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Value relevance of deferred taxes in mergers and acquisitions

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VALUE RELEVANCE OF DEFERRED TAXES IN MERGERS AND ACQUISITIONS

by

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ABSTRACT

The major concern in a mergers and acquisitions (M&A) transaction is how to determine the economic benefits and burdens and allocate them among the participating firms. Part of this concern can be described as the question of how the participating firms ascertain and price the potential tax benefits of the target's tax attributes.

Different from prior research, which focuses on the reaction of the market, this study emphasizes the viewpoint of the participating firms in pricing the target firms' deferred taxes when determining the acquisition price. The results indicate that the participating firms assign value to the target firms' deferred taxes. Further decomposing the deferred taxes into several components shows that net deferred tax assets are given value regardless of the taxability of acquisitions. However, deferred tax liabilities are assigned negative value in taxable transactions but are ignored in non-taxable transactions. Also, deferred tax assets from all others (AODTA) are priced by the participating firms, but deferred tax assets from other loss carryforwards (OLC) and tax credit carryforwards (TCC) are not. Moreover, deferred tax assets from NOL carryforwards (NOL) are priced only when the ratio of target's book value of equity to market value of equity is high. This finding is different from prior research which suggests NOL carryforwards and tax credit carryforwards are priced by the market. This difference implies that the market and the participating firms have a different point of view on the value of deferred tax assets from NOL carryforwards.

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Author Wei-Chih Chiang

Date 6/6/2008

DEDICATION

In loving memory of my grandparents,

Hua Chiang (蔣化, 1911-1988)
and
Chan Yu (余纏, 1912-1987)

Through their lives, I have learned the spiritual ways
of traditional Taiwanese.

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CHAPTER 1

INTRODUCTION

Background

Mergers and acquisitions (M&A) have been a popular business activity over the past decades.[1] The number of U.S. M&A per year has increased from less than 1,000 before the 1950s to more than 10,000 in the late 1990s (Bruner, 2004). Although M&A activity slowed down after the Internet bubble burst in 2000, the volume and value of M&A has increased during the past four years. The U.S. M&A market is anticipating a rise somewhere between 15% and 20% in 2007, which may push M&A activity to a new record high (Cohen, 2007).

Looking at aggregate M&A activity over the past 100 years, Bruner (2004) identifies five merger "waves" during which the merger activity was heightened. Bruner (2004) indicates several reasons, such as managerial hubris, market mania, market overvaluation, information asymmetry, agency costs, and industry shocks, to explain these waves. Further, he suggests that potential and actual M&A activity occurs in industry and company settings where economic turbulence is particularly active.

[1] Bruner (2004, p. 12) refers to the Oxford English Dictionary and defines "merger" as "the consolidation or combination of one firm or trading company with another." Further, "acquisition" is simply defined as "a purchase." This study follows these definitions and uses the terms generically and interchangeably.

Motives for Mergers and Acquisitions

Halpern (1983) considers motivations for M&A activity from a different perspective. Based on the value maximization hypothesis, he discusses diverse motives for M&A. First, financial motivation such as redeployment of excess cash, diversification benefits, and bankruptcy avoidance can stimulate business acquisitions. Second, synergies from economies of scale, economies of scope, excess capacity in some production factors, and monopoly power can motivate mergers. Third, firms may engage in M&A activity to take advantage of an asymmetry in information. Finally, an acquisition can be based on the attempt by the acquirer to obtain control of the target firm.

In addition, tax benefits could be another motivation that drives business combinations, even though firms may not make these deals based on tax benefits alone (Eccles et al., 1999). The tax motivations are illustrated in the following two activities.

Tax Shields for Conglomeration. A conglomerate merger is a combination of firms that are involved in different businesses. Corporate tax benefits can motivate conglomerate mergers. Shih (1994) argues that conglomerate mergers create several tax benefits. First, conglomerate mergers improve the probability of immediately utilizing tax write-offs and credits. Second, the chance of permanently losing tax write-offs and credits in bankruptcy is reduced by these mergers. Last, by increasing the chance of tax deductibility for marginal interest payments and reducing the marginal net cost of debt, conglomerate mergers enhance the ability of the conglomerated group to write off the interest on additional debt.

Bankruptcy vs. Merger Choice. Bankruptcy avoidance is one of the numerous motivations for mergers (Halpern, 1983). One of the reasons for preferring merger over bankruptcy is the possible loss of potential benefits from tax loss carryforwards and investment tax credit carryforwards if the troubled firms declare bankruptcy and liquidate (Shrieves and Stevens, 1979). Pastena and Ruland (1986) apply Probit analysis to test the importance of three firm-related variables – revenues, financial leverage, and tax carryforwards – in predicting the merger/bankruptcy option, but their results show that the tax carryforwards variable is not statistically significant.

Tax Benefits and Mergers and Acquisitions

There are several ways that M&A may provide tax benefits to the participating firms. For example, Auerbach and Reishus (1988a) point out three large tax saving acquisitions which took advantage of tax loss and credit carryforwards. First, the Atlantic Richfield Company is estimated to have gained over $100 million in tax benefits when it merged with Anaconda Copper Mining Company in 1977. Second, the Penn Central Corporation acquired Marathon Manufacturing Company and GK Technologies, Inc. during 1979-1981 and is estimated to have saved more than $180 million in tax liabilities through these two deals. Third, Allied Corporation's acquisitions of Bunker Ramo Corporation, Fisher Scientific International, Inc., and Supron Energy Corporation during 1981-1982 are projected to have resulted in tax benefits of over $80 million. Consequently, when a target firm is able to provide tax benefits to an acquiring firm, the acquirer might be willing to pay tax-driven price premiums. For instance, Erickson and Wang (2007) note that when Coca-Cola Enterprises acquired Herb Coca-Cola in 2001,

Coca-Cola Enterprises paid the Herb Coca-Cola shareholders a $100 million premium to obtain a beneficial step-up tax status.

Tax Considerations. Generally, the tax benefits gained from M&A activity are accrued at both the corporate and the shareholder levels (Auerbach and Reishus, 1988b). These potential tax benefits can be considered critically in terms of the following principal tax questions (Ginsburg and Levin, 2006, p. 1-11). First, will shareholders of the target firm pay tax on the appreciation of their stock? Can this gain be deferred by structuring the installment method, a tax-free reorganization, or a creative use of Section that provides non-recognition treatment?[2] Second, does the target firm have to pay corporate-level tax on the appreciation of its assets? If yes, do the shareholders of the target firm or the acquiring firm take the burden? Third, will the acquiring firm take a carryover tax base or obtain a new cost basis (either a step-up or step-down) on the target firm's assets? Finally, if the target firm has a net operating loss (NOL), or other tax carryforwards, can the acquiring firm use these carryforwards? If so, what are the restrictions jeopardizing the acquirer from enjoying the carryforwards?

Among these tax considerations, use of the target firm's NOL and other tax carryforwards to reduce tax liabilities might be the most visible attraction to an acquiring firm (Haw et al., 1987). Tax laws allow firms to use these tax carryforwards against their future earnings so that potential benefits from future tax savings make tax carryforwards valuable.[3] In this study, we are particularly interested in how participating firms estimate and price the deferred tax accounts in M&A. Therefore, understanding the tax ramifications of using the target firm's tax carryforwards provides some enlightenment

[2] Unless specified, code sections cited in this study refer to the Internal Revenue Code ("IRC") of 1986.
[3] See Sections 39(a), 53, 172(b)(1), 904(c), and 1212(a).

on how the participating firms might negotiate the value of the tax benefits given by the target's tax carryforwards.

Non-Taxable vs. Taxable Mergers. Acquisitions may be classified as taxable or non-taxable transactions. In either category, the acquiring firm may purchase the assets or the stock of the target. Generally, a taxable transaction provides a step-up basis on the transferred assets and no transfer of tax attributes. Conversely, in a non-taxable merger, there is no step-up in basis but tax attributes are transferred.

Section 368(a) specifies seven types of corporate reorganizations that qualify as nontaxable transactions: 1) "Type A:" a statutory merger or consolidation; 2) "Type B:" the acquisition in which the buyer uses solely voting-stock-for-stock exchange; 3) "Type C:" an acquisition where the purchasing firm exchanges solely its voting stock for substantially all of the seller's properties;[4] 4) "Type D:" a transfer of all or part of a company's assets to another firm when the original corporation's shareholders control the new company immediately after the transfer. A "Type D" reorganization could be either "acquisitive" or "divisive;"[5] 5) "Type E:" a recapitalization; 6) "Type F:" a mere change in identity, form, or place of organization of the company; and, 7) "Type G:" the transfer by a firm of all or part of its assets to another corporation in a bankruptcy or similar situation. In addition, a qualified tax-free reorganization has to meet several general requirements such as having a plan of reorganization, passing the continuity of interest and the continuity of business enterprise tests, possessing a sound business purpose, and avoiding the step transaction doctrine (Hoffman et al., 2006).

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[4] There is no statutory definition of "substantially all." However, the IRS expects assets representing at least 90 percent of the fair market value of the net assets and at least 70 percent of the fair market value of the gross assets held by the target to be transferred. See, Rev. Proc. 77-37, 1977-2 C.B. 568, amplified by Rev. Proc. 86-42, 1986-2 C.B. 722.

[5] There are three types of "divisive Type D" reorganizations: spin-off, split-off, and split-up.

As a general rule, when a transaction is qualified as a Section 368 reorganization, the participating firms do not recognize gain or loss.[6] Likewise, subject to some exceptions, shareholders of the firms involved in a non-taxable reorganization do not recognize gain or loss on the exchange of their stock.[7] The assets transferred from the target firm to the acquirer carry over their basis, while the basis might be increased by any gain recognized by the target firm in the transaction.[8] When an acquisition occurs in the "Type A," "Type C," acquisitive "Type D," "Type F," or "Type G," the acquiring firm succeeds to the target firm's tax attributes on the assets transferred.[9] That is, NOL and other carryforwards such as net capital loss, general business credit, foreign tax credit, and alternative minimum tax credit (Ginsburg and Levin, 2006, p. 12-149) can be carried over to and used by the acquirer.[10] Nevertheless, carryovers of a target firm's tax carryforwards to the acquirer are not allowed if the principal purpose of the overall transaction is to avoid tax by securing the benefit of the target firm's carryforwards.[11] On the other hand, a target firm must generally recognize full gain or loss when disposing of its assets in a taxable transaction. Similarly, shareholders of the target firm must generally realize gain or loss on any sale or exchange of their target firm stock in a taxable acquisition.

The participating firms can choose whether to take a step-up in tax basis or a carryover tax basis on the target firm's assets through different transaction structures. Ginsburg and Levin (2006, p. 4-109) provide two structuring formats of obtaining a step-up tax basis. First, the acquirer can either acquire the target firm's assets in a taxable

[6] Section 361(a).
[7] Section 354(a)(1).
[8] Section 362(b).
[9] Section 381(a).
[10] Section 381.
[11] Section 269(a).

forward merger or purchase the target firm's assets.[12] Second, with Sections 338 or 338(h)(10) elections, the acquiring company buys the target firm's stock in a taxable reverse subsidiary merger or purchases the target firm's stock.[13] Nevertheless, if a carryover tax basis of the target firm's assets is desirable, the acquiring firm will use the second structuring format but without a Section 338 or 338(h)(10) election. An acquiring firm is generally able to use the target firm's tax carryforwards if the acquirer purchases the target firm's stock in a non-taxable transaction without making a Section 338 election to treat the acquisition as an asset purchase. In contrast, an acquirer will not succeed to the target firm's tax attributes in a taxable asset purchase.

See Table 1.1 for a summary of different treatments between financial and tax accountings regarding target firm's tax attributes. For numeric examples, see Appendix. Table 1.2 presents a flow chart that clarifies the relationships among types of deals, tax consequences, and availability of target firms' tax attribution transfers.

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[12] In a forward merger, the target firm ceases to exist and is merged into the acquirer or a subsidiary of the acquirer. Since the later involves three parties, it is called a "triangular merger."

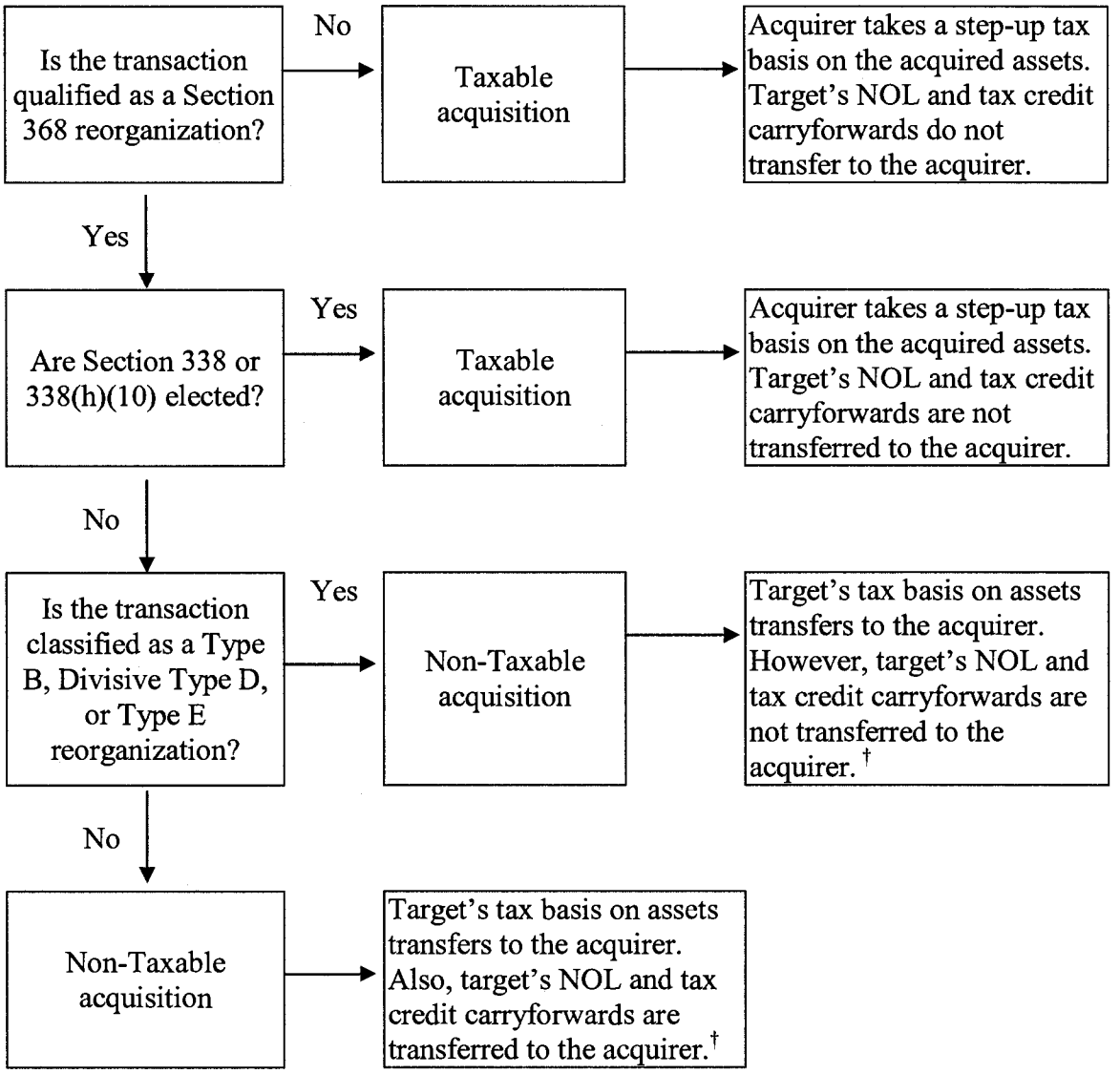
[13] In a reverse subsidiary merger, a subsidiary of the acquirer is merged into the target firm such that the latter is the surviving entity. A reverse subsidiary merger usually is employed to avoid the transfer of contracts and licenses held by the target firm.

Table 1.1 Financial and Tax Accounting in M&A

Acquirer	
Taxable M&A	Non-Taxable M&A[†]
Financial (Book): SFAS No. 141 requires that the assets and liabilities acquired must be recorded at their fair market value to the acquiring firm. Basis of acquired assets: Step-up. NOL carryforwards: not available to acquirer. Other carryforwards: not available to acquirer.	**Financial (Book):** SFAS No. 141 requires that the assets and liabilities acquired must be recorded at their fair market value to the acquiring firm. Basis of acquired assets: Step-up. NOL carryforwards: transferred to acquirer. Other carryforwards: transferred to acquirer.
Tax: Step-up. Tax basis of acquired assets: Step-up. NOL carryforwards: not available to acquirer. Other carryforwards: not available to acquirer.	**Tax:** Tax attributes succeed. Tax basis of acquired assets: transferred to acquirer. NOL carryforwards: transferred to acquirer. Other carryforwards: transferred to acquirer.
Target and Shareholders	
Target: Gains (losses) are recognized. NOL carryforwards: available to target. Other carryforwards: available to target.	**Target:** No gains (losses) are recognized. NOL carryforwards: transferred to acquirer. Other carryforwards: transferred to acquirer.
Shareholders: Gains (losses) are recognized according to shareholder's basis in the target stock.	**Shareholders:** No gains (losses) are recognized. Shareholder's basis in the target stock becomes the new basis in the acquirer's stock.

