the ability to control for other aspects of the investment decision, they do provide some evidence of trading activity on the days immediately surrounding the ex-dividend day. This is further discussed in Section 6.2.1. Section 6.2.2 discusses the various multivariate joint tests implemented. The multivariate tests provide a more complete analysis of the investment decision.

6.2.1 Univariate Analyses – Daily Trading Volume

To both provide evidence of abnormal daily trading activity in the days surrounding the ex-dividend day, two separate univariate analyses are performed. The first uses a means-adjusted measure of abnormal trading volume, while the second uses a measure based on a market model adapted for volume. Using a means-adjusted measure of abnormal trading activity is consistent with previous ex-dividend day studies, thus providing a basis for comparison. [For example, see Lakonishok and Vermaelen (1986) and Grammatikos (1989).] The measure of abnormal volume based on a market model allows for a potentially more precise measure because it controls for fluctuations due to the market as a whole. The use of such a measure has also been documents in previous studies. In particular, Ajinkya and Jain (1989) provide evidence of the superiority of this measure relative to a means-adjusted measure.

Means-adjusted Abnormal Trading Volume

Abnormal percentage trading volume (AV%) is computed for each day in the period beginning five days before (-5) and ending five days after (+5) the ex-dividend day. Consistent with Ajinkya and Jain's (1989) findings, the volume data are significantly and positively skewed, violating distributional assumptions of normality. A natural log transformation of the data results in a distribution that is very close to normal. Thus, abnormal percentage trading volume is computed as:

$$\ln(AV\%_{i,n,t}) = \ln (DV_{i,n,t} / NV_{i,t}) \qquad (9)$$

where:

$DV_{i,n,t}$ is the daily volume on the n^{th} day relative to the dividend distribution at time t for security i, and
$NV_{i,t}$ is the normal daily volume relative to the dividend distribution at time t for security i.

The normal volume is estimated as the median daily trading volume using a 120-day window defined as beginning trading day (-76) through (-16) and continuing from trading day (+16) to (+76). A second window consisting of 238 days (split similarly before and after the ex-dividend day) was also used as suggested in Ajinkya and Jain (1989). The results are similar. Using a 238-day window results in situations where the estimation window overlaps other event days. Therefore, all reported results use the 120-day window.

Including days before and after the ex-dividend day serves two purposes. First, it allows for a longer estimation period without creating a situation where the estimation period overlaps the event window for a previous distribution. Second, it controls for potential shifts in the trading pattern of the individual security.

Market Model Based Abnormal Trading Volume

Similar to the previous test, abnormal trading volume (AV-MM) is computed for each day in the period beginning five days before (-5) and ending five days after (+5) the ex-dividend day. Consistent with Bamber (1986), Bamber (1987), and Ajinkya and Jain (1989), abnormal trading volume ($AV_{i,t}$) for the individual day is computed using a market-adjusted expectation model for trading volume. The parameters of the expectation model are the coefficients from the GLS estimation of Equation (10) over the

pre-defined estimation period:

$$ln\,(V_{i,n,t}) = a_i + b_i\,ln(V_{mt,n,t}) + \varepsilon_{i,t} \qquad (10)$$

where:

$V_{i,n,t}$ is the volume of shares traded on day n relative to the distribution of security i at time t
$V_{mt,n,t}$ is the NYSE share volume on day n relative to time t
a_i b_i are the regression constant and coefficient specific to security *i*
ε_{it} is the volume residual for security i for event window around day t.

As in the previous section, the estimation period is defined as the 120-day window beginning trading day (-76) through (-16) and continuing from trading day (+16) to (+76). The abnormal trading volume data are positively skewed. Once again, as suggested by Ajinkya and Jain (1989), a natural log transformation is used to alleviate this departure from normality.

Bamber (1986) and Bamber (1987) suggest that NYSE volume better captures macro economic events affecting market-wide level of trading than the individual market levels. Thus, the NYSE index is used for all distributions regardless of the individual exchange listing.

6.2.2 Market Model Regression Analysis – Short Window Event Study

This study provides a unique opportunity where cross-sectional variation in the tax variable allows for a multivariate joint test of both tax and non-tax factors impacting trading activity. The functional form of the regression analysis is:

$$AVOL_{i,t} = \beta_0 + \beta_1 (Tax_{i,t} * DY_{i,t}) + \beta_2\, Tax_{i,t} + \beta_3\, DY_{i,t} + \beta_4\, TC_{i,t} + \beta_5\, Size_{i,t} + \varepsilon_{i,t} \qquad (11)$$

where:

$AVOL_{i,t}$ is the abnormal trading volume for the event window surrounding the ex-dividend day for security i at time t,
$Tax_{i,t}$ is the foreign withholding rate related to dividend distribution of security i at time t,
$DY_{i,t}$ is the dividend yield of the distribution at time t for security i,
$TC_{i,t}$ is the estimated transaction cost associated with the distribution at time t for security i.
$Size_{i,t}$ is the book value of assets for the entity issuing security I at year end of t.

Due to the potential for serial correlation, the regression is estimated with a random effects model that uses the GLS estimator (Greene 1993). Abnormal trading volume ($AVOL_{i,t}$) is computed as total abnormal trading activity for a three-day event window beginning one day prior (-1) and ending one day after (+1) the ex-dividend day[11], scaled by the normal volume ($NV_{i,t}$). As described in the previous section, a volume-based market model approach is used to estimate abnormal daily trading

$Tax_{i,t}$ is defined as the foreign withholding rate applicable to the distribution of security i at time t. Dividend yield is computed as the dividend payout divided by the price of the security thirty days prior to the payout. Direct measures are not available for transaction costs. Therefore, three common proxies are estimated: bid-ask spread, the inverse of the price of the security, and the standard deviation of the stock return. [See Karpoff and Walkling (1988).] The bid-ask spread is calculated as the mean spread over the five trading days centered on the ex-dividend day. Consistent with the computation of dividend yield, price is observed 30 days prior to the distribution and the standard

[11] Results are also presented for two alternative windows (5 day and 11 day) centered on the ex-dividend day.

deviation of stock return is computed over the same estimation period as used for normal volume.