[†] NOL and tax credit carryforwards are not transferred to the acquirer if the acquisition is classified as a Type B, divisive Type D, or Type E reorganization.

Table 1.2 Type of Deals, Tax Consequences, and Tax Attribute Transfers



† Section 381(a).

Limitation on Tax Benefits. Although Auerbach and Reishus (1988a) find that tax carryforwards may provide tax-savings in M&A activity, their study suggests no apparent evidence that the utilization of tax credits and tax losses plays an important role

in affecting merger activity. However, Congress has been concerned with the tax benefits taken by merging firms and has attempted to eliminate the tax incentives from business combinations. As a result, numerous provisions have been established to limit the use of NOL and other tax carryforwards.[14] For example, Section 382 is one of the complex provisions applicable to NOL carryforwards and this section is also effective to other tax carryforwards through Section 383. Section 382 limits the amount of NOLs that can be utilized each year by the successor corporation. Generally, the Section 382 limitation applies when there has been an ownership change for the target's common shareholders of more than 50 percent.[15] Section 382 restricts the use of NOL carryforwards in several ways. First, the NOL carryforwards are disallowed if the acquirer fails to satisfy the continuity of business enterprise requirement for at least two years after the change date.[16] Second, the NOL carryforwards cannot be carried back to a prior acquiring corporation tax year (that is, it can only be used prospectively). Third, the annual amount of NOL carryforwards available to the acquirer is limited to the market value of the target firm multiplied by the long-term tax-exempt rate. The long-term tax-exempt rate is the highest adjusted Federal long-term rate for the previous three-month period. Last, the amount of NOLs available to the acquirer in the change year is proportional to the remaining days after the change date.

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[14] See, for example, Sections 172(b)(1)(E), 269, 381, 382, 383, and 384.

[15] An ownership change exists where there is either an owner shift involving 5-percent shareholder or an equity structure shift as defined in Section 382(g). An owner shift involving 5-percent shareholder occurs where the common stock ownership of one or more 5-percent shareholders changes. Equity structure shift means any tax free reorganization under Section 368, but excluding divisive "Type D," "Type G," and "Type F" reorganizations. See, Hoffman et al. (2006).

[16] Continuity of business enterprise requires that the successor corporation either continues the target corporation's historic business or uses a significant portion of the target firm's historic assets in a business. See, Reg. 1.368-1(d)(1).

The effectiveness of the Section 382 limitation has been empirically investigated. Moore and Pruitt (1987) test the impact of the passage of the revised Section 382 of the **Tax Reform Act of 1976 (TRA'76)** which was recast to restrict the use of NOL carryforwards obtained through M&A. They find that this Section 382 revision reduced the present value of the loss firms' NOLs by limiting the use of the NOL carryforwards and, thereby, increasing the probability of their expiration. That is, Section 382 as revised under **TRA'76** is effective in reducing the potential tax benefits provided by the NOL carryforwards.

The preceding discussion describes the relationship between tax benefits of a target firm's tax carryforwards and M&A activity. The tax considerations, tax benefits, and limitations on the use of a target's tax carryforwards have been reviewed. This discussion provides a basis for the expectation of why an acquirer may be willing to pay a price for tax benefits acquired in an M&A transaction.

Value Relevance of Deferred Taxes

Target firms' tax carryforwards are one of the tax benefits that acquiring firms may obtain in M&A. While Congress restricted this benefit via the aforementioned Section 382 limitations, the easy identification of tax carryforwards may make it likely that participating firms could value these carryforwards in estimating the total value of target. Auerbach and Reishus (1988a) estimate that the average size of the tax benefits from tax loss and credit carryforwards obtained by acquiring firms is around 10% of the target firm's total market value. Nevertheless, the question of how an acquirer valuates and prices a target firm's tax carryforwards, as well as other deferred tax components, is

not adequately addressed in their study. Analyzing the deferred tax accounts provides insights into this issue.

Deferred Tax Accounts. While firms must follow GAAP for financial reporting, tax accounting must follow the Internal Revenue Code. Tax laws often differ from the recognition and measurement requirements of financial accounting standards. Consequently, accounting for financial reporting purposes and accounting for tax purposes are different. To address and account for the differences between GAAP reporting and tax accounting, the Financial Accounting Standards Board (FASB) issued the Statement of Financial Accounting Standards No. 109 (SFAS No. 109), "*Accounting for Income Taxes*," which suspended Accounting Principles Board Opinion No. 11 (APB No. 11), "Accounting for Income Taxes" (APB, 1967). Because SFAS No. 109 requires firms to recognize the amount of taxes payable or refundable for the current year and deferred tax liabilities and assets for the future tax consequences of transactions that have been recognized in the firms' financial statements or tax returns, the FASB believes that SFAS No. 109 produces the most useful and understandable information (SFAS No. 109, par. 63). Ayers (1998) provides empirical evidence that SFAS No. 109 gives incremental value relevant information relative to APB No. 11.

Differences between the amount of income tax payable (the amount calculated under tax laws) and the amount of income tax expense (the amount computed under GAAP) can be classified as either permanent differences or temporary differences. Permanent differences are amounts used to calculate income tax expense for financial reporting purposes but not used to determine income tax payable for tax purposes or vice versa (Norton et al., 2007, p. 765). A temporary difference is defined as "a difference

between the tax basis of an asset or liability and its reported amount in the financial statements that will result in taxable or deductible amounts in future years" (SFAS No. 109, par 289). The deferred tax account, which appears on the balance sheet as either a deferred tax asset or a deferred tax liability, reflects only the tax impact of temporary differences (and not permanent differences) between the financial accounting and tax accounting.

A deferred tax liability refers to the increase in taxes payable in future years as a result of temporary taxable differences existing at the end of the current year. In contrast, a deferred tax asset indicates the increase in taxes refundable or saved in future years as a result of temporary deductible differences existing at the end of the taxable year (Kieso et al., 2007, p. 967). Furthermore, firms are required to measure deferred tax assets and liabilities at the tax rate expected to be applicable in the future rather than at the tax rate applicable during the year the amounts originated (SFAS No. 109, par 27). Also, while the deferred tax liability account is not subject to valuation adjustments, the deferred tax asset account should be reduced by a valuation allowance. If, based on all available positive and negative evidence, it is more likely than not (a likelihood of more than 50 percent) that some portion or all of the deferred tax assets will not be realized, a valuation allowance should be recognized (SFAS No. 109, par 17). Moreover, the following four sources of taxable income may be viewed as sufficient enough to realize a tax benefit for deductible temporary differences: 1) Future reversals of existing taxable temporary differences; 2) Future taxable income exclusive of reversing temporary differences and carryforwards; 3) Taxable income in prior carryback year(s) if the carryback is permitted under the tax laws; and, 4) Tax-planning strategies such as accelerating taxable amounts

to utilize expiring carryforwards, changing the character of taxable or deductible amounts from ordinary income/loss to capital gain/loss, and switching from tax-exempt to taxable investments (SFAS No. 109, par 21). Meanwhile, the total amount of deferred taxes must be separated into current and noncurrent parts, of which the classification as current or noncurrent should generally rely on the classification of the related asset or liability that gave rise to the temporary difference (SFAS No. 109, par 41). Further, companies are required to disclose in the financial statements the approximate tax effect of each type of temporary difference and carryforward that gives rise to a significant portion of deferred tax liabilities and deferred tax assets (SFAS No. 109, par 43). Therefore, the financial statement users can notice the impact of deferred taxes on the balance sheet and the income statement. These tax disclosures also provide important information for business valuation purposes (Weber and Wheeler, 1992).

Value Relevance of Tax Disclosures. In Statement of Financial Accounting Concepts No. 2 (SFAC No. 2), "*Qualitative Characteristics of Accounting Information*", the FASB states the objective of financial reporting is to provide useful information for decision-making of the existing and potential financial statement users (FASB, 1980). Income tax information can serve the functions of assessing quality of earnings, making better predictions of future cash flows, and predicting future cash flows from operating loss carryforwards (Kieso et al., 2005). This tax information is needed for investors, creditors, and acquirers to assess the value of the business and, thereby, make their decisions. That is, financial statement users should be able to utilize the disclosed income tax information to explore significant economic transactions of the companies they are interested in (Weber and Wheeler, 1992). Therefore, income tax information

should be able to provide value relevant knowledge to financial statement users. Empirical studies (e.g., Givoly and Hayn, 1992; Chaney and Jeter, 1994; Amir et al., 1997; Ayers, 1998) have confirmed that while making investment and pricing decisions, the market indeed considers the income tax information provided in financial statements and prices the net deferred tax account as well as its components. However, whether an acquiring firm uses this information to price a target firm's deferred tax accounts in M&A has not yet been explored.

Significance of the Problem

The central concern in an M&A transaction is how to determine the economic benefits and burdens in the transaction and allocate them among the participating parties (Ginsburg and Levin, 2006, p. 1-10). Moreover, the impact of tax laws is one of the economic factors which a business would consider in an M&A activity. Accordingly, the question of how the merging firms ascertain and price the potential tax benefits of the acquisition transaction is worthy of further investigation.

SFAC No. 2 depicts the objective of financial reporting as providing useful information for decision-making. At least two prior research streams have shown that deferred tax accounts provide value relevant information to the market. First, research in value relevance of deferred taxes (e.g., Givoly and Hayn, 1992; Chaney and Jetter, 1997; Amir et al., 1997; Ayers, 1998) has examined the relationship between deferred taxes and stock price. Generally, the findings indicate that deferred taxes are appropriately valued and included in the stock price. Second, other studies (e.g., Moore and Pruitt, 1987; Haw et al., 1987) identify the impact of tax benefits associated with NOL carryforwards on the stock price with/without the presence of M&A activity. By and large, the results of these

studies show that NOL carryforwards are associated with a higher stock price or acquisition premium. The first research stream (e.g., Amir et al., 1997; Amir and Sougiannis, 1999; Zeng, 2003) relates deferred tax accounts to stock price outside the scope of M&A activity. The second research stream, using the event study method, focuses on the market valuation to NOL carryforwards in M&A activity. The purpose of the current study is to apply the value relevance method used in the first research stream to the M&A setting.

Studying the value relevance of deferred taxes in mergers and acquisitions is very important in the following perspectives. First, M&A is currently a very significant business activity. This study can improve our knowledge of M&A activity, especially the pricing of target firms' deferred taxes. Second, Congress is concerned with merging firms taking tax advantages of loss firms' tax carryforwards. Enactment of the strictly revised Section 382 limitations was an attempt to mitigate this concern.[17] However, Moore and Pruitt (1987) find that Section 382 of **TRA'76** has significant influence on this issue, but Plummer and Robinson (1990) are skeptical on the necessity of imposing these limitations. Although prior research has investigated the viewpoint of the market on pricing firms' NOL carryforwards, whether participating firms give value to NOL and other tax carryforwards has not been examined. Third, this study provides an opportunity to examine the relevance of income tax information, i.e., whether SFAS No. 109 provides the merging firms with value relevant tax information.

[17] Section 382 was enacted in the IRC of 1939. However, the restriction on the use of NOL carryforwards was amended for several times. Section 382 limitations revised by **TRA'76** and **TRA'86** are stricter than that in the 1954 Code prior to 1977.

Objectives of the Study

The objective of this study is twofold. First, this study expands the research of value relevance of deferred taxes to M&A activity. Specifically, merging firms' evaluation of, rather than the market's reaction to, deferred tax accounts are examined. Therefore, this paper can provide insights on how participating firms consider the tax benefits associated with tax carryforwards. Second, this study avoids the methodological issue of the market's early response to an anticipated event. The anticipation effect may be most serious for firms with tax carryforwards prior to the merger announcement (Plummer and Robinson, 1990). A valuation model based on the Feltham-Ohlson (1995) model is employed to investigate the value relevance of tax information and eliminate the anticipation effect that may influence the findings of event studies.

Research Focus

Research Question 1

The first research question is to determine whether deferred tax assets (liabilities) of a target firm are valued as assets (liabilities) in mergers and acquisitions. Investors, financial analysts, and creditors use financial ratios to assess a firm's value. However, financial ratios may change if the users make adjustments to financial statement items. For example, Comiskey and Mulford (1994) suggest that lenders should deduct deferred-tax assets either in whole, or in part, when calculating the tangible net worth of a firm because the realization of benefits from deferred tax assets is subject to uncertainty. Any adjustment to the reported numbers will affect the ratios used for valuation.

Prior research (e.g., Amir et al., 1997; Ayers, 1998) shows that the stock market views the deferred tax assets, positively. Also, investors consider deferred tax liabilities

as real liabilities (Givoly and Hayn, 1992; Chaney and Jetter, 1994; Ayers, 1998; Citron, 2001). Although these studies are not related to M&A activity, it is expected that merging firms consider deferred tax assets (liabilities) as real assets (liabilities) in non-taxable acquisitions. However, the coefficients relating tax attribute to price in this study may vary from those found in prior research because of Section 382 limitations. Because Section 382 limitations restrict the annual amount of target firms' NOL carryforwards that can be used by acquiring firms, the tax attributes may be less valuable in M&A than they would be in a going concern situation. [18]

Research Question 2

Whether a target firm's valuation allowance account is priced in a merger is the second research question. The valuation allowance is a contra deferred tax asset account. Ayers (1998) shows that the market prices the valuation allowance account negatively against the deferred tax assets account. However, because of investors' failure to assign a positive value to the deferred tax assets from losses and credit carryforwards, Amir et al. (1997) find that it is difficult to interpret the coefficients on the valuation allowance account. Consistent with prior research, valuation allowances are expected to be priced negatively in non-taxable acquisitions.

Research Question 3

The third research question specifically investigates how a target firm's NOL and tax credit carryforwards are priced. NOL carryforwards are the most visible tax benefit

[18] Information shown in the financial statements is under "the going concern" assumption. If a firm is in liquidation or is expected to enter liquidation, emphasis shifts from performance to liquidation. Regarding this shift, SFAC No. 1 states that the objectives of financial reporting do not necessarily change, but the information that is relevant to those objectives may differ (FASB 1978, footnote 10). Therefore, if performance and acquisition have different emphases, the needed relevant information for performance and acquisition could be different.

that a loss firm can provide in M&A activity, and consequently, it has raised Congressional concern for merging firms taking tax advantages of this tax attribute. While unrelated to the M&A context, Zeng (2003) shows that NOL carryforwards, but not investment tax credit carryforwards, enhance firm market value. Amir et al. (1997) investigate the value relevance of deferred taxes and find that investors fail to assign a positive value to the NOL and tax credit carryforwards accounts. They suggest that the market does not expect these carryforwards to be utilized. However, these carryforwards may be more valuable in an M&A setting when merged into a profitable acquiring firm that can take advantage of them.

Within the scope of M&A research, the findings are inconsistent. Although Moore and Pruitt (1987) demonstrate that NOL carryforwards are priced by the market in connection with potential mergers, Plummer and Robinson (1990) indicate the difference of acquisition premiums between target firms with and without NOL carryforwards is not statistically significant. Although prior studies are split in whether a firm's NOL and tax credit carryforwards are valued by the market, it is expected that a target firm's NOL and tax credit carryforwards are priced by participating firms in non-taxable acquisitions. There are two reasons to support this expectation. First, Moore and Pruitt (1987) show that stock price is related to firm's NOL carryforwards in the M&A context. Second, the insignificant relationship between acquisition premiums and NOL carryforwards in the Plummer and Robinson (1990) event study might arise from the anticipation effect.

Organization of Dissertation

This dissertation is divided into five chapters. Chapter 1 serves as an introduction to the topics of deferred taxes and mergers movements and includes a discussion of the

relation between tax attributes and merger activities. The relevance and purpose of the study are also presented. Chapter 2 reviews the prior empirical research in the areas of value-relevance of deferred taxes and effects of deferred taxes on mergers and acquisitions. Chapter 3 presents the research questions and hypotheses to be investigated and discusses the data and the research methodology used in this study. Chapter 4 reports descriptive statistics and the results of the hypothesis tests. Last, Chapter 5 contains analyses and discussions of the research findings, conclusions, suggestions for future research opportunities, and notes the limitations of this study.