Various studies have demonstrated that micro economic differences exist between small and large firms. Depending on the setting, size could proxy for a variety of attributes (e.g., information availability, analyst following, liquidity, etc.) In this study, book value of assets is used as a control for size. Market value of assets is a preferred measure for size. However, these data were not available for ADRs. Furthermore, it is difficult to determine the appropriate market value measure. (Is market value of the ADR issuance appropriate? Would market value of all foreign issuances, as well as the ADR, be a preferred measure?) Previous studies have documented a significant correlation between transaction costs and size of the entity. Therefore, this size proxy may also be controlling for transaction costs.

6.3 Summary

The sample selection procedure, consisting primarily of two screening processes on the total pool of 2,285 ADR distributions, resulted in a sample of 940 cash distributions from 167 securities representing 27 foreign countries. The following chapter presents the results of applying both methodologies (univariate and multivariate analyses) described in this section to the final sample and various sub-samples.

CHAPTER 7 – RESULTS

This chapter presents evidence that is generally consistent with the hypotheses presented in Chapter 5 --- foreign tax costs associated with ADRs are significantly related to ex-dividend day trading behavior and this activity is constrained by transaction costs. The following sections provide a statistical description of the data, along with tables and discussion detailing the results of the univariate daily trading volume tests and the multivariate analyses that examine an event window centered on the ex-dividend day. The sample is partitioned several ways to assess whether this type of activity is concentrated in a specific tax jurisdiction or time period, and several sensitivity tests are conducted to determine whether some other intervening variable is driving the results.

7.1 Descriptive Statistics

Table 7 presents a statistical description of the full sample, as well as taxable and non-taxable partitions of the sample. Although a dichotomous (taxable versus non taxable) classification has been assigned to observations (distributions), it probably does not conclusively describe clear situations in which abnormal ex-dividend day trading activity would and would not be predicted. This is because the tax costs must reach a sufficient level to create an incentive for investors to trade. The tax costs are a function of both the foreign withholding rate and the dividend yield. Thus, it is the combined levels of these factors, as well as the related transaction costs, that determine the magnitude of the tax penalty. It could be that a distribution taxable at 35% with a very low dividend yield may not yield sufficient incentive (greater than the applicable

transaction costs) for tax penalized investors to avoid the dividend distribution. On the other hand, a 15% taxable distribution with a high dividend yield might create a situation where dividend strategies are profitable. Both would be classified in our sample as taxable. Thus, the reader should use caution when interpreting the statistics presented in this section and the results in Section 7.2 that are based upon this dichotomous tax partitioning of the sample.

Analysis of the sample reveals that the dividend yields (both mean and median)[12] for the taxable and non-taxable samples are not significantly different. Furthermore, the median dividend yield for the final sample is similar to that documented by Lakonishok and Vermaelen (1986). They report a median dividend yield of .0125 for a sample containing virtually all securities listed on the NYSE or AMEX from 1970 to 1981.

The bid-ask spread provides a proxy for transaction costs including risk inherent in the returns process. The mean bid-ask spread, deflated by price, for the total sample of ADRs (all three exchanges) is .015. The non-taxable sample exhibited a significantly ($p<.01$) greater mean bid-ask spread of .020 compared to .015 for the taxable sample. Similarly, non-parametric tests reveal that the median bid-ask spread of the non-taxable sample (.021) is significantly greater than that of the taxable sample (.017).

Chan, Seow, and Wong (1996) report considerably higher median bid-ask spreads for NASDAQ traded ADRs ranging from .0209 to .0252 for the years 1990-1993. Further analysis reveals that isolating ADRs included in the sample, that traded only on the NASDAQ, produces a result (median bid-ask .0188) much closer to that reported by

[12] Means are compared using a t-test. The Wilcoxon rank-sum test is used to evaluate median values.

Table 7
Final Sample - Descriptive Statistics

	DY mean median (std dev)	NV mean median (std dev)	BID/ASK mean median (std dev)	PRICE mean median (std dev)	SIZE mean median (std dev)
Final	.013	153,523	.015	$28.74	.015
Sample	.013	47,444	.014	25.00	.014
n=940	(.041)	(386,962)	(.019)	(28.61)	(.019)
Non	.015	601,297	.020	$21.30	.026
Taxable	.014	140,200	.021	19.00	.014
n=83	(.013)	(1,038,330)	(.003)	(16.11)	(.034)
Taxable	.013	110,156	.015	$29.46	.014
n=857	.013	40,888	.017	25.75	.014
	(.043)	(199,140)	(.001)	(29.44)	(.016)

DY = Dividend yield

NV = Median trading volume over estimation period for a single observation

BID/ASK = Mean bid/ask spread over five-day window centered on ex-dividend day divided by share price measured 30 trading days prior to ex-dividend day.

PRICE = Share price measured 30 trading days prior to ex-dividend day

SIZE= The natural log of (Book Value of Assets/100,000) measured at the latter of 1995 fiscal year-end or year delisted

Chan et al. (1996). Including NYSE traded ADRs dramatically lowers the bid-ask spread. Thus, we can infer lower transaction costs for these NYSE traded ADRs. Another source of discrepancy between the sample bid-ask spread and that reported by Chan et al. (1996) may be due to the fact that, in this study, bid-ask is computed with respect to a particular event, the dividend distribution.

Both the mean and median normal trading volume are significantly greater for the non-taxable sample relative to the taxable sample. Similarly, the mean size is significantly greater for the non-taxable sample relative to the taxable sample. However, no significant difference exists when evaluating median values. Thus, it appears that a few observations may exhibit extreme values. The mean and median price of the taxable sample are significantly greater than the observed values for the non-taxable sample. The median price for the total sample of ADRs is $28.74, which is considerably greater than the value reported for ADRs in Chan et al. (1996). They report median prices ranging from $14.7711 to $18.0837 over the period 1990 to 1993 for NASDAQ traded ADRs. It is likely that the screening processes used to arrive at the study sample, and the inclusion of NYSE and AMEX traded ADRs, account for this difference.

7.2 Univariate Analyses – Daily Trading Volume

The following analyses provide a representation of daily trading activity for the sample of ADR distributions. According to the hypotheses presented in Chapter 5, evidence of tax motivated trading activity (abnormal trading volume) should occur in both the period immediately preceding the ex-dividend day and again, for a short period,

beginning on the ex-dividend day. Table 8 and Table 9 detail ex-dividend day trading activity using a means-adjusted (Table 8) and market model measure (Table 9) of abnormal trading volume. For both analyses, the final sample is divided into a taxable and non-taxable sample. (Recall the note of caution on this dichotomous partitioning of the sample.) Measures of abnormal trading activity are reported for the 11- day period surrounding the ex-dividend day.