CHAPTER 2

SELECTED LITERATURE REVIEW

Prior research is selectively reviewed in two areas: value relevance of deferred taxes and effects of deferred taxes on mergers and acquisitions. The first category can facilitate an understanding of how the market evaluates deferred tax accounts. The second provides insights into the methodology used to examine the impact of deferred taxes on M&A activity.

Research on Value Relevance of Deferred Taxes

Event Studies

Givoly and Hayn. Givoly and Hayn (1991) investigate the effects of the passage of the **Tax Reform Act of 1986 (TRA'86)** on the equity values of publicly traded companies. They argue that since **TRA'86** amends some provisions related to the deferred tax accounts, the passage of **TRA'86** could impact the market's valuation of these accounts. First, NOL carryforwards would provide less tax savings because of tax rate reduction and additional restrictions on the use of NOL carryforwards in acquisitions under **TRA'86**. Second, the decrease in the tax rate would lead to a decline in the valuation of deferred tax liabilities. Third, the investment tax credit, which previously acted as an important tax shield, was repealed. Therefore, when the likelihood of passing

TRA'86 increased, the abnormal return on a firm's stock was expected to relate negatively to the NOL carryforwards and investment tax credit, but positively to the deferred tax liability While identifying ten **TRA'86** impact subperiods, Givoly and Hayn employ the event study methodology and confirm their expectations.

Givoly and Hayn (1992) is closely related to Givoly and Hayn (1991) in terms of methodology and sample. However, although Givoly and Hayn (1991) apply firm-specific variables to explain the stock price response to **TRA'86**, Givoly and Hayn (1992) use the passage of **TRA'86** as a vehicle to assess whether the deferred tax liability is viewed by the market as a real liability. Givoly and Hayn (1992) argue that if the deferred tax liability is considered a real liability, the tax rate cut of **TRA'86** would proportionally reduce the market value of liabilities and correspondingly increase the market value of equity. Further, the increase in the equity value of an individual company would depend on how investors discount its liabilities. Specifically, the discount factor is a function of the expected growth rate in the deferred tax liability and the likelihood of future losses. Meanwhile, several variables, such as investment tax credits, NOL carryforwards, etc., were incorporated in the model to control the effect of **TRA'86** on stock prices. Their findings show that, on average, one dollar of deferred tax liability is valued by investors at about 56 cents.

Chaney and Jeter. Using an event study, Chaney and Jeter (1994) argue that deferred taxes are associated with stock returns after controlling for the net income computed without the deferred tax component (the pseudo-net income). Further, they predict that, due to the delayed nature of the future tax payment, the return response to the deferred taxes should be weaker than that for other components. Also, they anticipate

that the market should perceive the recurring portion of deferred taxes differently in terms of the implications of future tax payments when compared to the nonrecurring portion. Moreover, whether the market response differs between firms with different levels of variance in unexpected deferred taxes is examined in their study.

The test period includes the years 1969-1985, during which firms were required to report deferred taxes in compliance with APB Opinion No. 11. The results show that for 8 of the 17 years examined, the coefficient on deferred taxes is negatively significant at the 0.10 level. Thus, they suggest that the deferred tax component provides incremental information to the market. However, an F-test between the full model and reduced model reveals that the coefficient of the deferred tax component is significantly smaller in absolute value than that of the pseudo-net income in only three years. Furthermore, their findings suggest that the market's reaction to the nonrecurring deferred tax items is not significantly different from that to the recurring deferred tax component. Evidence is presented that the market's response is stronger for firms with less volatility in deferred taxes.

Espahbodi et al. Using an event study, Espahbodi et al. (1995) examine the market reaction around the issuance of the Exposure Drafts leading to SFAS No. 96 and No. 109. Because of the decrease in maximum tax rates from 46 percent to 34 percent, a change from APB Opinion No. 11 to either SFAS No. 96 or No. 109 should lead most companies to see an increase in earnings and a reduction in liability. Furthermore, they expect the increase in stock prices to be more pronounced for firms with a larger deferred tax liability to total assets and firms with higher NOL carryforwards to total assets.

Three related events – two exposure drafts leading to SFAS No. 96 and No. 109 and the formal vote by the FASB to revise SFAS No. 96 – are considered. The Multivariate Regression Model (Schipper and Thompson, 1983) is employed to test the impact of these three events on stock prices. Also, the portfolio weighting procedure (Sefcik and Thompson, 1986) is used to evaluate the relative importance of different firm characteristics (e.g., deferred tax liability, NOL carryforwards, etc.) in explaining the market reaction to the three events.

Their findings reveal significantly abnormal returns around the three events. Also, they note that firms with the following characteristics are most favorably affected by the new standard announcements: small, offering postretirement benefits, high debt ratios, high deferred tax liability and NOL carryforwards over total assets, and using the purchase method of acquisition.

Price Valuation Models

Amir et al. Amir et al. (1997) investigate the market valuation of deferred taxes and their components, which include seven items: 1) depreciation and amortization, 2) losses, credits, and alternative minimum taxes carryforwards, 3) restructuring charges, 4) environmental charges, 5) employee benefits, 6) valuation allowance required by SFAS No. 109, and 7) all other components.

Using a variant of the Feltham and Ohlson (1995) model, Amir et al. (1997) relate the market value of equity to the current value of net operating assets, net financial assets, abnormal operating earnings, and net deferred taxes. Also, industry effects were controlled for via adding industry dummy variables to each independent variable, except

for net financial assets. Their findings show that the marginal value of a dollar of net deferred taxes is $1.20, which is significantly above one at the 0.05 level.

Furthermore, Amir et al. (1997) decompose the net deferred taxes into seven items to examine the incremental information content of these components. Their results indicate that deferred taxes from losses and credit carryforwards are not significant. Therefore, they suggest that investors do not expect these carryforwards to be utilized. Moreover, instead of using two separate components, they combine deferred taxes from losses and credits carryforwards with the valuation allowance and, then, rerun the model. The coefficients on this new variable are not significant. Accordingly, they interpret the result as net tax losses carryforwards (i.e., losses and credit carryforwards minus the valuation allowance) are not valued as real assets.

Amir and Sougiannis. Amir and Sougiannis (1999) examine the interpretations of financial analysts and investors on tax carryforward information. They distinguish two conflicting roles of deferred taxes in valuation. First, tax carryforwards represent future tax savings so that they should be positively valued as assets. On the other hand, deferred tax assets from NOL carryforwards may signal a higher likelihood of future losses and could negatively impact stock price.

Using the Feltham-Ohlson (1995) model, Amir and Sougiannis (1999) relate analysts' forecast to deferred taxes, adjusted book value (book value minus deferred taxes), and abnormal earnings. Also, deferred taxes are decomposed into three components: losses and credits carryforwards, valuation allowance, and all other deferred taxes. They argue that if analysts use the deferred tax carryforwards information as a signal of future losses, abnormal earnings and book value will be considered as less

valuable for firms with deferred tax carryforwards. Meanwhile, for the investigation of investors' valuation of deferred taxes, stock price is related to deferred taxes, adjusted book value, and the present value of expected abnormal earnings. Similarly, deferred taxes are decomposed into the three aforementioned components. They expect that investors will discount the expected earnings and the adjusted book value for firms with deferred tax carryforwards, compared to those without such carryforwards.

Their initial sample is identical to the one used by Amir et al. (1997). The results suggest analysts consider abnormal earnings and adjusted book value of firms with tax carryforwards less valuable than those of firms without carryforwards. In addition, the deferred tax assets from NOL and tax credit carryforwards are viewed as assets but with small magnitude and weak significance levels and the valuation allowance component is unstable and insignificant. Furthermore, the findings indicate that investors reduce stock price in accordance with the likelihood of utilizing tax carryforwards. Investors price the adjusted book value of firms with deferred taxes less than those of firms without deferred taxes, and, in contrast, price the expected earnings higher for firms with deferred taxes than those without such tax carryforwards.

Zeng. Using Canadian data, Zeng (2003) investigates the value relevance of loss carryforwards. He extends the Feltham-Ohlson (1995) model by adding a variable for corporate taxation. That is, firm market value is related to the current book value, the present value of the expected future after-tax abnormal earnings, and the present value of the expected future tax reductions. Further, he decomposes the loss carryforwards into two items: NOL carryforwards and capital loss carryforwards.

The results show that the total loss carryforwards are positively and significantly related to stock price suggesting that the loss carryforwards increase a firm's market value. However, after the decomposition, the findings indicate that while the coefficients on the NOL carryforwards are significant, the coefficients on capital loss carryforwards are not. Zeng interprets this result as suggesting that the market does not expect these capital losses to be realized in future. After further detailed decomposition and analysis of the NOL carryforwards account, he finds that the portion of NOL carryforwards which occurred in Canada, and would not expire soon, significantly increased a firm's market value.

Bauman and Das. Bauman and Das (2004) assess the association between expectations of future profitability and the stock prices of Internet firms before and after the bubble burst in 2000. Because net deferred tax assets represent managers' perspective on the expectation of future profitability, they actually investigate the relationship between deferred tax assets and stock price. Specifically, Bauman and Das argue that the pre-correction valuation of deferred tax assets exceeds the post-correction valuation.

Because Internet firms usually record valuation allowances in amounts equal, or close, to gross deferred tax assets, multicollinearity can be a severe issue in their model. To solve this issue, two dummy variables, DTA-FULL and DTA-PART, are included in the model. DTA-FULL equals to 1 if valuation allowance is the same as the net deferred tax assets. In contrast, DTA-PART is 1 if valuation allowance is not equal to the net deferred tax assets. Also, based on Internet industry segments, Bauman and Das categorize the full sample into two groups: web traffic sensitive firms and others.

The results show that both DTA-FULL and DTA-PART are significantly, positively related to stock price irrespective of whether before or after the bubble burst or whether in traffic sensitive or non-traffic sensitive groups. Furthermore, the findings indicate that in the full sample DTA-FULL increases in both magnitude and significance in the post-correction valuation, but the estimate is not significantly larger than the pre-correction estimate. However, in the traffic sensitive group, the coefficient of DTA-FULL in post-correction is significantly larger than that in pre-correction. Bauman and Das interpret the shift in valuation as an implication that investors in Internet firms increased their relative focus on future profitability as a value driver.

Summary of Research on Value Relevance of Deferred Taxes

Prior research in the non-M&A arena indicates that deferred taxes, as well as its components (e.g., NOL carryforwards), provide value relevant information to the market, although the effect of the valuation allowance is mixed. Two methodologies commonly employed in this research stream are event studies and price valuation models. However, event studies dominate the research on the effects of deferred taxes in the M&A context that is discussed below. Price valuation models have not yet been applied in M&A related research.

Research on Effects of Deferred Taxes in M&A

Tax Benefits

Auerbach and Reishus (1988a). Auerbach and Reishus (1988a) assess the potential tax benefits that merging firms could have gained from losses and tax credits.

Depending on the tax status of firms before mergers, they classify firms in their sample into four groups. Group I firms have positive federal taxes payable and no tax credit carryforwards. Firms in Group II have no current federal taxes but are able to fully carry back current losses and credits against taxable incomes in prior years. Group III contains firms with tax credit carryforwards but no loss carryforwards. Group IV firms possess both loss and tax credit carryforwards. Conceptually, only mergers between firms from Group I and those from groups III and IV would provide tax benefits associated with tax loss and credit carryforwards.

Assuming that Group I firms maintain their taxable incomes at the same level as that prior to the mergers, Auerbach and Reishus (1988a) measure tax benefits as the maximum amount that could be used by the combined firm over a three-year period. Their findings indicate that nearly one fifth of the mergers seize the tax benefits with the average size around one tenth of the target firm's market value. However, in their calculation, potential restrictions under Sections 269 and 382 of the IRC of 1954 are not taken into account.[19] As a result, the actual tax benefits should be less when these constraints are considered.

Auerbach and Reishus (1988b). Auerbach and Reishus (1988b) employ the same dataset as Auerbach and Reishus (1988a) and estimate the tax benefits from tax loss and credit carryforwards in a different manner. Namely, tax benefits are calculated as the present value of taxes saved through the use of the existing tax carryforwards. The results show that the average net present value of tax benefits is 13.7 percent of the

[19] Section 382 of **TRA'76** was not actually enacted until January, 1984 (Moore and Pruitt, 1987). Therefore, the Section 382 of the IRC of 1954 was effective during the sample period (1968-1983) in Auerbach and Reishus (1988a).

market value of the target firm. They conclude that there is no strong evidence that the utilization of tax losses and credit carryforwards play an important role in affecting merger activity. First, the percentage of the sample firms with tax loss carryforwards is roughly equivalent, compared to Auerbach and Poterba (1987) where M&A is not involved. Second, if tax benefits from tax carryforwards are an important merger motivation, the number of non-taxable transactions should be larger than the number of taxable transactions. However, a logit model does not detect any significant relation between the type of transaction and the presence and size of tax benefits.

Auerbach and Reishus (1988c). Although Auerbach and Reishus (1988a) find that one fifth of the acquisitions gain tax benefits from tax loss carryforwards and credits, they are concerned with whether the availability of the tax benefits have significantly impacted the frequency and pattern of mergers. Therefore, Auerbach and Reishus (1988c) compare the actual merger sample with "pseudomergers," mergers which did not occur but were drawn from random combinations of firms. That is, they create a corresponding "pseudomerger" for each of the 316 actual merger cases on hand. A "pseudotarget" firm and a "pseudoparent" firm are randomly selected from all firms in Compustat in terms of the same size class and year as the real target and acquirer, respectively.

Following a multinominal logit model, Auerbach and Reishus (1988c) calculate the potential tax benefits from the transfer of tax loss carryforwards and credits between parent and target firms. These estimations are performed for both actual mergers and pseudomergers. The results show that 19.3 percent of the real merger sample contains a tax benefit with a mean weighted gain of 10.5 percent of the target's market value.

Likewise, 19.2 percent of the pseudomergers exhibit a tax gain of which the weighted mean is 7.8 percent of the market value of the pseudotarget. Since the tax benefits from the actual merger sample and pseudomergers are remarkably similar, they suggest that the transfer of tax loss carryforwards and credits may not be an important factor in initiating merger activity.

Capital Market Reaction

Moore and Pruitt. Moore and Pruitt (1987) investigate the capital market pricing of the NOLs accrued by loss firms and the likelihood of acquisition premiums attributable to the NOLs. The passage of the revised Section 382 in **TRA'76** on October 5, 1976, is used as a vehicle for the event study. Essentially, this revision reduces the tax incentives for profitable firms to merge with loss firms in an attempt to secure the NOL carryforwards of the target firms. Naturally, how the market reacts to this revised section can assist in gauging the impact of NOLs on pricing in M&A activity.

Two samples (NOP and NOL) are used by Moore and Pruitt (1987). The NOP sample is the profit firm sample which consists of randomly selected firms of one-fifth of all firms listed in Compustat without reporting NOLs in 1975. Also, firms with 1975 NOLs smaller in magnitude than their seven-year expected earnings are included in NOP. The NOL sample contains all firms in Compustat whose NOLs in 1975 are larger in magnitude than their seven-year earnings expectations. Subsequently, the cumulative standardized portfolio performance differentials between the NOP and NOL groups around the time of passage of the Section 382 revision are measured.

The results show that the NOP portfolio significantly outperforms the NOL portfolio over the pre-event interval (101 days), but there is no significant difference over

the post-event interval (50 days). Based on these results, Moore and Pruitt note that NOLs are priced by the market, and because of the probability of expiration, the Section 382 revision reduces the present value of the loss firms' NOLs. Accordingly, they suggest that tax motivated mergers may be more of a myth than reality, and the substantial acquisition premiums over pre-offer prices observed by target firms at the time of merger announcements are not the result of tax considerations (p. 160).

Haw et al. Haw et al. (1987) argue that, because of the availability of tax benefits in M&A, troubled firms with tax loss carryforwards could receive larger acquisition premiums than those troubled firms without tax loss carryforwards. Further, due to the visibility of the tax loss carryforwards, they expect that troubled firms with tax loss carryforwards would experience earlier increases in market values compared with troubled firms without tax loss carryforwards.

Using the Altman Z score as an indicator of financial stress, Haw et al. recognize some of their sample firms as troubled firms, which are separated into groups with and without tax loss carryforwards. Meanwhile, the acquisition premiums are calculated as the cumulative average returns (CARs) which are the average of the aggregate weekly abnormal returns for the period beginning the sixty weeks before and ending the three weeks after the acquisition announcement. Their results indicate that troubled firms with tax loss carryforwards had a 33.7 percent acquisition premium while the acquisition premium for those without tax loss carryforwards was only 19.6 percent.