Panal A of Table 8 and Table 9 report abnormal trading volume for the taxable and non-taxable samples. Using a means-adjusted measure of abnormal trading volume (Panel B of Table 8), the taxable sample exhibits statistically significant ($p<.01$) volume increases beginning in the day prior to the ex-dividend day (-1) and continuing through day (+4). As illustrated in Panel B or Table 9, the market model-based measure of abnormal trading volume yields similar results. However, significant abnormal trading activity is also documented in day (-4) and (-3).

For the non-taxable sample (Panel A of Table 8 and Table 9), abnormal trading volume is not significantly ($p<.05$) different from zero in any of the days surrounding the ex-dividend day using the means-adjusted measure, but significant on days (-2) and (-1) with a market model measure of abnormal trading volume. Although the latter is not consistent with expectations, as discussed before, it is likely due to misclassification of non-taxable dividend distributions rather than dividend dumping activity related to non-taxable distributions.

Overall, Panel A and Panel B of Table 8 and Table 9 document a clear difference in ex-dividend day trading activity for the two sub samples, taxable and non-taxable distributions. This difference is generally consistent with the prediction that the presence

of foreign withholding taxes results in a tax penalty on dividend distributions. Investors subject to this tax penalty on dividend distributions engage in tax motivated trading.

It is interesting to note that abnormal increases in trading volume appear to be more prominent in the taxable sample after the ex-dividend day. It is possible that the pre-ex-dividend day activity is spread over a longer period, beginning when the dividend is announced. Therefore, volume for a single day may not be significant. On the other hand, trading activity may be more concentrated after the ex-dividend day as new investors, entering the expanding ADR market, try to capitalize on depressed prices.

Table 8
Abnormal Percentage Trading Volume and t-statistic for 11 Days Surrounding the Ex-Dividend Day

	-5	-4	-3	-2	-1	Ex-Day	1	2	3	4	5
Panel A: Non Taxable Distribution (n=83 ex-dividend days)											
ln (AV%)	-.00	.07	.10	.14	.15	.07	.09	.12	-.21	.18	-.10
t statistic	.03	.70	.93	1.30	1.62	.68	.89	1.05	-1.68	-1.47	-.96
Panel B: Taxable Distributions (n=857 ex-dividend days)											
ln (AV%)	-.01	.04	.05	.04	.12	.21	.18	.24	.24	.15	-.05
t statistic	-.29	1.08	1.37	1.22	2.78**	4.63**	4.25**	5.77**	5.63**	3.47**	-1.51
Panel C: Distributions Subject to 15% Foreign Withholding Tax by Dividend Yield (n=750 ex-dividend days)											
Dividend Yield Quartile 4 (mean = .055)											
ln (AV%)	-.10	.07	.09	.02	.27	.26	.19	.28	.16	.09	-.13
t statistic	-1.36	.87	1.28	.29	3.26**	2.64**	2.00*	3.48**	1.96	.94	-1.78
Dividend Yield Quartile 3 (mean = .023)											
ln (AV%)	.08	-.05	.00	.09	.11	.30	.28	.26	.34	.23	.05
t statistic	1.02	-.67	.05	1.13	1.31	3.19**	2.85**	2.88**	3.79**	2.73**	.74
Dividend Yield Quartile 2 (mean = .015)											
ln (AV%)	-.05	.10	.16	.09	.22	.44	.20	.34	.29	.33	-.05
t statistic	-.61	1.36	2.22*	1.15	2.50*	4.14**	2.29*	3.69**	2.80**	3.16**	-.77
Dividend Yield Quartile 1 (mean = .005)											
ln (AV%)	.02	.00	-.07	-.03	-.09	-.00	-.01	.22	.24	.02	-.05
t statistic	.35	-.10	-.96	-.42	-1.21	.05	-.14	2.51**	2.90**	.27	-.75

AV% represents trading volume on day n as a percentage of the normal trading volume (NV) during the estimation period.
*and ** denotes significance at the .05 and .01 level, respectively, using a one-tailed test

Table 9
Market Model Abnormal Trading Volume and t-statistic for 11 Days Surrounding the Ex-Dividend Day

	-5	-4	-3	-2	-1	Ex-Day	1	2	3	4	5
Panel A: Non Taxable Distribution (n=83 ex-dividend days)											
AV(MM)	.04	.11	.15	.25	.24	.19	.15	.22	-.13	-.12	-.01
t statistic	.40	1.13	1.48	2.48*	2.63*	1.78	1.48	1.88	-1.10	-1.08	-.13
Panel B: Taxable Distributions (n=857 ex-dividend days)											
AV(MM)	.06	.13	.09	.04	.13	.30	.29	.32	.32	.24	.04
t statistic	1.65	3.48**	2.82**	1.16	3.06**	6.24**	6.63**	7.32**	7.21**	5.73**	1.10
Panel C: Distributions Subject to 15% Foreign Withholding Tax by Dividend Yield (n=750 ex-dividend days)											
Dividend Yield Quartile 4 (mean = .055)											
AV(MM)	-.01	.12	.12	.07	.12	.44	.45	.32	.41	.10	.03
t statistic	-.17	1.25	1.42	.91	1.26	3.91**	4.45**	3.10**	3.77**	1.00	.52
Dividend Yield Quartile 3 (mean = .023)											
AV(MM)	.18	.15	.06	-.03	.09	.24	.28	.20	.27	.22	-.06
t statistic	2.28*	1.98*	.77	-.34	1.01	2.26*	2.77**	2.10*	2.65**	2.19*	-.71
Dividend Yield Quartile 2 (mean = .015)											
AV(MM)	-.01	.11	.12	.12	.33	.42	.30	.49	.31	.26	-.01
t statistic	-.07	1.51	1.71	1.48	3.39**	4.71**	3.51**	5.62**	3.51**	2.96**	-.17
Dividend Yield Quartile 1 (mean = .005)											
AV(MM)	-.00	.08	.06	.11	.08	.09	.27	.29	.27	.33	.16
t statistic	-.07	1.12	.79	1.30	.99	1.00	3.22**	3.45**	3.51**	1.80	2.25*

AV(MM) represents trading volume on day n estimated using a volume market model.
*and ** denotes significance .01 level using a one-tailed test.