Additionally, Haw et al. relate CARs to four firm-specific variables: tax loss carryforwards magnitude (defined as the ratio of available tax loss carryforwards to total revenues), leverage, size, and ownership concentration. CARs are calculated over four

testing periods: 1) the entire testing period, weeks -60 to +3; 2) an early recovery period, weeks -40 to -11; 3) the second recovery period: weeks -30 to -11; and 4) the period surrounding the acquisition announcement, week -6 to +1. They find that the magnitude of the tax loss carryforwards is positively associated with the size of the acquisition premium over the recovery periods. These results confirm their expectation that troubled firms with tax loss carryforwards, relative to those without tax loss carryforwards, experience early market value recovery.

Hayn. Hayn (1989) assesses the importance of target firms' two tax attributes – NOL carryforwards and unused (investment and foreign) tax credits – in motivating acquisitions. She argues that because of the difficulty of anticipating the tax status of an acquisition, the potential benefits of these tax attributes are not fully included in the participating firms' stock prices prior to the merger announcement. Therefore, it is expected that the NOL carryforwards and unused tax credits are positively correlated with the announcement-period returns of the involved firms. Specifically, the magnitude of the announcement-period returns should be positively related to the portion of the NOL carryforwards and unused tax credits that are expiring within a short period of time.

In her model, Hayn relates the announcement-period returns to the tax attributes and several nontax control variables in a cross-sectional regression. The combined amount of the NOL carryforwards and unused tax credits is divided into two components: short-lived (expiring within two years) and long-lived. The control variables include the ratio between the sizes of the target and the acquirer, type of acquisition offer, single or multiple active bidders, resistance to an acquisition, and financial performance of the target.

The results show that in nontaxable acquisitions the long-lived NOL carryforwards and unused tax credits are positively related to the announcement-period returns, as expected, but not significant. Nevertheless, the short-lived portion of NOL carryforwards and unused tax credits is positive and significant at the 0.05 level. Accordingly, Hayn suggests that the amount of NOL carryforwards and unused tax credits due to expire is the most prominent tax attribute in nontaxable acquisitions. Meanwhile, the coefficient of the short-lived NOL carryforwards and unused tax credits in taxable acquisitions is negative and significant at the 0.10 level. She interprets the findings as that the market has partially priced the value of these tax carryforwards and credits before the acquisition announcement and decreased the stock price after realizing that these tax attributes will never be used in a taxable acquisition.

Plummer and Robinson. Plummer and Robinson (1990) examine the relation between the target firms' tax carryforwards and the excess stock returns when a pending acquisition is announced (the announcement effect). Concerned with the conflicting results shown in prior studies, they use a matched-pair design to control for non-tax variables associated with acquisition returns. That is, the sample target firms with and without tax carryforwards are matched in light of the four characteristics: industry classification, year of acquisition, asset size, and profitability. In addition, to control for the market anticipation effect, Plummer and Robinson estimate the excess returns for periods up to 300 trading days prior to the announcement date.

The results show that while tax carryforwards are associated with higher excess returns instantaneously surrounding the announcement, the difference is not statistically significant. They explain this lack of statistical significance as the result of the increased

market anticipation on the prospective acquisition for firms with tax carryforwards. Nevertheless, the subsequent test for market anticipation provides no evidence of an earlier increase in returns for firms with tax carryforwards. Accordingly, they suggest that the lack of evidence supporting either the announcement effect or the anticipation effect indicates that the value of tax carryforwards does not increase with the acquisition announcement. As a result, they are suspect of the necessity for imposing limitations on the use of tax carryforwards.

Acquisition Premium

Crawford and Lechner. While Haw et al. (1987) and Hayn (1989) claim that a target's valuable attributes result in higher acquisition premiums, Crawford and Lechner (1996) argue that the target's attributes affect both the value of the target and the probability that it will be acquired. When an acquisition is anticipated, the anticipation effect is already reflected in the price of the target's stock. Therefore, as anticipation increases, the market's response on the announcement date decreases.

In their study, the price offered by the acquiring firm is decomposed into three components: the value of the target if no acquisition occurs, the anticipated portion of the acquisition premium that investors can estimate, and the remaining unanticipated portion of the acquisition premium that is paid to target shareholders. They assert that prior research (e.g., Haw et al., 1987; Hayn, 1989) only measures the surprise portion of the price premium. Instead, they define the acquisition premium as the target's cumulative market model residuals from 50 days before the announcement to the date the target was delisted. This definition considers the value-weighted market portfolio as a benchmark so the calculation can catch both the anticipated and surprise portions of the price premium.

Crawford and Lechner use a Probit model to rank the sample target firms in terms of their estimated probability of acquisition, which is a function of three tax variables – the potential increase in the tax basis of the target's assets, NOL carryforwards, and tax credit carryforwards – and three financial variables – return on equity, leverage, and liquidity. They find that the price premiums and the probabilities of acquisition are negatively associated. Subsequently, a multivariate regression is employed to test the relation between price premiums and the six explanatory variables. The results show that leverage, liquidity, and the potential step-up of the target's assets are significantly related to the acquisition premiums. In other words, NOL and tax credit carryforwards are not relevant to acquisition premiums.

Ayers et al. Ayers et al. (2003) examine whether shareholder-level capital gains taxes are associated with higher acquisition premiums for taxable acquisitions. They model acquisition premiums as a function of proxies for the capital gains taxes of target shareholders, taxability of the acquisition, and tax status of the price-setting shareholder as represented by the level of target institutional ownership. Several explanatory variables representing characteristics of the acquired firm and the acquisition transactions (e.g., tax carryforwards of the target firms) are incorporated in the model as control variables. Their results show that acquisition premiums are associated with shareholder's capital gains tax, type of acquisition, management hostility, competing bids, tender offers, tax carryforwards, the target firm's leverage, book-to-market ratio, return on market value of equity, and the bidder's pre-announcement ownership in the target firm.

Summary of Research on Effects of Deferred Taxes in M&A

Auerbach and Reishus (1988a, 1988b, and 1998c) estimate the tax benefits associated with tax loss and credit carryforwards in M&A and suggest that tax motivations do not play an important role in merger decisions. Meanwhile, prior research employing event studies in the M&A context confirms that the market reacts positively to tax carryforwards. However, these studies do not focus on how the acquirers evaluate these tax benefits. Also, the price valuation model which is popularly employed in non-M&A situations is not applied. Therefore, a study that uses price valuation models to explore the evaluation by acquirers on target firms' tax carryforwards benefit can augment this research stream.

CHAPTER 3

METHODOLOGY

This study extends the value relevance research of deferred taxes to the M&A arena. Specifically, price valuation models (e.g., Feltham and Ohlson, 1995) are applied to examine the effect of target firms' tax attributes on acquisition prices. Price valuation models have been used to ascertain the value relevant content of deferred tax information in non-M&A activity (e.g., Amir et al., 1997; Amir and Sougiannis, 1999; Zeng, 2003). However, these models have not been used in the M&A context to examine the value relevance of deferred taxes. Therefore, this paper extends the methodological application of the Feltham-Ohlson model.

Research Questions

As discussed in chapter 1, this study focuses on the following research questions to shed light on the value relevance of deferred taxes in M&A.

1. Are target firms' deferred tax assets (liabilities) priced as assets (liabilities) in M&A?
2. Are target firms' valuation allowance accounts priced in M&A?
3. Are target firms' deferred tax assets from NOL and tax credit carryforwards priced in M&A?

Hypotheses

The preceding research questions are examined by testing the following hypotheses, which are written in alternative forms.

H_{1a}: Deferred tax assets (liabilities) of target firms are priced as assets (liabilities) in M&A.

H_{2a}: Target firms' valuation allowance accounts are priced in M&A.

H_{3a}: Target firms' NOL and tax credit carryforwards are priced in M&A.

Research Methods

Event studies have been employed in prior research (Moore and Pruitt, 1987; Haw et al., 1987; Hayn, 1989; Plummer and Robinson, 1990) to investigate the value relevance of tax carryforwards in the M&A context. Most of these studies suggest the market does give value to tax carryforwards in connection to the potential tax benefits in M&A. However, Plummer and Robinson (1990) point out that the anticipation effect of the market in an earlier period can weaken the significance level of the research results. Meanwhile, although the market's (i.e., the investors') viewpoint of evaluating tax carryforwards in M&A is well documented, participating firms' perspectives on these carryforwards have not yet been studied.[20] As an alternative to an event study, price valuation models can avoid the anticipation effect and reveal how the participating firms price a target firm's tax attributes.

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[20] An acquisition transaction should be officially approved by the shareholders of the acquired and acquiring firms (Bruner, 2004, p. 685). Essentially, the acquisition price implies the shareholders' perspectives on the value of the target. However, the top management of the participating firms usually initiates the acquisition price and negotiates with each other. Therefore, this price is primarily based on the perspective of participating firms' management instead of their shareholders.

Under the assumption of clean surplus accounting, Feltham and Ohlson (1995) present a price valuation model in which the market value of equity is equal to the sum of the book value of shareholders' equity and the present value of expected future abnormal earnings. Feltham and Ohlson argue that the present value of expected future abnormal earnings is a function of current abnormal earnings, the current book value of operating assets, and other relevant information. Amir et al. (1997) extend the Feltham and Ohlson model in order to examine the value relevance of deferred taxes by adding net deferred taxes to the model. Consistent with these studies, the current paper relates the market value of equity (P) to net deferred taxes (DT), net operating assets (OA), net financial assets (FA), and current abnormal earnings (AE).

$$P = \alpha_0 + \alpha_1 DT + \alpha_2 OA + \alpha_3 FA + \alpha_4 AE + \omega \quad (1)$$

In M&A, it is common for an acquirer to pay a target firm acquisition premiums, which is the portion of the payment over the premerger market value of the target's equity. That is, acquisition price (AP) equals the premerger market value of equity plus acquisition premiums (PREM). Substituting the market value of equity from equation (1), acquisition price can be written as follows:

$$AP = \alpha_0 + \alpha_1 DT + \alpha_2 OA + \alpha_3 FA + \alpha_4 AE + \alpha_5 PREM + \gamma \quad (2)$$

Determinants of merger premiums have been empirically assessed. Specifically, Ayers et al. (2003) find that acquisition premiums are associated with transactional factors such as taxability of acquisition (TRAN), the bidder's pre-announcement ownership in the target (BOWN), management hostility (HOST), competing bids (CB), and tender offers (TEN), as well as the target firm's characteristics, such as leverage (LEV), return on market value of equity (ROE), and ratio of book value of equity to

market value of equity (BKMV).[21] Furthermore, because target firms' NOL and tax credit carryforwards cannot be transferred to acquirers under Type B, divisive Type D, and Type E reorganizations, an indicator variable BDE is included in the model to control this factor. Therefore, equation (2) can be extended as follows:

$$AP = \alpha_0 + \alpha_1 DT + \alpha_2 OA + \alpha_3 FA + \alpha_4 AE + \alpha_5 TRAN + \alpha_6 BDE + \alpha_7 BOWN + \alpha_8 HOST + \alpha_9 CB + \alpha_{10} TEN + \alpha_{11} LEV + \alpha_{12} ROE + \alpha_{13} BKMV + \sigma \quad (3)$$

Indicator variables for target firm industry and year of acquisition are added to the model to control the possibility that acquisition prices may vary among industries and over time.

Firms in different industries may face diversities in fundamental economic factors such as maturity, technological change, capital expenditures, and innovation intensity. To control these economic fundamentals, sample firms are usually grouped by industry. The underlying assumption is that the market evaluates firms in a given industry in a similar manner (Landry, 1998). In non-M&A, the prior research on whether the industry effect exists shows mixed results. That is, Amir et al. (1997) divide sample firms into six industrial groups but do not find differences among these groups. However, Landry (1998) reveals that the value relevance of deferred taxes is different among drug, automotive, and computer industries. In the M&A context, Ayers et al. (2003) find that target firms in SIC 1000 (metal and mining), SIC 2000 (food, textile, and chemicals), and SIC 4000 (transportation and utilities) received significantly lower acquisition premiums than firms in other SIC segments.

[21] Target's NOL carryforwards are significant in Ayers et al. (2003). Since research question 3 mainly focuses on this variable, it is not included in the base model.

Following the sample grouping in Ayers et al. (2003), the present study assigns firms with the same one-digit SIC into groups and incorporates indicator variables SIC_i in the model. Also, indicator variables $YEAR_j$ represent the year when the acquisition is announced. A two-way fixed effect model is used to control the industry and year effects.

$$AP = \beta_0 + \beta_1 DT + \beta_2 OA + \beta_3 FA + \beta_4 AE + \beta_5 TRAN + \beta_6 BDE + \beta_7 BOWN + \beta_8 HOST + \beta_9 CB + \beta_{10} TEN + \beta_{11} LEV + \beta_{12} ROE + \beta_{13} BKMV + \Sigma\beta_{14i} SIC_i + \Sigma\beta_{15j} YEAR_j + \varepsilon \quad (4)$$

Equation (4) serves as a base model in the present study. Additional independent variables are incorporated to test the research hypotheses. For detailed variable definitions, see Table 3.1. Further discussions of the variables are provided later in this chapter.

Table 3.1 Variable Definitions

Variable	Definition
	Dependent Variable
AP	Acquisition price represents the implied value of a transaction calculated by multiplying the number of common shares outstanding by the offering price, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date.
	Independent Variables
DT	Net deferred taxes, which are the net amount of target's deferred tax assets minus deferred tax liability, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date.
OA	Net operating assets of the target, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date.
FA	Net financial assets of the target, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date.
AE	Current abnormal earnings, which are the current earnings in the year before the announcement year minus expected normal earnings (net operating assets at the beginning of the year before the announcement year times cost of capital), deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date. Proxies for cost of capital are obtained from Ibbotson (2008).
TRAN	Taxability of acquisition: an indicator variable which equals one for a non-taxable acquisition, otherwise zero.
BDE	Indicator variable which equals one if the acquisition is classified as Type B, divisive Type D, or Type E reorganization, otherwise zero.
BOWN	A continuous variable, which is ranged between 0 and 1, represents the percentage of target's common stock owned by the acquirer prior to the announcement date.
HOST	Management hostility: an indicator variable, which equals one if the target's management opposed the acquisition, otherwise zero.
CB	Competing bids: an indicator variable, which equals one if a competing bidder existed, otherwise zero.
TEN	Tender offer: an indicator variable, which equals one if the acquisition was initiated with a tender offer, otherwise zero.
LEV	Target's leverage, which is the ratio of long-term debt to the target's market value 4 weeks prior to the announcement date.
ROE	Return on market value of equity, which is the ratio of the target's net income before extraordinary items to the target's market value 4 weeks prior to the announcement date.

Table 3.1 Variable Definitions (Continued)

Variable	Definition
	Independent Variables
BKMV	Ratio of target's book value of equity to market value of equity, which is the target's book value of equity in the last annual report prior to the announcement date, divided by the target's market value 4 weeks prior to the announcement date.
GDTA	Gross deferred tax assets, which are the target's deferred tax assets before being reduced by the valuation allowance, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date.
NDTA	Net deferred tax assets, which are the target's deferred tax assets netted after the valuation allowance, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date.
DTL	Deferred tax liabilities of the target, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date.
VA	Valuation allowance of the target, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date.
NOL	Deferred tax assets from the target's NOL carryforwards, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date.
OLC	Deferred tax assets from the target's other loss carryforwards, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date.
TCC	Deferred tax assets from the target's tax credit carryforwards, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date.
AODTA	All other deferred tax assets of the target, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date.
SIC_i	Target firm's one-digit SIC classifications: indicator variables.
$YEAR_j$	Indicator variable which is equal to one when the acquisition announcement is in year j, otherwise zero. j = 1998, 1999, ...2006.

Research Question 1

Deferred taxes are recorded as assets and/or liabilities on the balance sheet. Past research has shown that investors may treat deferred tax assets (liabilities) and adjust them in several ways: 1) as real assets (liabilities), 2) deduct (add) deferred tax assets (liabilities) from (to) equity, or 3) simply ignore them (Landry, 1998). Prior research indicates that in general the market views deferred assets (liabilities) as real assets (liabilities) in non-M&A settings. Consequently, it is expected that participating firms will consider the targets' deferred assets (liabilities) in setting acquisition prices.

A tax variable included in the base model is net deferred taxes (DT) which represents an aggregated number of deferred tax assets (netted after valuation allowance) and deferred tax liabilities. However, aggregated information can lose some of its original contents. Accordingly, net deferred taxes are decomposed into deferred tax assets netted after valuation allowance (NDTA) and deferred tax liabilities (DTL).