Panel A and Panel B of Table 8 and Table 9 present an informative but crude analysis of trading behavior because they focus on only one dimension of the tax penalty, the withholding rate. In reality, the magnitude of the penalty is a function of both the dividend yield as well as non-tax costs for distributions subject to foreign withholding tax of 15%. Tax motivated abnormal trading should be positively related to the dividend yield. The analysis is not provided for the non-taxable sample because each quartile would consist of only 21 or 22 observations, making inferences about the population and t-statistic invalid.

The top three dividend yield quartiles consistently show significant increases in trading volume surrounding the ex-dividend day. The lowest quartile exhibits significant increases ($p<.01$) on days +2 and +3 for the means-adjusted measure in Panel C of Table 8 and days (-1), (0), and (+1) for the market model measure reported in Panel C of Table 9. Trading volume does not appear to be a linearly increasing function of dividend yield. It appears that once a threshold has been achieved, foreign taxes provide sufficient incentive to engage in tax motivated trading. While this analysis provides insight into the events around the ex-dividend day, it is only univariate and allows for only two levels of tax (taxable and non-taxable). Both the interaction between the taxes and dividend yield and non-tax costs dictate whether tax motivated trading is profitable. This is not captured in this analysis. The regression analysis presented in the next section provides a more powerful joint test of the tax and non-tax factors affecting trading behavior.

7.3 Regression Analysis

Consistent with expectations, the regression results presented in Table 10 provide evidence consistent with investors engaging in dividend strategies to avoid foreign withholding taxes. Contrary to expectation, the coefficient on the interaction (Tax*DY) is not significant. However, the regression coefficient on the tax variable is positive and significant (t-statistic 2.66), suggesting the presence of tax induced trading. The absence of a significant coefficient on the interaction variable (Tax*DY) may be due to the fact that little variation in the dividend yield exists between observations. Thus, interacting tax with dividend yield does little more in explaining abnormal ex-dividend day trading volume. The coefficient on transaction costs, when measured as the bid-ask spread, is negative and significant (t-statistic –2.77). This is consistent with the prediction that profitable trading strategies are constrained by transaction costs. After controlling for tax, dividend yield (DY) alone is not significantly related to abnormal increases in volume. Similarly, size is not significantly related to ex-dividend day trading volume. The regression analysis yields an R-squared of .10, indicating that other factors that have yet to be identified are important in the investment decision, as well.

Overall, this multivariate analysis provides evidence that several factors, including taxes and transaction costs, are important in the investment decision. More specifically, the results are consistent with tax-motivated ex-dividend day trading that is constrained by transaction costs.

Table 10
GLS Regression Coefficients (t-statistics) from Model of Tax and Non-Factors Affecting Trading Volume of ADRs.

Model: $AVOL_{i,t} = \beta_0 + \beta_1 (Tax_{i,t} * DY_{i,t}) + \beta_2 Tax_{i,t} + \beta_3 DY_{i,t} + \beta_4 TC_{i,t} + \beta_5 Size_i + \varepsilon_{i,t}$

Explanatory Variable (n= 940)	Prediction	Coefficient Estimate (t-statistic)
Tax*DY	+	-.16 (-.20)
Tax	+	.05 (2.66)**
DY	+	5.45 (.44)
TC	-	-7.32 (-2.77)**
Size		.04 (.87)
Intercept		-10.03
R-squared		.10

$AVOL_{i,t}$ = abnormal trading volume for dividend distribution for security i at time t.

$Tax_{i,t}$ = foreign withholding rate relative to dividend distribution of security i at time t.

$DY_{i,t}$ = dividend yield for dividend distribution of security i at time t.

$TC_{i,t}$ = Mean bid/ask spread over five-day window centered on ex-dividend day divided by share price measured 30 trading days prior to ex-dividend day.

$Size_i$ = ln (Book Value of Assets/100,000) of firm issuing security i at the latter of 1995 fiscal year end or year delisted.

* and ** denotes significance at the <.05 and <.01 level, respectively, using a two-tailed test

7.4 Sensitivity Tests

This section presents the results of several sensitivity tests. The first set of tests is designed to assess whether the regression results presented in Table 10 are sensitive to variable specification. The second set of tests examines the possibility that some factor, not controlled for in the model, is driving the results as documented in Section 7.3.

7.4.1 Variable Measurement

Because this study is modeled after a traditional event study, it is necessary to identify a window in which abnormal trading activity is predicted to occur. No theory exists that explains exactly when investors will choose to alter their investment portfolio, given a tax penalty related to dividend income. In other words, it is difficult to predict how far this window will extend prior to and beyond the actual ex-dividend day. In Table 10, the regression analysis is based on a 3-day event window centered on the ex-dividend day. To assess the sensitivity of the results to the width of the event window, the regression was re-estimated using both a 5-day and 11-day period centered on the ex-dividend day. As shown in Table 11, these alternative specifications of the event window (3-day, 5-day and 11-day) yield essentially the same results.

Both the univariate and multivariate regression rely on a 120-day estimation period for normal volume. This window begins prior to the event day (ex-dividend day) and spans days (-76) to (–16) and then extends over a post-event period including days (+16) to (+76). The window was selected to maximize the number of days in the estimation period but to avoid overlapping a subsequent or previous event window. The

estimation window was split before and after the ex-dividend day to control for transitional shifts in trading activity.

Previous studies suggest alternative measures of normal trading volume. In a simulation study, Ajinkya and Jain (1989) document that a 238-day estimation window, similarly split before and after the event, was marginally superior to alternative estimation windows (170-day and 100-day window) in an OLS regression simulation. The regression was estimated using this alternative measure of normal volume. (See Table 12, *alternative 1*.) This did not change any inferences made regarding ex-dividend day trading activity.

In the original regression (Table 10) book value of assets is measured as the book value at 1995 fiscal year-end. If the security was not in existence at 1995 year-end, book value is measured as the book value in the year delisted. The regression was also estimated using book value for the year of each individual observation. The results were not significantly changed and are included in Table 12 as *alternative 2*.

Because direct measures of transaction costs are not available, proxies are identified to represent these costs. In previous studies, several proxies have been suggested for transaction costs [see Karpoff and Walkling (1988)]. Among these proxies are bid-ask spread, market value of the firm's common stock, the standard deviation of stock return, and the inverse of price. Bid-ask spread is used to estimate the original regression in Table 10. As previously discussed, data are not available to compute the market value of the firm's equity. Furthermore, it is unclear what the appropriate

Table 11
GLS regression coefficients (t-statistics) to Test Sensitivity to Alternative Measure of the Event Window

Model: $AVOL_{i,t} = \beta_0 + \beta_1 (Tax_{i,t} * DY_{i,t}) + \beta_2 Tax_{i,t} + \beta_3 DY_{i,t} + \beta_4 TC_{i,t} + \beta_5 Size_i + \varepsilon_{i,t}$

		Main Results: AVOL: 3 day window	*Alternative 1:* AVOL: 5 day window	*Alternative 2:* AVOL: 11 day window
Explanatory Variable (n= 940)	Prediction	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)
Tax*DY	+	-.16 (-.20)	-.25 (-.33)	-.34 (-.47)
Tax	+	.05 (2.66)**	.05 (2.76)**	.05 (3.10)**
DY	+	5.45 (.44)	6.56 (.56)	6.85 (.64)
TC	-	-7.32 (-2.77)**	-7.51 (-3.00)**	-5.64 (-2.50)**
Size		.04 (.87)	.04 (.87)	.03 (.64)
Intercept		-10.03	-9.42	-8.52
R-squared		.10	.09	.09

$AVOL_{i,t}$ = abnormal trading volume for dividend distribution for security i at time t.

$Tax_{i,t}$ = foreign withholding rate relative to dividend distribution of security i at time t.

$DY_{i,t}$ = dividend yield for dividend distribution of security i at time t.

$TC_{i,t}$ = Mean bid/ask spread over five-day window centered on ex-dividend day divided by share price measured 30 trading days prior to ex- dividend day.

$Size_i$ = ln (Book Value of Assets/100,000) of firm issuing security i at the latter of 1995 fiscal year end or year delisted.

* and ** denotes significance at the <.05 and <.01 level, respectively, using a two-tailed test.

measure of equity would be---market value of the ADR and/or market value of the

underlying equity. However, the standard deviation of the stock return and the inverse of price are estimated and presented as alternative measures of transaction costs. Table 13 presents a pair-wise correlation matrix of transaction cost proxies, including correlation coefficients and significance levels.

Studies have shown that micro economic differences may exist between firms of different size. For this sample of ADRs, book value of assets is the best available size proxy. Although this measure has been included in the regression analyses primarily as a control variable for size of the firm, it may also be a weak proxy for transaction costs and, thus, has been included in the correlation matrix.

To the extent these proxies correlate with transaction costs, they should correlate with each other. As expected, bid-ask spread is significantly correlated with both alternative measures of transaction costs, the inverse of price and the standard deviation of stock return. However, it is not significantly correlated with the size measure, book value of assets. Conversely, book value of assets is significantly correlated with price. Thus, it appears that bid-ask, the inverse of price, and standard deviation of stock return are all potential proxies for transaction costs. Book value of assets is not as highly correlated. This is not surprising, given the number of firm characteristics for which size may be a proxy. The regression in Table 10 has been re-estimated to test for sensitivity to the alternative measures of transaction costs. The results are presented in Table 14 as "*Alternative 1*" and "*Alternative 2.*" The results of the original regression are also included for comparative purposes as the "*Main Result.*" Using the inverse of price and

standard deviation of stock return as alternative measures for transaction costs yielded essentially the same results as the main regression estimate using bid-ask spread.

Overall, the results presented in Table 10 appear robust to specified alternative measures of the dependent and independent variables.

Table 12
GLS regression coefficients (t-statistics) to Test Sensitivity to Alternative Measures of Normal Volume and Book Value of Assets

Model: $AVOL_{i,t} = \beta_0 + \beta_1 (Tax_{i,t} * DY_{i,t}) + \beta_2 Tax_{i,t} + \beta_3 DY_{i,t} + \beta_4 TC_{i,t} + \beta_5 Size_i + \varepsilon_{i,t}$

		Alternative 1 Normal Volume (238 day window)	*Alternative 2* Book Value of Assets by Year
Explanatory Variable (n= 940)	Prediction	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)
Tax*DY	+	.30 (.64)	-.22 (.79)
Tax	+	.04 (2.52)*	.04 (2.56)**
DY	+	7.25 (.88)	6.17 (.50)
TC	-	-7.22 (-2.21)*	-6.73 (-2.52)*
Size ln(Book value by year)			.05 (1.16)
Size ln(Book value 12/31/95 or year delisted)		.03 (.88)	
Intercept		-9.92	-10.22
R-squared		.09	.09

$AVOL_{i,t}$ = abnormal trading volume for dividend distribution for security i at time t.
$Tax_{i,t}$ = foreign withholding rate relative to dividend distribution of security i at time t.
$DY_{i,t}$ = dividend yield for dividend distribution of security i at time t.
$TC_{i,t}$ = Mean bid/ask spread over five-day window centered on ex-dividend day divided by share price measured 30 trading days prior to ex-dividend day.
$Size_i$ = ln (Book Value of Assets/100,000) of firm issuing security i at
1)the latter of 1995 fiscal year end or year delisted, or
2) year end related to observation.

* and ** denotes significance at the <.05 level and <.01 level, respectively, using a two-tailed test

Table 13
Correlation Matrix for Transaction Cost Proxies

(p-values are indicated in parentheses)

	Bid-Ask	Price	Standard Deviation of Return	Book Value of Assets
Bid Ask	1.00			
Price	.56 (.00)	1.00		
Standard Deviation of Return	.11 (.00)	.04 (.20)	1.00	
Book Value of Assets	-.03 (.40)	.19 (.00)	-.02 (.61)	1.00

Table 14
GLS regression coefficients (t-statistics) to Test Sensitivity to Alternative Measures of Transaction Costs

Model: $AVOL_{i,t} = \beta_0 + \beta_1 (Tax_{i,t} * DY_{i,t}) + \beta_2 Tax_{i,t} + \beta_3 DY_{i,t} + \beta_4 TC_{i,t} + \beta_5 Size_i + \varepsilon_{i,t}$

		Main Result: Bid-Ask Spread	*Alternative 1:* Inverse of Price	*Alternative 2:* Standard Deviation of Return
Explanatory Variable (n= 940)	Prediction	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)	Coefficient Estimate (t-statistic)
Tax*DY	+	-.16 (-.20)	-33 (-.40)	-.13 (-.36)
Tax	+	.05 (2.66)**	.05 (2.81)**	.05 (2.82)**
DY	+	5.45 (.44)	7.16 (.58)	5.99 (.21)
TC: Bid-Ask Spread	-	-7.32 (-2.77)**		
TC: Price	-		-.006 (-2.47)*	
TC: Standard Deviation of Return	-			-.03 (-2.87)**
Size		.04 (.87)	.06 (1.27)	.02 (1.22)
Intercept		-10.03	-10.23	-9.22
R-squared		.10	.08	.08

Table 14 (continued)

$AVOL_{i,t}$ = abnormal trading volume for dividend distribution for security i at time t.