Numeric examples in Table 3.2 show the underlying mechanism between the acquisition price and target firms' deferred tax assets (liabilities).[22] In non-taxable acquisitions, a target firm with deferred tax assets (Scenario B1) provides more net present value to the acquirer than a target firm without deferred tax assets/liabilities (Scenario A1). In contrast, a target firm with deferred tax liabilities (Scenario C1) provides less net present value to the acquirer that a target firm without deferred tax assets/liabilities (Scenario A1). Furthermore, in the taxable acquisitions A2, B2, and C2, the net present values provided by the target firm to the acquirer are the same in the three scenarios. However, the target firm with deferred tax assets (Scenario B2) and the target

[22] For detailed information regarding these numeric examples, see Appendix.

firm with deferred tax liabilities (Scenario C2) receive the highest and lowest net amounts from the acquirers, respectively. Therefore, in a non-taxable acquisition, acquiring firms should be willing to pay higher acquisition prices for target firms with deferred tax assets, but lower acquisition prices for target firms with deferred tax liabilities. To examine the relationship between taxability of acquisition and deferred tax assets/liabilities, interactions NDTA*TRAN and DTL*TRAN are included in the model. Therefore, the model used to test hypothesis one is as follows.

$$AP = \beta_0 + \lambda_1 NDTA + \lambda_2 NDTA*TRAN + \lambda_3 DTL + \lambda_4 DTL*TRAN + \beta_2 OA + \beta_3 FA + \beta_4 AE + \beta_5 TRAN + \beta_6 BDE + \beta_7 BOWN + \beta_8 HOST + \beta_9 CB + \beta_{10} TEN + \beta_{11} LEV + \beta_{12} ROE + \beta_{13} BKMV + \Sigma\beta_{14i} SIC_i + \Sigma\beta_{15j} YEAR_j + \xi \quad (5)$$

Table 3.2 Mechanism between the Acquisition Price and Target's Deferred Taxes

The potential target firms have the following basic financial information.

	Market Value of Assets†	Book Value of Assets	Tax Basis of Assets	Deferred Tax Assets‡	Deferred Tax Liabilities‡
Target A	211,336	100,000	100,000		
Target B	211,336	100,000	100,000	20,000	
Target C	211,336	100,000	50,000		17,500

† *Effects of deferred taxes are not included.*

‡ *Deferred tax assets and liabilities are not included in the book value of assets.*

For the following scenarios, assume discount rate = 10%, corporate income tax rate = 35%, and capital gains tax Rate = 20%. Target firms A, B, and C are predicted to have net pretax cash flows of $75,000 for the next five years and assume their residual values are zero. Assume target firms' assets are fully depreciated by the acquirers in five years with a straight-line method.

	Target with No DT		Target with DTA		Target with DTL	
	Non-Taxable	Taxable	Non-Taxable	Taxable	Non-Taxable	Taxable
Scenario	A1	A2	B1	B2	C1	C2
Net present value to the acquirer	211,336	240,880	226,500	240,880	198,069	240,880
Amount paid to the target	211,336	211,336	211,336	211,336	211,336	211,336
Net amount received by the target	211,336	189,069	211,336	209,069	211,336	179,069

Note: For detailed information regarding these numeric examples, see Appendix.

Because of the expectation that acquirers cannot utilize a target firms' deferred tax assets (liabilities) in taxable acquisitions, the coefficients of NDTA and DTL (i.e., λ_1 and λ_3) are expected to be zero. Since acquirers are willing to pay higher (lower) acquisition prices for target firms with deferred tax assets (liabilities) in a non-taxable acquisition, λ_2 (λ_4) is expected to be positive (negative).[23]

Research Question 2

SFAS No. 109 requires that a valuation allowance be recognized for deferred tax assets if there is a likelihood of more than 50 percent that some, or all, of the deferred tax assets will not be realized. Therefore, a valuation allowance may represent managers' perspectives on the expectation of future profitability (Bauman and Das, 2004). In non-M&A, Amir et al. (1997) and Ayers (1998) indicate that valuation allowances are negatively associated with firm value. Also, Amir et al. (1997) argue that the coefficients on the valuation allowances should be interpreted together with the coefficient on tax carryforwards. Nevertheless, they find it difficult to interpret the coefficients on the valuation allowances because the market does not assign a value to the tax carryforwards.

Consistent with prior research in non-M&A, this study creates gross deferred tax assets (GDTA) by adding valuation allowances (VA) back to deferred tax assets netted after valuation allowances. Similar to Model 5, interactions GDTA*TRAN and VA*TRAN are incorporated. Consequently, the following model is employed to test hypothesis two:

[23] All deferred tax assets and liabilities are coded as positive numbers.

$$AP = \beta_0 + \varphi_1 GDTA + \varphi_2 GDTA*TRAN + \varphi_3 VA + \varphi_4 VA*TRAN$$
$$+ \lambda_3 DTL + \lambda_4 DTL*TRAN + \beta_2 OA + \beta_3 FA + \beta_4 AE$$
$$+ \beta_5 TRAN + \beta_6 BDE + \beta_7 BOWN + \beta_8 HOST + \beta_9 CB + \beta_{10} TEN$$
$$+ \beta_{11} LEV + \beta_{12} ROE + \beta_{13} BKMV + \Sigma\beta_{14i} SIC_i + \Sigma\beta_{15j} YEAR_j + \eta \quad (6)$$

Since acquirers succeed target firms' tax attributes only in non-taxable acquisitions, φ_4 is expected to be negative but φ_2 is positive. Conversely, in taxable acquisitions, acquirers cannot utilize target firms' tax attributes. Therefore, the coefficients on valuation allowance (i.e., φ_3) and gross deferred tax assets (i.e., φ_1) are expected to be zero.

Research Question 3

Prior research shows mixed results on whether the market assigns a value to a firm's NOL and tax credit carryforwards. In non-M&A, Givoly and Hayn (1991) indicate that stock price is related to a firm's NOL and tax credit carryforwards, but Ayers (1998) provides evidence that loss and tax carryforwards are not priced by the market. Zeng (2003) suggests that NOL carryforwards, but not investment tax credit carryforwards, increase firm market value. In the M&A context, Moore and Pruitt (1987) find there is a positive relationship between a firm's NOL carryforwards and stock price. Also, Ayers et al. (2003) show acquisition premiums are associated with a target firm's NOL carryforwards. However, Moore and Pruitt (1987) do not confirm a significant association.

In accordance with prior research, the present study decomposes gross deferred tax assets into several components: NOL carryforwards (NOL), other loss carryforwards (OLC), tax credit carryforwards (TCC), and all other deferred tax assets (AODTA). Also,

interactions NOL*TRAN, OLC*TRAN, TCC*TRAN, and AODTA*TRAN are incorporated in the model. Accordingly, the model used to test the third hypothesis is as follows.

$$\begin{aligned} AP = {} & \beta_0 + \rho_1 NOL + \rho_2 NOL*TRAN + \rho_3 OLC + \rho_4 OLC*TRAN \\ & + \rho_5 TCC + \rho_6 TCC*TRAN + \rho_7 AODTA + \rho_8 AODTA*TRAN \\ & + \varphi_3 VA + \varphi_4 VA*TRAN + \lambda_3 DTL + \lambda_4 DTL*TRAN + \beta_2 OA \\ & + \beta_3 FA + \beta_4 AE + \beta_5 TRAN + \beta_6 BDE + \beta_7 BOWN + \beta_8 HOST \\ & + \beta_9 CB + \beta_{10} TEN + \beta_{11} LEV + \beta_{12} ROE + \beta_{13} BKMV + \\ & + \Sigma\beta_{14i} SIC_i + \Sigma\beta_{15j} YEAR_j + \delta \end{aligned} \quad (7)$$

The current study focuses on whether these tax carryforwards can provide tax benefits to the acquiring firms such that the acquirers are willing to pay for these carryforwards. Since target firms' tax attributes may provide potential tax benefits to acquirers only in non-taxable acquisitions, the coefficients of ρ_2, ρ_4, ρ_6, and ρ_8 are expected to be positive. Conversely, since acquirers cannot succeed target firms' tax attributes in taxable acquisitions, ρ_1, ρ_3, ρ_5, and ρ_7 are expected to be zero. For a summary of expected signs of coefficients and variables included in models, see Table 3.3.

Table 3.3 Expected Signs of Coefficients

Variable	Coefficient	Expected Sign	Variable included in			
			Base Model	Model 5	Model 6	Model 7
Intercept	β_0	?	✓	✓	✓	✓
DT	β_1	+	✓			
OA	β_2	+	✓	✓	✓	✓
FA	β_3	+	✓	✓	✓	✓
AE	β_4	+	✓	✓	✓	✓
TRAN	β_5	?	✓	✓	✓	✓
BDE	β_6	–	✓	✓	✓	✓
BOWN	B_7	–	✓	✓	✓	✓
HOST	B_8	+	✓	✓	✓	✓
CB	B_9	+	✓	✓	✓	✓
TEN	B_{10}	+	✓	✓	✓	✓
LEV	β_{11}	?	✓	✓	✓	✓
ROE	β_{12}	?	✓	✓	✓	✓
BKMV	β_{13}	?	✓	✓	✓	✓
SIC*i*	β_{14i}	?	✓	✓	✓	✓
YEAR*j*	β_{15j}	?	✓	✓	✓	✓
NDTA	λ_1	NA‡		✓		
NDTA*TRAN	λ_2	+		✓		
DTL	λ_3	NA‡		✓	✓	✓
DTL*TRAN	λ_4	–		✓	✓	✓
GDTA	φ_1	NA‡			✓	
GDTA*TRAN	φ_2	+			✓	
VA	φ_3	NA‡			✓	✓
VA*TRAN	φ_4	–			✓	✓
NOL	ρ_1	NA‡				✓
NOL*TRAN	ρ_2	+				✓
OLC	ρ_3	NA‡				✓
OLC*TRAN	ρ_4	+				✓
TCC	ρ_5	NA‡				✓
TCC*TRAN	ρ_6	+				✓
AODTA	ρ_7	NA‡				✓
AODTA*TRAN	ρ_8	+				✓

NA‡: The coefficient is expected to be zero.

Research Sample

Sample Selection

The frame of the research sample consists of firms listed in the Securities Data Corporation's M&A database (the SDC database) and acquired during 1997-2006. Variable STATC in the SDC database for these firms must show "Completed" and the targets are wholly owned by the acquiring firms after the acquisitions (PCTOWN="100"). These firms should also meet all of the following requirements in order to be included in the final sample. First, before acquisition, the firms were listed on the New York or American Stock Exchanges. Second, firms were not classified as financial institutions (one-digit SIC code 6) or electric utilities (two-digit SIC code 49).[24] Third, firms should have desired financial data (e.g., LEV, ROE, and BKMV). Finally, firms' last annual financial statements prior to the announcement date shown in the Edgar online database disclose needed deferred tax information.

Variables

This section includes detailed discussions of the key variables used in this study. The continuous dollar variables are all deflated by the number of the target's common stock outstanding in the last annual report prior to the announcement date in order to reduce the heteroskedasticity effect.

Acquisition Price. Acquisition price represents the total value of consideration paid to target shareholders. The variable VALIMP (the implied value of a transaction) in the SDC database is used as this variable. This price is calculated by multiplying the number of common shares outstanding by the offering price.

[24] This requirement is identical to Amir et al. (1997).

Transactional Variables. TRAN is an indicator variable that equals one if the acquisition is non-taxable and zero otherwise. Information about TRAN can be obtained from the **Commerce Clearing House ("CCH") Capital Changes Reporter** that covers federal taxation consequences of corporate capital changes resulting from stock dividends, stock splits, reorganizations, exchanges, rights, and other changes in capital structure.

Variable BDE is an indicator variable that equals one if the acquisition is classified as Type B, divisive Type D, or Type E reorganization and zero otherwise. Variables CONSID_STRUCTURE, SPIN, SPLIT, and RECAP in the SDC database are used to decide the value of BDE. That is, if CONSID_STRUCTURE equals "Stock only" or SPIN, SPLIT, or RECAP equal "Yes," BDE is equal to one, otherwise zero.

Transactional variable BOWN is continuous, but HOST, CB, and TEN are indicator variables. Information needed for these variables are derived from the SDC database. Specifically, PCTACQ (percentage of shares acquired), ATTC (attitude code of the transaction), CHA (challenging bid flag), and TEND (tender offer flag) in the SDC database are respectively used for the transactional variables. PCTACQ represents the percentage of shares acquired in the transaction. Accordingly, BOWN equals to 100 minus PCTACQ. If ATTC equals "Hostile," HOST is equal to one and zero otherwise. When CHA is greater than "1," CB equals one and zero, otherwise. When TEND equals "Yes," TEN is equal to one and zero, otherwise.

Target's Financial Variables. Variables related to a target's financial status, OA, FA, AE, LEV, ROE, and BKMV, are taken from the target's last annual report before the announcement date. The calculations for OA, FA, and AE follow Amir et al.

(1997). That is, net operating assets are figured as book value of shareholders' equity minus net deferred taxes (i.e., net deferred tax assets minus deferred tax liabilities) and net financial assets. Net financial assets are computed as cash and cash equivalents plus short-term investments, minus long-term debt, current portion of long-term debt, and preferred stock. All assets and liabilities are coded as positive so that the coefficients of independent variables present the associated direction with acquisition price. Current earnings are calculated as income before extraordinary items plus tax-adjusted interest expense minus tax-adjusted other nonoperating income. All tax-adjusted items are calculated by using the original amounts multiplied by one minus the maximum federal corporate income tax rate effective in the year prior to the announcement year.[25] Therefore, current abnormal earnings are computed as current earnings minus expected normal earnings (net operating assets at the beginning of the year before the announcement year times cost of capital). Similar to prior research (e.g., Givoly and Hayn, 1991; Landry, 1998; Amir and Sougiannis, 1999), proxies for the cost of capital are obtained from the Ibbotson Yearbook. The current study uses Ibbotson (2008, p. 44).

Deferred Tax Variables. Data for deferred tax variables (i.e., DT, GDTA, NDTA, DTL, VA, NOL, OLC, TCC, and AODTA) are collected from the target's last annual report prior to the announcement date. FISCAL in the SDC database is used to identify the date of last fiscal year end prior to the announcement date. All of the values of these deferred tax variables are recorded positively in the current study such that the corresponding coefficients in the models can easily indicate the directions between the acquisition price and these variables. Notwithstanding that VA is a contra account of

[25] The maximum federal corporate income tax rate between 1997 and 2006 persisted at 35 percent. Therefore, the multiplier of the tax-adjusted items is 0.65 for all observations.

GDTA, the amount of VA is recorded as a positive number. Likewise, the dollar amount of the liability in DTL is recorded as a positive number such that the expected correlation with prices is negative.

NOL, OLC, TCC, and AODTA are proxies as tax benefits of the carryforwards to the acquirer at the announcement date. These variables are disclosed in tax footnotes as future tax savings (SFAS No. 109, par 43).

SIC_i. Based on one-digit SIC code, sample firms are grouped by industry. Targets' SIC codes are obtained from Research Insight. See Table 3.4 for detailed grouping information.

Table 3.4 Industrial Groups and Indicator Variables

One-Digit SIC Code	Industry	Indicator Variable
SIC 0000	Agriculture, forestry, and fishing	
SIC 1000	Metal and mining	
SIC 2000	Food, textile, and chemicals	SIC_1
SIC 3000	Rubber, metal, and machines	SIC_2
SIC 4000	Transportation	SIC_3
SIC 5000	Wholesale and retail trade	SIC_4
SIC 7000	Hotel and other services	SIC_5
SIC 8000	Health and engineering services	SIC_6

Summary

Price valuation models have been applied to examine the value relevance of deferred taxes in non-M&A. In contrast, event study methodology is dominant in M&A. However, price valuation models can provide two advantages to the value relevance of deferred taxes research in the M&A context. First, price valuation models can avoid the drawback of the anticipation effect. Second, the models can reveal participating firms'

viewpoints, rather than the market's, on the price of a target's deferred taxes. Accordingly, price valuation models are used in this study.

Chapter 1 addresses four research questions and this chapter develops the models by which these questions are investigated. Specifically, the procedure to identify the research sample, definitions of variables, and appropriate statistical techniques are discussed. Results of this empirical inquiry are presented in Chapter 4.

CHAPTER 4

ANALYSIS OF RESULTS

Previous chapters contain: (1) a discussion of the important role of deferred taxes in M&A settings, (2) a selected literature review related to the valuation of deferred tax assets/liabilities, and (3) development of the methodology used in this study. The purpose of this chapter is to present the results of the data analysis and tests of the hypotheses. Descriptive statistics are shown first, followed by an analysis of each hypothesis presented in Chapter 3.