$Tax_{i,t}$ = foreign withholding rate relative to dividend distribution of security i at time t.

$DY_{i,t}$ = dividend yield for dividend distribution of security i at time t.

$TC_{i,t}$ Bid-Ask Spread = Mean bid/ask spread over five-day window centered on ex-dividend day divided by share price measured 30 trading days prior to ex-dividend day.

Price = The inverse of price of the security measured 30 days prior to the ex-dividend day.

Standard Deviation of Return = standard deviation of the return scaled by price over the estimation period.

$Size_i$ = ln (Book Value of Assets/100,000) of firm issuing security i at (1) the latter of 1995 fiscal year end or year delisted or (2) year end related to observation.

*and ** denotes significance at the <.05 and <.01 level, respectively, using a two-tailed test

7.4.2 Additional Tests to Assess Model Specification

To control for the possibility that the results are driven by (1) trading behavior in a single year or (2) a shift in trading behavior over time, two separate sets of variables are added to the model. First, zero-one indicator variables that specify the year of the distribution are added to the regression to allow the regression constant to vary by year. Second, an interaction variable is added for each year. This variable is an interaction between the year dummy and the tax variable. Alternatively, separate regressions could be estimated for each year. However, for most years, there is not enough variation in the tax variable to run the regression and interpret the results. It would be unclear whether insignificant coefficients on the variables of interest could be attributed to no tax effect or simply not enough power in the tests. Thus, the regression is estimated with year dummy variables, and the results are presented in Table 15.

The tax and transaction cost variables (bid-ask spread) remains significant even after controlling for the year of the distribution. The only individual year dummy that shows a significant coefficient was 1988 (D88). Thus, relative to the base year of 1995, the constant term is significantly different for distributions occurring in 1988. Similarly, the coefficient related to the 1988 interaction variable is significant. Therefore, to determine whether distributions from 1988 are driving the results, all 1988 distributions are dropped (84 observations) from the sample and the regression re-estimated. This resulted in a sample of 856 ex-dividend days.

Excluding 1988 distributions yielded results very similar to the original regression

Table 15
GLS Regression Coefficients (t-statistics) to Test Sensitivity to Year of Distribution

Model: $AVOL_{i,t} = \beta_0 + \beta_1 (Tax_{i,t} * DY_{i,t}) + \beta_2 Tax_{i,t} + \beta_3 DY_{i,t} + \beta_4 TC_{i,t} + \beta_5 Size_i$

$+ \beta_6 (Tax_{i,t} * Y88_{i,t}) + \beta_7 (Tax_{i,t} * Y89_{i,t}) + \beta_8 (Tax_{i,t} * Y90_{i,t}) + \beta_9 (Tax_{i,t} * Y91_{i,t})$
$+ \beta_{10} (Tax_{i,t} * Y92_{i,t}) + \beta_{11} (Tax_{i,t} * Y93_{i,t}) + \beta_{12} (Tax_{i,t} * Y94_{i,t})$

$+ \beta_{13} Y88_{i,t} + \beta_{14} Y89_{i,t} + \beta_{15} Y90_{i,t} + \beta_{16} Y91_{i,t} + \beta_{17} Y92_{i,t} + \beta_{14} Y93_{i,t}$
$+ \beta_{14} Y94_{i,t} + \varepsilon_{i,t}$

Explanatory Variable (n= 940)	Prediction	Coefficient Estimate (t-statistic)
Tax*DY	+	-.39 (-.47)
Tax	+	.04 (2.10)*
DY	+	8.97 (.72)
TC	-	-9.9 (-3.41)**
Size		.04 (1.02)
D88*Tax		.21 (3.50)**
D89*Tax		.06 (1.24)
D90*Tax		.03 (.63)
D91*Tax		.02 (.57)
D92*Tax		.04 (1.53)
D93*Tax		-.01 (-.33)
D94*Tax		.01 (.77)

Table 15 (continued)

D88	-3.06 (-3.36)**
D89	-.96 (-1.45)
D90	-.59 (-.80)
D91	-.16 (-.35)
D92	-.67 (-1.54)
D93	.10 (.29)
D94	-.39 (-1.41)

$AVOL_{i,t}$ = abnormal trading volume for dividend distribution for security i at time t.

$Tax_{i,t}$ = foreign withholding rate relative to dividend distribution of security i at time t.

$DY_{i,t}$ = dividend yield for dividend distribution of security i at time t.

$TC_{i,t}$ Bid-Ask Spread = Mean bid/ask spread over five-day window centered on ex-dividend day divided by share price measured 30 trading days prior to ex-dividend day.

$Size_i$ = ln (Book Value of Assets/100,000) of firm issuing security i at (1) the latter of 1995 fiscal year end or year delisted or (2) year end related to observation.

$DXX_{i,t}$= dummy variables representing year of distribution where XX equal years 1988 to 1995.

*and ** denotes significance at the <.05 and <.01 level, respectively, using a two-tailed test

Table 16
GLS Regression Coefficients (t-statistics) from Model of Tax and Non-Factors Affecting Trading Volume of ADRs
(all observations from 1988 dropped)

Model: $AVOL_{i,t} = \beta_0 + \beta_1 (Tax_{i,t} * DY_{i,t}) + \beta_2 Tax_{i,t} + \beta_3 DY_{i,t} + \beta_4 TC_{i,t} + \beta_5 Size_i + \varepsilon_{i,t}$

Explanatory Variable (n= 856)	Prediction	Coefficient Estimate (t-statistic)
Tax*DY	+	-.31 (-.37)
Tax	+	.05 (2.68)**
DY	+	7.62 (.62)
TC	-	-7.80 (-2.70)**
Size		.03 (.71)
Intercept		-10.02
R-squared		.07

$AVOL_{i,t}$ = abnormal trading volume for dividend distribution for security i at time t.

$Tax_{i,t}$ = foreign withholding rate relative to dividend distribution of security i at time t.

$DY_{i,t}$ = dividend yield for dividend distribution of security i at time t.

$TC_{i,t}$ = Mean bid/ask spread over five-day window centered on ex-dividend day divided by share price measured 30 trading days prior to ex-dividend day.

$Size_i$ = ln (Book Value of Assets/100,000) of firm issuing security i at the latter of 1995 fiscal year end or year delisted.

* and ** denotes significance at the <.05 level and <.01 level, respectively, using a two-tailed test

(see Table 16). The coefficient on tax was significant in the predicted direction. Transaction costs remain significant (p-value = .01) in the predicted direction. Size and dividend yield still fail to have a significant role in explaining abnormal ex-dividend day trading volume. Thus, the finding that taxes are associated with abnormal ex-dividend day volumes does not appear to be the result of a single dominant year.

A large number of U.K. securities are represented in the sample. Therefore, another concern is whether abnormal ex-dividend day activity is simply a characteristic of British securities, and if the dominance of British securities is responsible for the results presented in the original regression. Almost 40 percent, or 374 observations, are British. Thus, the regression is again re-estimated without these observations. The analysis reveals that abnormal ex-dividend day activity is not concentrated only in U.K. ADRs. Table 17 documents that taxes and transaction costs continue to have a significant role in explaining abnormal ex-dividend day activity among ADRs representing non-U.K. equity.

A sensitivity test is also performed to assess the potential impact of misclassification of tax status. Recall that distributions from Mexican ADRs were classified as non-taxable. However, the status is actually dependent on whether the income was previously taxed as earnings of the corporation. This information regarding specific distributions is not available. Therefore, all Mexican ADRs have been conservatively classified as non-taxable. In Table 18 all distributions from Mexican ADRs are eliminated from the sample. This appears to weaken the results. Although transaction costs continue to exhibit a significant relation ($p<.01$), the coefficient on the

Table 17
GLS Regression Coefficients (t-statistics) from Model of Tax and Non-Factors Affecting Trading Volume of ADRs
(all observations from U.K. dropped)

Model: $AVOL_{i,t} = \beta_0 + \beta_1 (Tax_{i,t} * DY_{i,t}) + \beta_2 Tax_{i,t} + \beta_3 DY_{i,t} + \beta_4 TC_{i,t} + \beta_5 Size_i + \varepsilon_{i,t}$

Explanatory Variable (n= 566)	Prediction	Coefficient Estimate (t-statistic)
Tax*DY	+	-.13 (-.17)
Tax	+	.05 (2.76)**
DY	+	4.48 (.37)
TC	-	-6.10 (-2.13)*
Size		.00 (.09)
Intercept		-9.65
R-squared		.07

$AVOL_{i,t}$ = abnormal trading volume for dividend distribution for security i at time t.

$Tax_{i,t}$ = foreign withholding rate relative to dividend distribution of security i at time t.

$DY_{i,t}$ = dividend yield for dividend distribution of security i at time t.

$TC_{i,t}$ = Mean bid/ask spread over five-day window centered on ex-dividend day divided by share price measured 30 trading days prior to ex-dividend day.

$Size_i$ = ln (Book Value of Assets/100,000) of firm issuing security i at the latter of 1995 fiscal year end or year delisted.

*and ** denotes significance at the <.05 level and <.01 level, respectively, using a two-tailed test

Table 18
GLS Regression Coefficients (t-statistics) from Model of Tax and Non-Factors Affecting Trading Volume of ADRs
(all observations from Mexico dropped)

Model: $AVOL_{i,t} = \beta_0 + \beta_1 (Tax_{i,t} * DY_{i,t}) + \beta_2 Tax_{i,t} + \beta_3 DY_{i,t} + \beta_4 TC_{i,t} + \beta_5 Size_i + \varepsilon_{i,t}$

Explanatory Variable (n= 895)	Prediction	Coefficient Estimate (t-statistic)
Tax*DY	+	.36 (-.17)
Tax	+	.03 (1.62)♦
DY	+	-2.33 (-.87)
TC	-	-10.74 (-3.51)**
Size		.06 (1.61)♦
Intercept		-9.94
R-squared		.07

$AVOL_{i,t}$ = abnormal trading volume for dividend distribution for security i at time t.

$Tax_{i,t}$ = foreign withholding rate relative to dividend distribution of security i at time t.

$DY_{i,t}$ = dividend yield for dividend distribution of security i at time t.

$TC_{i,t}$ = Mean bid/ask spread over five-day window centered on ex-dividend day divided by share price measured 30 trading days prior to ex-dividend day.

$Size_i$ = ln (Book Value of Assets/100,000) of firm issuing security i at the latter of 1995 fiscal year end or year delisted.

*and ** denotes significance at the <.05 level and <.01 level, respectively, using a two-tailed test
♦denotes significance at .10 level

tax variable is now only marginally significant (p-value = .10). It is difficult to determine whether this is because the presence of Mexican observations are driving the results or because the decrease in variation in the tax variable has simply reduced the power of the test. Eliminating Mexican distributions results in a loss of 44 of the non-taxable distributions.

Finally, to determine whether abnormal ex-dividend day activity is limited to a single exchange, in Table 19, indicator variables are added to represent exchange listing and the regression is re-estimated. Neither of the exchange indicator variables exhibited a significant coefficient. The tax and transaction cost coefficients remain significant (p-value = .01). Thus, abnormal ex-dividend day activity does not appear to be characteristic of a particular exchange.

7.5 Summary

This chapter presents the results of several tests designed to identify abnormal ex-dividend day trading volume consistent with a tax motivation. Results from both the univariate daily trading volume and regression analyses are generally consistent with the presence of a tax effect that is constrained by the level of transaction costs. Further tests reveal that the results are generally not sensitive to the particular measure of transaction costs or the estimation window selected for normal volume. Furthermore, significant coefficients on the variables of interest do not appear to be due to the large percentage of observations representing the U.K. equity or from observations from a single year or listing on a particular exchange.