Summary of Input Data

Research Insight holds 2,506 inactive firms listed on the New York or American Stock Exchanges during 1997-2006. However, only 829 companies comply with the status and ownership criteria. After deleting firms without needed data, the final sample consists of 690 observations. See Table 4.1 for the sampling scheme. The number of firms over the time period covered by this study are presented in Figure 4.1. The year 2000 contains the largest sample, 121 firms, but during the years following the internet bubble burst the numbers dropped dramatically. Figure 4.2 shows the number of firms classified by one digit SIC code. The one digit SIC code of 3 (i.e., rubber, metal, and machine industries) provides the largest number of firms, 209, while only two firms are from the one digit SIC code of 0 (i.e., agriculture, forestry, and fishing industries). Due to

the small number of observations from the one digit SIC code of 0, these two firms are included in the SIC1000 group for SIC dummy variable purposes.[26]

Table 4.1 Sampling Scheme

	Number of Firms Deleted	Number of Firms
Research Insight inactive firms listed on the NYSE/ASE during 1997-2006		2,506
No matching firms in SDC database under the status and ownership criteria	1,677	
Firms identified via Research Insight and SDC databases		829
Repeated records	4	
No matched firms in EDGAR	8	
No electronic files in EDGAR	45	
Partnership	11	
Limited Liability Companies	2	
Missing tax information in financial statements	3	
Missing data on variable VALIMP in SDC	39	
Missing data on variable MV in SDC	8	
Missing financial data in Research Insight	15	
Missing CCH capital changes data	4	
Final Sample		690

[26] When these two observations are deleted, the results remain unchanged.

Figure 4.1 Numbers of Firms by Year

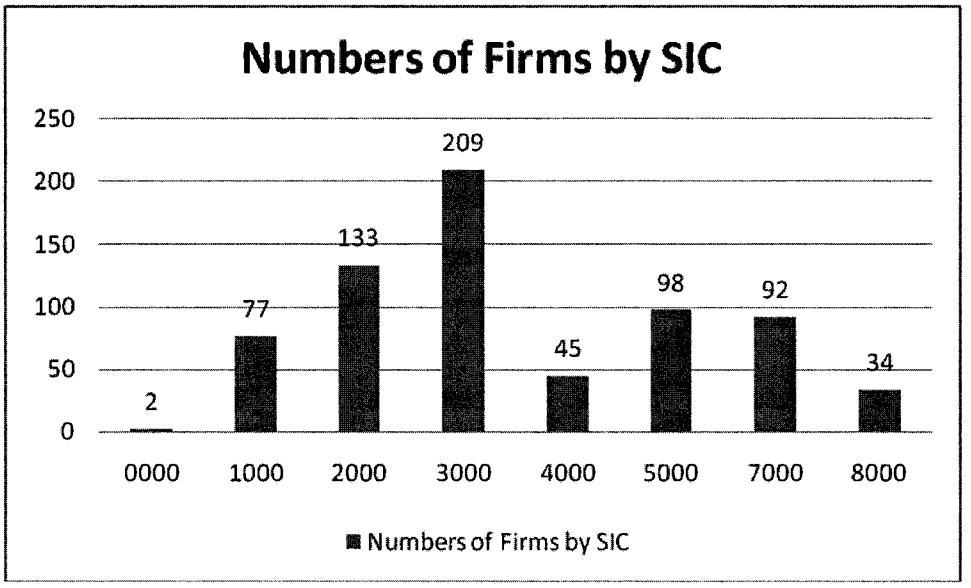

Figure 4.2 Numbers of Firms by SIC

Table 4.2 shows the frequencies of indicator variables in this study. Two hundred fifty four transactions (36.8 percent) are non-taxable. One hundred thirty two acquisitions (19.1 percent) are classified as Type B, divisive Type D, or Type E transactions. Only seventeen (2.5 percent) target firms' management is hostile against the acquisition, but

most of the transactions (93.3 percent) do not have multiple bidders. Finally, two hundred twenty seven acquirers (32.9 percent) provide tender offer to the targets.

Table 4.2 Frequencies of Indicator Variables

Variable	Where the indicator variable is	
	0	1
TRAN	436 (63.2%)	254 (36.8%)
BDE	558 (80.9%)	132 (19.1%)
HOST	673 (97.5%)	17 (2.5%)
CB	644 (93.3%)	46 (6.7%)
TEN	463 (67.1%)	227 (32.9%)

TRAN: 0 Taxable transaction; 1 Non-Taxable transaction.
BDE: 0 Non-Type B, divisive Type D, or Type E transaction; 1 Type B, divisive Type D, or Type E transaction.
HOST: 0 Management-friendly transaction; 1 Management-hostile transaction.
CB: 0 Single bidder; 1 Multiple bidders.
TEN: 0 Non-tender offer; 1 Tender offer.

Panel A in Table 4.3 presents the descriptive statistics of financial variables. AP, OA, FA, and AE are stated in dollars per share. The average (median) acquisition price is $32.56 ($27.32). The mean (median) net operating assets of the target is $16.45 ($12.88), while the mean (median) net financial assets of the target is -$6.15 (-$4.16). The negative sign of FA indicates that most of the target firms have debt in excess of cash, cash equivalent, and short-term investments. The mean (median) current abnormal earnings is -$1.38 (-$0.83), indicating that most of the target firms have lower current earnings than expected. The target's mean (median) leverage is $0.63 ($0.26) and return on market value of equity is close to zero (mean (median) = -$0.03 ($0.05)). However, the negative mean of ROE shows that its distribution is skewed to the left. These numbers indicate that the target firms do not make large profits, in general. Finally, the median market value of equity (MV) is around twice that of the book value of equity (BK).

Table 4.3 Descriptive Statistics of Financial Variables

Variable	Minim.	Maxim.	Mean	Median	Std.Err.	1st Qrt	3rd Qrt
Panel A: Overall Sample							
AP	0.10	165.00	32.56	27.32	25.81	12.79	45.08
OA	-37.34	239.17	16.45	12.88	17.30	6.40	22.60
FA	-200.18	113.52	-6.15	-4.16	14.27	-9.62	-0.08
AE	-47.58	8.16	-1.38	-0.83	3.35	-2.05	0.09
LEV	0	32.16	0.63	0.26	1.77	0.06	0.64
ROE	-13.76	1.19	-0.03	0.05	0.77	0.01	0.08
BKMV	-27.03	13.42	0.59	0.51	1.35	0.28	0.80
BK	-16.55	76.16	10.03	8.37	8.75	4.23	13.42
MV	0.10	150.00	22.14	17.97	17.96	8.52	30.74
Panel B: Taxable Acquisitions							
AP	0.10	145.66	28.84	23.43	22.91	11.47	40.61
OA	-14.89	239.17	16.31	12.62	18.40	6.25	22.02
FA	-200.18	32.67	-6.24	-4.01	14.61	-9.33	0.13
AE	-18.97	5.25	-1.36	-0.92	2.62	-2.22	0.02
LEV	0	32.16	0.77	0.28	2.18	0.07	0.80
ROE	-13.76	1.19	-0.06	0.05	0.95	0.01	0.08
BKMV	-27.03	13.42	0.65	0.56	1.67	0.32	0.90
BK	-16.55	50.96	9.92	8.25	8.87	4.00	13.70
MV	0.10	84.00	19.04	15.08	15.71	6.96	27.96
Panel C: Non-Taxable Acquisitions							
AP	0.29	165.00	38.94	32.72	29.09	18.17	51.77
OA	-37.34	99.37	16.68	14.00	15.27	6.85	23.42
FA	-84.25	113.52	-5.99	-4.37	13.70	-10.35	-0.69
AE	-47.58	8.16	-1.43	-0.61	4.33	-1.73	0.28
LEV	0	3.11	0.39	0.24	0.50	0.06	0.51
ROE	-3.17	0.49	0.00	0.04	0.26	0.01	0.07
BKMV	-1.50	2.44	0.49	0.39	0.43	0.24	0.60
BK	-7.52	76.16	10.21	8.66	8.55	5.03	12.81
MV	0.36	150.00	27.45	24.11	20.21	13.21	35.04

Panel D: Mean Difference between Taxable and Non-Taxable Acquisitions

	AP	OA	FA	AE	LEV	ROE	BKMV	BK	MV
Difference†	-10.10	-0.37	-0.24	0.07	0.38	-0.06	0.17	-0.28	-8.41
t-statistic	-5.04	-0.27	-0.21	0.25	2.71	-0.97	1.58	-0.41	-6.09
p-value	**<.0001**	0.7845	0.8303	0.8006	**0.0068**	0.3335	0.1137	0.6817	**<.0001**

†*Difference = Mean of taxable acquisitions – mean of non-taxable acquisitions.*

Notes:

Sample consists of 690 firms listed on New York or American Stock Exchanges and acquired during1997-2006.

Acquisition price (AP) represents the implied value of a transaction calculated by multiplying the number of common shares outstanding by the offering price, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date. OA represents the net operating assets of the target, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date. Net operating assets are figured as book value of shareholders' equity plus net deferred tax liabilities minus net financial assets. FA represents the net financial assets of the target, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date. Net financial assets are computed as cash and cash equivalents plus short-term investments, minus long-term debt, current portion of long-term debt, and preferred stock. Current abnormal earnings (AE), which are the current earnings in the year before the announcement year minus expected normal earnings (net operating assets at the beginning of the year before the announcement year times cost of capital), deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date. Current earnings are calculated as income before extraordinary items plus tax-adjusted interest expense minus tax-adjusted other nonoperating income. Target's leverage (LEV) is the ratio of long-term debt to the target's market value 4 weeks prior to the announcement date. Return on market value of equity (ROE) is the ratio of the target's net income before extraordinary items to the target's market value 4 weeks prior to the announcement date. Ratio of target's book value of equity to market value of equity (BKMV) is the target's book value of equity in the last annual report prior to the announcement date, divided by the target's market value 4 weeks prior to the announcement date. BK is the target's book value of equity in the last annual report prior to the announcement date. MV is the target's market value 4 weeks prior to the announcement date.

Panels B and C in Table 4.3 present the descriptive statistics of the financial variables in taxable and non-taxable acquisitions, respectively. In non-taxable transactions, target firms receive a mean acquisition price of $38.94, which is $10.10 (35 percent) higher than the amount received by the targets in taxable transactions. Target firms are paid a mean acquisition premium of $11.49 in non-taxable acquisitions, while the mean acquisition premium is only $9.80 in taxable acquisitions. However, in terms of percentage, target firms receive a mean acquisition premium equal to 51.47 percent of their market value of equity in taxable acquisitions, whereas the mean acquisition premium is 41.85 percent of the targets' market value of equity in non-taxable acquisitions.[27]

Panel D in Table 4.3 shows the mean difference of the financial variables between taxable and non-taxable acquisitions. Target firms acquired in non-taxable transactions have significantly higher market value and receive higher acquisition price than target firms acquired in taxable transactions. However, target firms acquired in taxable transactions have significantly higher leverage than target firms acquired in non-taxable transactions.

The descriptive statistics of deferred tax-related variables such as DT, NDTA, DTL, GDTA, VA, NOL, OLC, TCC, and AODTA are presented in Table 4.4. All numbers are stated in dollars per share. The average deferred tax is -$0.27, indicating that target firms have more net deferred tax liabilities than net deferred tax assets. This

[27] This result is contradicted to the expectation that target firms should receive higher acquisition premiums in non-taxable acquisitions. However, two reasons may explain this contradiction. First, target's mean deferred taxes are negative, indicating that target's deferred tax liabilities exceed deferred tax assets. Also, Table 4.4 shows targets in non-taxable acquisitions have more deferred tax liabilities than targets in taxable acquisitions. Net deferred tax liabilities decrease the value of the target. Second, the negotiation effect as discussed later may give target firms higher acquisition premiums in taxable acquisitions, which in general is the type of transactions the acquirers in this study prefer.

interpretation is confirmed by the fact that net deferred tax assets have a mean of $1.36 while net deferred tax liabilities are $1.63 on average. However, the average gross deferred tax assets are $1.90, which is $0.27 larger than the average net deferred tax liabilities. The reduction of deferred tax assets is caused by the valuation allowance that has an average of $0.54. Deferred tax assets from NOL carryforwards have a mean of $0.56 which is only $0.02 larger than the average valuation allowance. Average deferred tax assets from other loss carryforwards and tax credit carryforwards are $0.04 and $0.11, respectively. Compared with these two items, deferred tax assets from all other areas have a much larger mean of $1.18. Deferred tax assets from all others consists of the largest share (62.1 percent) of gross deferred tax assets and deferred tax assets from NOL carryforwards have the second largest portion (29.5 percent).

Panel D in Table 4.4 presents the mean differences of the tax related variables between taxable and non-taxable acquisitions. None of the mean differences are significant at the 0.05 level. That is, target firms acquired in taxable acquisitions have the means of these tax related variables similar to that of the target firms acquired in non-taxable acquisitions.

Table 4.5 presents the major items aggregated in deferred taxes. Most of the items are combined into deferred tax liabilities (DTL) and deferred tax assets from all others (AODTA). Several items (e.g., depreciation, pension benefits, and state taxes) have dual characteristics, i.e., depending on the circumstances, they can be included in DTL or AODTA.[28] However, some components (e.g., oil and gas properties, installment sales, and prepaid expenses) are only included in DTL and others (e.g., environmental reserves, warranty reserves, and contingent litigation payment) are only included in AODTA.

[28] For example, SFAS No. 158 (FASB, 2006b) requires companies to recognize on their balance sheet the full overfunded or underfunded status of their defined benefit pension plan. The overfunded or underfunded status is measured as the difference between the fair value of the plan assets and the projected benefit obligation. Companies should account for pension costs on the accrual basis (Kieso et al., 2007, p. 1025). On the other hand, an employer's contributions to a qualified pension plan are generally deductible, but the amount that qualifies for the deduction is limited. Under Code Section 404(o)(2), the maximum deductible amount is limited to the excess of the sum of the funding target for the plan year, the target normal cost for the plan year, and the cushion amount for the plan year, over the value (determined under Section 430(g)(2)) of the assets of the plan which are held by the plan as of the valuation date for the plan year. Furthermore, under Section 404(o)(3)(A), the cushion amount is the sum of 50 percent of the funding target for the plan year and the amount by which the funding target for the plan year would increase. Since the accrued pension expense may not equal to the amount actually contributed by the company, the contributed amount could be greater or less than the accrued expense. When the contributed amount is greater (less) than the accrued pension expense, deferred tax liabilities (assets) may be recognized.

Table 4.4 Descriptive Statistics of Deferred Tax-Related Variables

Variable	Minim.	Maxim.	Mean	Median	Std.Err.	1st Qrt	3rd Qrt
Panel A: Overall Sample							
DT	-29.46	11.22	-0.27	0	2.26	-0.65	0.43
NDTA	0	18.71	1.36	0.73	1.92	0.30	1.54
DTL	-33.16	0	-1.63	-0.73	2.66	-1.77	-0.23
GDTA	0	33.21	1.90	1.02	2.92	0.46	2.14
VA	-33.21	0	-0.54	-0.02	2.03	-0.31	0
NOL	0	30.00	0.56	0.05	1.73	0	0.47
OLC	0	2.89	0.04	0	0.21	0	0
TCC	0	3.59	0.11	0	0.35	0	0.07
AODTA	0	11.45	1.18	0.63	1.68	0.25	1.32
Panel B: Taxable Acquisitions							
DT	-29.46	11.22	-0.15	0	2.34	-0.56	0.45
NDTA	0	18.71	1.34	0.73	1.97	0.29	1.41
DTL	-33.16	0	-1.49	-0.68	2.64	-1.69	-0.23
GDTA	0	33.22	1.92	0.96	3.22	0.44	2.05
VA	-33.22	0	-0.58	-0.02	2.33	-0.31	0
NOL	0	30.00	0.60	0.05	2.05	0	0.47
OLC	0	2.89	0.04	0	0.22	0	0
TCC	0	2.81	0.11	0	0.30	0	0.06
AODTA	0	11.45	1.18	0.63	1.68	0.25	1.29
Panel C: Non-Taxable Acquisitions							
DT	-11.61	5.95	-0.48	-0.02	2.10	-0.79	0.40
NDTA	0	10.73	1.38	0.73	1.85	0.30	1.65
DTL	-15.53	0	-1.87	-0.80	2.67	-2.19	-0.22
GDTA	0	13.12	1.87	1.10	2.31	0.47	2.22
VA	-12.93	0	-0.48	-0.02	1.38	-0.31	0
NOL	0	6.28	0.50	0.06	0.95	0	0.51
OLC	0	2.01	0.05	0	0.20	0	0
TCC	0	3.59	0.14	0	0.42	0	0.09
AODTA	0	10.32	1.18	0.62	1.69	0.25	1.33

Panel D: Mean Difference between Taxable and Non-Taxable Acquisitions

	DT	NDTA	DTL	GDTA	VA	NOL	OLC	TCC	AODTA
Difference†	0.33	-0.05	-0.38	0.05	0.10	0.09	-0.00	-0.04	0.00
t-statistic	1.87	-0.32	-1.82	0.22	0.62	0.67	-0.26	-1.37	0.01
p-value	0.0623	0.7456	0.0689	0.8269	0.5343	0.5029	0.7914	0.1699	0.9940

†*Difference = Mean of taxable acquisitions – mean of non-taxable acquisitions.*

Notes:

Sample consists of 690 firms listed on New York or American Stock Exchanges and acquired during1997-2006.

Net deferred taxes (DT) represents the net amount of target's deferred tax assets minus deferred tax liability, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date. Net deferred tax assets (NDTA) represents the target's deferred tax assets netted after valuation allowance, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date. DTL is the deferred tax liability of the target, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date. Gross deferred tax assets (GDTA) represents the target's deferred tax assets before reduced by valuation allowance, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date. VA is the valuation allowance of the target, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date. NOL is the deferred tax assets from the target's NOL carryforwards, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date. OLC is the deferred tax assets from the target's other loss carryforwards, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date. TCC is the deferred tax assets from the target's tax credit carryforwards, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date. AODTA is all other deferred tax assets of the target, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date.

Table 4.5 Items Aggregated in Deferred Taxes

Items that result in deferred tax assets/liabilities	DTA	DTL	Included in Model 7
NOL carryforwards	X		NOL
Other loss carryforwards (e.g., capital loss carryforwards)	X		OLC
Alternative minimum tax	X		TCC
Tax credit carryforwards	X		TCC
Other tax credit carryforwards (e.g., foreign tax credit)	X		TCC
Valuation allowance†	X		VA
Operating leases		X	DTL
Oil and gas properties		X	DTL
Goodwill		X	DTL
Franchise rights		X	DTL
Foreign currency translation		X	DTL
Installment sales		X	DTL
Licenses		X	DTL
Commission costs		X	DTL
Prepaid expenses		X	DTL
Amortizations	X	X	AODTA/DTL
Depreciation	X	X	AODTA/DTL
Intangible assets	X	X	AODTA/DTL
Development costs	X	X	AODTA/DTL
Bad debts and receivables	X	X	AODTA/DTL
Inventory	X	X	AODTA/DTL
Investments	X	X	AODTA/DTL
Capital leases	X	X	AODTA/DTL
Equity in joint venture, partnership	X	X	AODTA/DTL
Capitalized interest	X	X	AODTA/DTL
Employee benefits	X	X	AODTA/DTL
Employee stock options	X	X	AODTA/DTL
Pension benefits	X	X	AODTA/DTL
Postretirement benefits	X	X	AODTA/DTL
Deferred compensation	X	X	AODTA/DTL
Acquisition costs	X	X	AODTA/DTL
Restructuring costs	X	X	AODTA/DTL
Abandonment reserve	X	X	AODTA/DTL
Taxes on foreign income	X	X	AODTA/DTL
Deferred income, gains	X	X	AODTA/DTL
State taxes	X	X	AODTA/DTL
Other deferred taxes	X	X	AODTA/DTL
Closing reserve	X		AODTA
Environmental reserves	X		AODTA
Financial reserve	X		AODTA
Insurance reserve	X		AODTA
Warranty reserves	X		AODTA
Deferred charges	X		AODTA
Accrued liabilities	X		AODTA
Contingent litigation payment	X		AODTA
Unrealized losses	X		AODTA
Covenant not to compete	X		AODTA

† *Valuation allowance is a contra-asset account.*

The correlation matrix is shown in Table 4.6, where Pearson (Spearman) correlations are presented above (below) the diagonal. Several high correlations exist between net operating assets and several other variables. Specifically, the Pearson (Spearman) correlation between net operating assets and net financial assets is -0.84 (-0.73). Also, net operating assets are highly correlated to deferred tax liabilities with a Pearson (Spearman) correlation of 0.69 (0.71). Furthermore, the valuation allowance is extremely highly correlated with gross deferred tax assets (Pearson (Spearman) = 0.75 (0.50)) and with deferred tax assets from NOL carryforwards (Pearson (Spearman) = 0.82 (0.59)). The exceptionally high correlation between deferred tax assets from NOL carryforwards and the valuation allowance indicates that target firms might not expect NOL carryforwards to be fully utilized before expiration and, thereby, recognize a valuation allowance. These high correlations may else suggest that a multicollinearity issue exists in the models.[29]

[29] However, Variance Inflation Factor (Kutner et al., 2005) and Condition Index (Belsey, Kuh, and Welsch, 1980) in models do not detect severe multicollinearity issues.

Table 4.6 The Correlation Matrix

Variable	AP	OA	FA	AE	LEV	ROE	BKMV	DT	NDTA	DTL	GDTA	VA	NOL	OLC	TCC	AODTA
AP	1.00	0.39	-0.06	0.06	-0.18	0.12	-0.12	-0.17	0.23	0.32	0.11	-0.06	-0.05	-0.00	0.09	0.23
OA	0.48	1.00	**-0.84**	-0.41	0.17	0.07	0.09	-0.42	0.45	**0.69**	0.27	-0.04	0.09	-0.00	0.23	0.33
FA	-0.16	**-0.73**	1.00	0.39	-0.30	0.01	0.02	0.26	-0.33	-0.46	-0.20	0.02	-0.10	-0.01	-0.13	-0.22
AE	0.09	-0.44	0.40	1.00	-0.21	0.24	0.00	0.15	-0.25	-0.31	-0.20	-0.05	-0.07	0.00	-0.18	-0.24
LEV	-0.22	0.44	**-0.77**	-0.38	1.00	-0.49	-0.36	0.05	0.20	0.10	0.19	0.09	0.16	-0.00	0.01	0.17
ROE	0.17	0.16	-0.03	0.44	-0.02	1.00	**0.55**	-0.05	-0.00	0.04	-0.06	-0.08	-0.05	0.00	0.02	-0.05
BKMV	-0.38	0.18	0.08	-0.34	0.14	0.10	1.00	0.00	0.06	0.03	0.06	0.03	0.02	0.01	0.04	0.07
DT	-0.13	-0.36	0.25	0.20	-0.14	-0.08	-0.00	1.00	0.20	**-0.70**	0.20	0.09	0.15	0.07	-0.11	0.20
NDTA	0.43	0.48	-0.35	-0.13	0.18	0.08	0.00	0.24	1.00	**0.55**	**0.72**	0.09	0.33	0.10	0.44	**0.81**
DTL	0.44	**0.71**	**-0.50**	-0.25	0.28	0.17	0.01	**-0.55**	**0.56**	1.00	0.35	-0.01	0.11	0.01	0.41	0.42
GDTA	0.26	0.32	-0.29	-0.21	0.24	-0.11	-0.04	0.23	**0.81**	0.40	1.00	**0.75**	**0.79**	0.24	0.43	**0.80**
VA	-0.12	-0.08	-0.00	-0.11	0.11	-0.25	-0.07	0.09	0.09	-0.02	**0.50**	1.00	**0.82**	0.26	0.20	0.39
NOL	-0.11	0.01	-0.12	-0.19	0.22	-0.30	-0.03	0.10	0.24	0.08	**0.52**	**0.59**	1.00	0.08	0.21	0.30
OLC	-0.08	-0.05	0.04	0.04	-0.04	-0.04	0.00	0.04	0.02	-0.01	0.06	0.23	-0.04	1.00	0.10	0.19
TCC	0.04	0.09	-0.10	-0.07	0.11	-0.04	-0.02	-0.00	0.27	0.19	0.35	0.25	0.22	0.04	1.00	0.32
AODTA	0.39	0.35	-0.24	-0.11	0.12	0.04	-0.02	0.28	**0.83**	0.39	**0.83**	0.24	0.15	0.01	0.16	1.00

Notes:

Pearson (Spearman) correlations are above (below) the diagonal. Correlations with absolute values above 0.10 are significant at the 0.01 level.

Sample consists of 690 firms listed on New York or American Stock Exchanges and acquired during1997-2006.

Acquisition price (AP) represents the implied value of a transaction calculated by multiplying the number of common shares outstanding by the offering price. OA represents the net operating assets of the target. Net operating assets are figured as book value of shareholders' equity plus net deferred tax liabilities minus net financial assets. FA represents the net financial assets of the target. Net financial assets are computed as cash and cash equivalents plus short-term investments, minus long-term debt, current portion of long-term debt, and preferred stock. Current abnormal earnings (AE), which are the current earnings in the year before the announcement year minus expected normal earnings (net operating assets at the beginning of the year before the announcement year times cost of capital. Current earnings are calculated as income before extraordinary items plus tax-adjusted interest expense minus tax-adjusted other nonoperating income. AP, OA, FA, and AE are deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date. Target's leverage (LEV) is the ratio of long-term debt to the target's market value 4 weeks prior to the announcement date. Return on market value of equity (ROE) is the ratio of the target's net income before extraordinary items to the target's market value 4 weeks prior to the announcement date. Ratio of target's book value of equity to market value of equity (BKMV) is the target's book value of equity in the last annual report prior to the announcement date, divided by the target's market value 4 weeks prior to the announcement date.

Net deferred taxes (DT) represents the net amount of target's deferred tax assets minus deferred tax liability. Net deferred tax assets (NDTA) represents the target's deferred tax assets netted after valuation allowance. DTL is the deferred tax liability of the target, deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date. Gross deferred tax assets (GDTA) represents the target's deferred tax assets before reduced by valuation allowance. VA is the valuation allowance of the target. NOL is the deferred tax assets from the target's NOL carryforwards. OLC is the deferred tax assets from the target's other loss carryforwards. TCC is the deferred tax assets from the target's tax credit carryforwards. AODTA is all other deferred tax assets of the target. All of these tax-related variables are deflated by the number of target's common stock outstanding in the last annual report prior to the announcement date.

Base Model

The base model contains net deferred taxes (DT) to test whether the participating firms give value to the targets' deferred taxes. The results are shown in Table 4.7. Specifically, column A includes SIC and YEAR dummy variables (the full model), whereas column B excludes these dummies (the reduced model). The following F-test is used for determination (Kutner et al., 2005, p. 268).

$$F^* = \frac{SSE(R) - SSE(F)}{df_R - df_F} \div \frac{SSE(F)}{df_F}$$

With an F-value of 1.3037 (i.e., p-value=0.1936), the full model does not provide significant incremental explanatory power as compared to the reduced model. In other words, year and industry effects are not significant in this study. Consequently, analyses in the current study are based on estimates of the reduced models.[30]

Results indicate that the effect on net deferred taxes is significantly larger than zero at the 0.001 level.[31] Findings show that a dollar value of net deferred taxes is priced at $1.34.[32] Therefore, the results do confirm that deferred taxes are priced by participating firms in M&A.

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[30] With p-values of 0.2082, 0.2098, and 0.1765, respectively, the full models do not provide significant incremental explanatory power as compared to the reduced models in models 5-7. Therefore, only reduced model results are reported and discussed in models 5-7.

[31] If coefficients do not have an expected sign, p-value is two-tailed. However, if sign expected, p-value is one-tailed.

[32] While this estimate is relatively greater than zero, it is not significantly different from one (p-value = 0.3619).

Table 4.7 Value Relevance of Net Deferred Taxes

Base Model:

$$AP = \beta_0 + \beta_1 DT + \beta_2 OA + \beta_3 FA + \beta_4 AE + \beta_5 TRAN + \beta_6 BDE + \beta_7 BOWN + \beta_8 HOST + \beta_9 CB + \beta_{10} TEN + \beta_{11} LEV + \beta_{12} ROE + \beta_{13} BKMV + \Sigma\beta_{14i} SIC_i + \Sigma\beta_{15j} YEAR_j + \varepsilon \quad (4)$$

Variable	Coefficient	Expected Sign†	Column A (Full Model)	Column B (Reduced Model)
Intercept	β_0	?	14.63239	17.47879
			(<.0001)	(<.0001)
DT	β_1	+	**1.48592****	**1.33791****
			(0.0001)	**(0.0002)**
OA	β_2	+	**1.69829****	**1.73017****
			(<.0001)	**(<.0001)**
FA	β_3	+	**1.36064****	**1.39199****
			(<.0001)	**(<.0001)**
AE	β_4	+	**1.25014****	**1.26751****
			(<.0001)	**(<.0001)**
TRAN	β_5	?	**7.63298****	**7.21774****
			(0.0002)	**(0.0003)**
BDE	β_6	–	0.99627	1.22709
			(0.6645)	(0.7016)
BOWN	β_7	–	**-8.98365****	**-9.17304****
			(0.0065)	**(0.0050)**
HOST	β_8	+	6.32573	6.01675
			(0.0970)	(0.1077)
CB	β_9	+	0.13996	0.44740
			(0.4817)	(0.4414)
TEN	β_{10}	+	2.81592	2.60376
			(0.0664)	(0.0668)
LEV	β_{11}	?	**-2.99397****	**-3.00176****
			(<.0001)	**(<.0001)**
ROE	β_{12}	?	1.86625	2.50611
			(0.1665)	(0.0559)
BKMV	β_{13}	?	**-6.43256****	**-6.69758****
			(<.0001)	**(<.0001)**
SIC_i			Included	Excluded
$YEAR_j$			Included	Excluded
R^2			0.4690	0.4533
Adj-R^2			0.4465	0.4427
Obs (n)			690	690

† *If coefficients do not have an expected sign, the p-value is two-tailed. However, if the coefficient has an expected sign, the p-value is one-tailed.*

Notes:

Sample consists of 690 firms listed on New York or American Stock Exchanges and acquired during1997-2006.

Acquisition price (AP) represents the implied value of a transaction calculated by multiplying the number of common shares outstanding by the offering price. Net deferred taxes (DT) represents the net amount of the target's deferred tax assets minus deferred tax liability. OA represents the net operating assets of the target. Net operating assets are figured as book value of the shareholders' equity plus net deferred tax liabilities minus net financial assets. FA represents the net financial assets of the target. Net financial assets are computed as cash and cash equivalents plus short-term investments, minus long-term debt, current portion of long-term debt, and preferred stock. Current abnormal earnings (AE), which are the current earnings in the year before the announcement year minus expected normal earnings (net operating assets at the beginning of the year before the announcement year times cost of capital. Current earnings are calculated as income before extraordinary items plus tax-adjusted interest expense minus tax-adjusted other nonoperating income. AP, OA, FA, and AE are deflated by the number of the target's common stock outstanding in the last annual report prior to the announcement date. Target's leverage (LEV) is the ratio of long-term debt to the target's market value 4 weeks prior to the announcement date. Return on market value of equity (ROE) is the ratio of the target's net income before extraordinary items to the target's market value 4 weeks prior to the announcement date. Ratio of the target's book value of equity to market value of equity (BKMV) is the target's book value of equity in the last annual report prior to the announcement date, divided by the target's market value 4 weeks prior to the announcement date.

Taxability of acquisition (TRAN) is an indicator variable which equals one for a non-taxable acquisition, otherwise zero. BDE is an indicator variable which equals one if the acquisition is classified as Type B, divisive Type D, or Type E reorganization, otherwise zero. BOWN, which is ranged between 0 and 1, represents the percentage of the target's common stock owned by the acquirer prior to the announcement date. Management hostility (HOST) is an indicator variable, which equals one if the target's management opposed the acquisition, otherwise zero. Competing bids (CB) is an indicator variable, which equals one if a competing bidder existed, otherwise zero. Tender offer (TEN) is an indicator variable, which equals one if the acquisition was initiated with a tender offer, otherwise zero.

The coefficient on net operating assets, net financial assets, and current abnormal earnings are also significantly larger than zero at the 0.001 level. A dollar value of net operating assets and net financial assets are priced at $1.73 and $1.39, respectively. These two coefficients are significantly different from one (both p-values <0.0001) and the coefficient of net operating assets is significantly larger than that of net financial assets (p-value <0.0001). The implication is that participating firms expect more returns from net operating assets, compared to net financial assets, and give it a higher value. Also, the concept of historical costs and conservatism accounting may cause the book value of net operating assets to be less than its market value, thereby, driving the coefficient higher than one.

These findings are similar to Amir et al. (1997), which is not related to the M&A settings. Nevertheless, this study differs from Amir et al. (1997) in two respects. First, Amir et al. (1997) finds net operating assets and net financial assets are priced by the market but the marginal value of these assets are significantly less than one. Conversely, the current study shows net operating assets and net financial assets are priced by participating firms at a higher value. Since the average acquisition price is 47 percent higher than the target's market value in this study, acquisition premiums could be the cause of escalating coefficients. Second, Amir et al. (1997) demonstrates that the marginal value of a dollar of net deferred taxes is significantly larger than one. However, the coefficient of net deferred taxes in the present study is not significantly different from one. A possible interpretation is that acquirers do not expect the target's net deferred taxes to contribute extra benefits after the acquisition. Thus, acquisition premiums are not allocated to this item.