Table 19
GLS Regression Coefficients (t-statistics) to Test Sensitivity to Exchange Listing

Model: $AVOL_{i,t} = \beta_0 + \beta_1 (Tax_{i,t}*DY_{i,t}) + \beta_2 Tax_{i,t} + \beta_3 DY_{i,t} + \beta_4 TC_{i,t} + \beta_5 Size_i + \beta_6 NYSE_{i,t} + \beta_7 NASDAQ_{i,t} + \varepsilon_{i,t}$

Explanatory Variable (n= 940)	Prediction	Coefficient Estimate (t-statistic)
Tax*DY	+	-.22 (-.26)
Tax	+	.04 (2.56)**
DY	+	6.17 (.50)
TC	-	-6.74 (-2.52)**
Size		.05 (1.16)
NYSE		-.04 (-.04)
NASDAQ		.36 (.39)
Intercept		-10.21
R-squared		.08

$AVOL_{i,t}$ = abnormal trading volume for dividend distribution for security i at time t.

$Tax_{i,t}$ = foreign withholding rate relative to dividend distribution of security i at time t.

$DY_{i,t}$ = dividend yield for dividend distribution of security i at time t.

$TC_{i,t}$ = mean bid/ask spread over five-day window centered on ex-dividend day divided by share price measured 30 trading days prior to ex-dividend day.

$Size_i$ = ln (Book Value of Assets/100,000) of firm issuing security i at the latter of 1995 fiscal year end or year delisted.

$NYSE_{i,t}$ = indicator variable set to 1 if NYSE listing, 0 otherwise.

$NASDAQ_{i,t}$ = indicator variable set to 1 if NASDAQ listing, 0 otherwise.

*and ** denotes significance at the <.05 level and <.01 level, respectively, using a two-tailed test

CHAPTER 8 – CONCLUSION AND FUTURE RESEARCH OPPORTUNITIES

This chapter presents conclusions related to the results of the univariate and multivariate analyses of Chapter 7. The conclusions are followed by suggestions for further developing this study, as well as some suggestions about related areas of inquiry.

8.1 Conclusion

This study presents evidence on the impact of cross-jurisdictional taxes on investor behavior. The results indicate that when a dividend payout is expected, ADRs exhibit an abnormal increase in volume surrounding the ex-dividend day that is positively related to the magnitude of the foreign tax costs and negatively related to transaction costs.

The study contributes to the literature by enhancing our understanding of the impact of taxes on investor behavior. Studying the trading behavior of investors in ADRs provides a setting where cross-sectional variation in the tax rates exists and can be more clearly measured. It is this variation that allows for a multivariate joint test of tax and non-tax factors not seen in previous single jurisdiction ex-dividend day studies.

Additionally, this study furthers our understanding of cross-jurisdictional securities, such as ADRs, traded on U.S. exchanges. As we move into a more global economy, it is important to understand how different financing vehicles interact with financial accounting practices and tax regulations. As in the case of dividend dumping strategies, this may result in policy concerns. Those who structure tax treaties may wish to consider whether these dividend strategies are the intended results of their negotiation. Although some investors may have the opportunity to capitalize on abnormal returns, it is

at the expense of other investors who incur additional costs to avoid the dividend. The worldwide taxing structure may be limiting the ability of the later group of investors to competitively maintain an internationally diversified portfolio.

8.2 Future Research

In a recent study, Bali and Hite (1998) suggest that a tax-induced clientele hypothesis may not be the only explanation for abnormal ex-dividend day trading activity. Rather, they present a market micro-structure argument related to the dividend distribution to explain ex-dividend day abnormal returns.

In a perfect market with no taxes or transaction costs, share price on the ex-dividend day would fall by exactly the amount of the dividend. However, a large body of research, including Elton and Gruber (1970), document that on average prices do not fall by the amount of the dividend. This has generally been attributed to a tax effect. The micro-structure argument by Bali and Hite (1998) is based on the fact that prices on the exchanges are constrained to ticks. A tick refers to the discrete price increments at which exchange listed securities are permitted to trade. For example, prices may be constrained to trade at increments equivalent to $1/16^{th}$ of a dollar. If the size of the dividend is not a multiple of the tick size, then the stock cannot adjust by exactly the amount of the dividend when it goes ex-dividend. The market may round the price change up (to the tick just above the dividend) or down (to the tick just below).

Bali and Hite (1998) hypothesize that the market systematically rounds down the value of the dividend. Thus, the ex-dividend day price drop would be less than the dividend. Rounding the value of the dividend up to the nearest tick could not exist in

equilibrium because, while there would be eager sellers, no one would be willing to buy. Furthermore, the smaller the dividend, the more significant the tick effect should be since the relative proximity to the nearest tick is a greater proportion of the dividend itself.

Bali and Hite (1998) may have important implications for this study. Although the potential impact of a tick effect on a returns study is easy to conceive, it is not as clear for a volume study and should be considered. Some crude preliminary analyses were performed. The sample was partitioned into four sub-samples based on the size of the dividend. In general, a tick effect should be less pronounced for a security with a larger dividend. The regression was re-estimated three times, each time dropping the partition with the smallest dividend amount. The coefficient on the tax variable remained significant each time. Thus, initial results do not indicate that controlling for "proximity to the tick" masks any tax effect. A more refined analysis is necessary to better assess the possibility. The sample used in the study may also provide a unique setting to shed light on the source of positive abnormal ex-dividend day returns. Similar to the current study, the cross-sectional variation in the tax variable provides a unique setting to jointly test for the presence of a tax effect and a tick effect.

Besides the tax consequences associated with ADRs, future related research should examine other characteristics of ADRs. Because ADRs have become a significant means by which investors diversify globally, it is important that we better understand how the market values these shares representing foreign equity and how cross-jurisdictional differences in accounting and securities regulation impact this valuation. Specifically, further inquiry is needed to better explain how financial accounting requirements and tax regulation affect liquidity, transaction costs, and access to global

markets. Furthermore, the opportunity to convert ADRs into their underlying security presents opportunities to further examine the efficiency of the global marketplace. Finally, related to efficiency, studying ADRs might add to the debate on informational efficiency and, in particular, the role of analysts in a cross-jurisdictional setting.

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