The coefficient on taxability of acquisition is $7.22 and significant at the 0.001 level. This means that an acquirer pays $7.22 more per share when the acquisition is non-taxable instead of taxable. Also, the coefficient of the percentage of the target's common stock owned by the acquirer prior to the announcement date is -$9.17 and significant at the 0.01 level. The negative sign, as expected, indicates that acquirers can reduce their acquisition price when they have owned some of the target's shares before the announcement date. The parameter estimates that acquiring firms can reduce the acquisition price by 9.17 cents per share for each one percent of pre-owned shares.

Other variables, including management hostility, competing bids, and tender offers, have the expected positive signs but they are not significant at the 0.05 level. BDE, which indicates whether the acquisition is classified as Type B, divisive Type D, or Type E reorganization, is not significant but has a sign opposite of expected.[33] The sign of BDE remains positive (not reported) even when the sample is limited to non-taxable acquisitions.

Hypothesis Analysis

Results from the base model show that net deferred taxes are priced in M&A. Next, net deferred taxes are decomposed into several deferred tax items to test whether these components provide incremental value relevance information.[34]

Hypothesis One

H_{1a}: Deferred tax assets (liabilities) of the target firms are priced as assets (liabilities) in M&A.

[33] Even when a three way interaction among NOL, TRAN, and BDE is included in Model 7 to test the effect of BDE, the result (not reported) is not significant.

[34] In models 5-7, non-tax-related explanatory variables typically have similar results as they do in the base model. Therefore, the discussion of this section only focuses on the tax-related variables.

To test hypothesis one, net deferred taxes are decomposed into net deferred tax assets and deferred tax liabilities and analyzed using Model 5. The results are presented in Table 4.8. The findings confirm that deferred tax assets of target firms are priced by participating firms as real assets. However, target firms' deferred tax liabilities are priced in taxable acquisitions, but not priced (or ignored) in non-taxable acquisitions.

The coefficient of net deferred tax assets is $1.50, which is significantly greater than zero at the 0.01 level, but not significantly different from one (p-value=0.3826). That is, participating firms price target firms' net deferred tax assets in acquisition transactions. Also, deferred tax liabilities have a coefficient of -$1.70 which is significantly less than zero at the 0.001 level, but not significantly different from negative one (p-value=0.1671). The negative sign means that participating firms price the target firms' deferred tax liabilities as real liabilities. Givoly and Hayn (1992) find that one dollar of deferred tax liabilities is valued by investors at about 56 cents. In this study, one dollar of the target firms' deferred tax liabilities is valued by participating firms at -$1.70, which is almost triple that of Givoly and Hayn's finding. The higher value given to deferred tax assets and liabilities in the current study may be driven by the negotiation effect, which exists when the acquirer and the target have different preferences toward the taxability of acquisitions. The potential negotiation effect is discussed in detail later in the Hypothesis Three subsection that follows the presentation of the primary regression results.

Table 4.8 Value Relevance of Net Deferred Tax Assets and Deferred Tax Liabilities

Model 5:

$$AP = \beta_0 + \lambda_1 NDTA + \lambda_2 NDTA*TRAN + \lambda_3 DTL + \lambda_4 DTL*TRAN + \beta_2 OA + \beta_3 FA + \beta_4 AE + \beta_5 TRAN + \beta_6 BDE + \beta_7 BOWN + \beta_8 HOST + \beta_9 CB + \beta_{10} TEN + \beta_{11} LEV + \beta_{12} ROE + \beta_{13} BKMV + \Sigma\beta_{14i} SIC_i + \Sigma\beta_{15j} YEAR_j + \xi \quad (5)$$

Variable	Coefficient	Expected Sign†	Estimate	p-value
Intercept	β_0	?	18.42526	<.0001
NDTA	λ_1	NA‡	**1.49574**	**0.0086****
NDTA*TRAN	λ_2	+	0.62153	0.2738
DTL	λ_3	NA‡	**-1.69917**	**0.0008****
DTL*TRAN	λ_4	–	1.54597	0.9847
OA	β_2	+	**1.69775**	**<.0001****
FA	β_3	+	**1.37555**	**<.0001****
AE	β_4	+	**1.36473**	**<.0001****
TRAN	β_5	?	2.93829	0.2268
BDE	β_6	–	2.54682	0.8617
BOWN	β_7	–	**-9.25726**	**0.0046****
HOST	β_8	+	3.07195	0.2665
CB	β_9	+	0.55731	0.4267
TEN	β_{10}	+	2.38466	0.0838
LEV	β_{11}	?	**-2.97230**	**<.0001****
ROE	β_{12}	?	2.44580	0.0605
BKMV	β_{13}	?	**-6.60023**	**<.0001****
SIC_i	Excluded			
$YEAR_j$	Excluded			
R^2	0.4625			
Adj-R^2	0.4497			
Obs (n)	690			

† *If coefficients do not have an expected sign, the p-value is two-tailed. However, if the coefficient has an expected sign, the p-value is one-tailed.*

‡ *NA: The coefficient is expected to be zero.*

Notes:

Sample consists of 690 firms listed on New York or American Stock Exchanges and acquired during1997-2006.

Acquisition price (AP) represents the implied value of a transaction calculated by multiplying the number of common shares outstanding by the offering price. Net deferred taxes (DT) represents the net amount of the target's deferred tax assets minus deferred tax liability. OA represents the net operating assets of the target. Net operating assets are figured as book value of the shareholders' equity plus net deferred tax liabilities minus net financial assets. FA represents the net financial assets of the target. Net financial assets are computed as cash and cash equivalents plus short-term investments, minus long-term debt, current portion of long-term debt, and preferred stock. Current abnormal earnings (AE), which are the current earnings in the year before the announcement year minus expected normal earnings (net operating assets at the beginning of the year before the announcement year times cost of capital). Current earnings are calculated as income before extraordinary items plus tax-adjusted interest expense minus tax-adjusted other nonoperating income. AP, OA, FA, and AE are deflated by the number of the target's common stock outstanding in the last annual report prior to the announcement date. Target's leverage (LEV) is the ratio of long-term debt to the target's market value 4 weeks prior to the announcement date. Return on market value of equity (ROE) is the ratio of the target's net income before extraordinary items to the target's market value 4 weeks prior to the announcement date. Ratio of the target's book value of equity to market value of equity (BKMV) is the target's book value of equity in the last annual report prior to the announcement date, divided by the target's market value 4 weeks prior to the announcement date.

Taxability of acquisition (TRAN) is an indicator variable which equals one for a non-taxable acquisition, otherwise zero. BDE is an indicator variable which equals one if the acquisition is classified as Type B, divisive Type D, or Type E reorganization, otherwise zero. BOWN, which is ranged between 0 and 1, represents the percentage of target's common stock owned by the acquirer prior to the announcement date. Management hostility (HOST) is an indicator variable, which equals one if the target's management opposed the acquisition, otherwise zero. Competing bids (CB) is an indicator variable, which equals one if a competing bidder existed, otherwise zero. Tender offer (TEN) is an indicator variable, which equals one if the acquisition was initiated with a tender offer, otherwise zero.

Net deferred tax assets (NDTA) represents the target's deferred tax assets netted after the valuation allowance. DTL is the deferred tax liability of the target, deflated by the number of the target's common stock outstanding in the last annual report prior to the announcement date.

Although the results in Table 4.8 indicate that a dollar of the target firms' deferred tax assets and liabilities is priced by participating firms at $1.50 and -$1.70, respectively, the difference between $1.50 and $1.70 is not statistically significant (p-value=0.7410). That is, participating firms basically assign similar value to target firms' deferred tax assets and deferred tax liabilities in taxable acquisitions.

The interaction term between deferred tax assets and taxability of acquisitions (DTA*TRAN) has a coefficient of $0.62 but is insignificant. This means that target's deferred tax assets are assigned positive values regardless of the taxability of acquisitions. The interaction term between deferred tax liabilities and taxability of acquisitions (DTL*TRAN) has a positive coefficient of $1.55. However, the sign of the coefficient is opposite of expectation. Also, this coefficient does not significantly differ from that of deferred tax liabilities (p-value=0.3871). The implication is that the target's deferred tax liabilities are negatively priced by participating firms in taxable acquisitions but not assigned a value (or ignored) in non-taxable acquisitions. It appears that participating firms price target firms' deferred tax assets in both taxable and non-taxable acquisitions, but only price deferred tax liabilities in taxable transactions. While this case seems contrary to expectations regarding the transferability of deferred tax attributes in non-taxable acquisitions, the plausibility of this result is further explored in the Hypothesis Three subsection.

Hypothesis Two

H_{2a}: Target firms' valuation allowance accounts are priced in M&A.

To test hypothesis two, net deferred tax assets are separated into two parts, gross deferred tax assets and a valuation allowance, in Model 6. The results are presented in Table 4.9, which confirms that the target firms' valuation allowance accounts are priced negatively in M&A.

Table 4.9 shows that the coefficient on valuation allowance is -$1.50 and significant at the 0.05 level. Valuation allowance has a negative sign, which suggests that the participating firms view the target firms' valuation allowance as a deduction against real assets irrespective of the taxability of acquisitions. A further test indicates that the coefficient on the valuation allowance is not significantly different from negative one (p-value=0.5042). The result that the valuation allowance is priced in taxable acquisitions is contrary to the expectations regarding the non-transferability of target firms' tax attributes in taxable acquisitions. The plausibility of this result is further investigated in the Hypothesis Three subsection.

Amir et al. (1997) find that the coefficient on valuation allowance is -$0.96 and significant at the 0.03 level. However, the current study differs from Amir et al. (1997) in two significant ways. First, this study involves M&A settings while Amir et al. (1997) does not. Second, this study focuses on the participating firms' viewpoint of the price of the target's valuation allowance, while Amir et al. (1997) looks into the stock market's pricing of the firm's valuation allowance account. Nevertheless, regardless of these differences, participating firms and the stock market act similarly when pricing the valuation allowance account.

Table 4.9 Value Relevance of Valuation Allowance

Model 6:

$$AP = \beta_0 + \varphi_1 GDTA + \varphi_2 GDTA*TRAN + \varphi_3 VA + \varphi_4 VA*TRAN + \lambda_3 DTL + \lambda_4 DTL*TRAN + \beta_2 OA + \beta_3 FA + \beta_4 AE + \beta_5 TRAN + \beta_6 BDE + \beta_7 BOWN + \beta_8 HOST + \beta_9 CB + \beta_{10} TEN + \beta_{11} LEV + \beta_{12} ROE + \beta_{13} BKMV + \Sigma\beta_{14i} SIC_i + \Sigma\beta_{15j} YEAR_j + \eta \quad (6)$$

Variable	Coefficient	Expected Sign†	Estimate	p-value
Intercept	β_0	?	18.40666	<.0001
GDTA	φ_1	NA‡	**1.49473**	**0.0093****
GDTA*TRAN	φ_2	+	0.61208	0.2776
VA	φ_3	NA‡	**-1.49520**	**0.0440***
VA*TRAN	φ_4	–	-0.24179	0.4338
DTL	λ_3	NA‡	**-1.70221**	**0.0008****
DTL*TRAN	λ_4	–	1.56049	0.9852
OA	β_2	+	**1.69949**	**<.0001****
FA	β_3	+	**1.37656**	**<.0001****
AE	β_4	+	**1.37097**	**<.0001****
TRAN	β_5	?	2.75301	0.2681
BDE	β_6	–	2.55456	0.8621
BOWN	β_7	–	**-9.24027**	**0.0047****
HOST	β_8	+	3.06187	0.2675
CB	β_9	+	0.57900	0.4240
TEN	β_{10}	+	2.40486	0.0831
LEV	β_{11}	?	**-2.97163**	**<.0001****
ROE	β_{12}	?	2.44986	0.0608
BKMV	β_{13}	?	**-6.60329**	**<.0001****
SIC_i	Excluded			
$YEAR_j$	Excluded			
R^2	0.4627			
Adj-R^2	0.4482			
Obs (n)	690			

† If coefficients do not have an expected sign, the p-value is two-tailed. However, if the coefficient has an expected sign, the p-value is one-tailed.
NA‡: The coefficient is expected to be zero.
Notes:
Sample consists of 690 firms listed on New York or American Stock Exchanges and acquired during1997-2006.
Acquisition price (AP) represents the implied value of a transaction calculated by multiplying the number of common shares outstanding by the offering price. Net deferred taxes (DT) represents the net amount of the target's deferred tax assets minus deferred tax liability. OA represents the net operating assets of the target. Net operating assets are figured as book value of the shareholders' equity plus net deferred tax liabilities minus net financial assets. FA represents the net financial assets of the target. Net financial assets are computed as cash and cash equivalents plus short-term investments, minus long-term debt, current portion of long-term debt, and preferred stock. Current abnormal earnings (AE), which are the current earnings in the year before the announcement year minus expected normal earnings (net operating assets at the beginning of the year before the announcement year times cost of capital). Current earnings are calculated as income before extraordinary items plus tax-adjusted interest expense minus tax-adjusted other nonoperating income. AP, OA, FA, and AE are deflated by the number of the target's common stock outstanding in the last annual report prior to the announcement date. Target's leverage (LEV) is the ratio of long-term debt to the target's market value 4 weeks prior to the announcement date. Return on market value of equity (ROE) is the ratio of the target's net income before extraordinary items to the target's market value 4 weeks prior to the announcement date. Ratio of the target's book value of equity to market value of equity (BKMV) is the target's book value of equity in the last annual report prior to the announcement date, divided by the target's market value 4 weeks prior to the announcement date.
Taxability of acquisition (TRAN) is an indicator variable which equals one for a non-taxable acquisition, otherwise zero. BDE is an indicator variable which equals one if the acquisition is classified as Type B, divisive Type D, or Type E reorganization, otherwise zero. BOWN, which is ranged between 0 and 1, represents the percentage of the target's common stock owned by the acquirer prior to the announcement date. Management hostility (HOST) is an indicator variable, which equals one if the target's management opposed the acquisition, otherwise zero. Competing bids (CB) is an indicator variable, which equals one if a competing bidder existed, otherwise zero. Tender offer (TEN) is an indicator variable, which equals one if the acquisition was initiated with a tender offer, otherwise zero.
DTL is the deferred tax liability of the target, deflated by the number of the target's common stock outstanding in the last annual report prior to the announcement date. Gross deferred tax assets (GDTA) represents the target's deferred tax assets before reduced by valuation allowance. VA is the valuation allowance of the target.

The coefficient of gross deferred tax assets are $1.49 and significant at the 0.01 level. A further test shows that this coefficient is not significantly different from one (p-value=0.3880). These results are consistent with what this study finds concerning tax-related variables in the base model and in Model 5.

Hypothesis Three

H_{3a}: Target firms' deferred tax assets from NOL and tax credit carryforwards are priced in M&A.

To test hypothesis three, gross deferred tax assets is decomposed into deferred tax assets from NOL carryforwards (NOL), deferred tax assets from other loss carryforwards (OLC), deferred tax assets from tax credit carryforwards (TCC), and all other deferred tax assets (AODTA) in Model 7. The results are presented in Table 4.10 and indicate that the target firms' deferred tax assets from NOL and tax credit carryforwards are not priced.

AODTA. The coefficient of deferred tax assets from all others is $2.53 and significant at the 0.001 level. Further tests show that this coefficient is significantly different from one (p-value=0.0285) but does not significantly differ from the coefficients of net operating assets and net financial assets (p-values=0.2151 and 0.0918, respectively). This implies that the target firms' deferred tax assets from all others are priced by the participating firms in a similar manner as the target firms' net operating assets or net financial assets. Also, the insignificant coefficient ρ_8 indicates that AODTA is not given more weight by the participating firms in non-taxable acquisitions.

Table 4.10 Value Relevance of Deferred Tax Assets from NOL Carryforwards, Other Loss Carryforwards, Tax Credit Carryforwards, and All Others

Model 7:

$$AP = \beta_0 + \rho_1 NOL + \rho_2 NOL*TRAN + \rho_3 OLC + \rho_4 OLC*TRAN + \rho_5 TCC + \rho_6 TCC*TRAN + \rho_7 AODTA + \rho_8 AODTA*TRAN + \varphi_3 VA + \varphi_4 VA*TRAN + \lambda_3 DTL + \lambda_4 DTL*TRAN + \beta_2 OA + \beta_3 FA + \beta_4 AE + \beta_5 TRAN + \beta_6 BDE + \beta_7 BOWN + \beta_8 HOST + \beta_9 CB + \beta_{10} TEN + \beta_{11} LEV + \beta_{12} ROE + \beta_{13} BKMV + + \Sigma\beta_{14i} SIC_i + \Sigma\beta_{15j} YEAR_j + \delta \quad (7)$$

Variable	Coefficient	Expected Sign†	Estimate	p-value
Intercept	β_0	?	18.73420	<.0001
NOL	ρ_1	NA‡	0.08306	0.9277
NOL*TRAN	ρ_2	+	-1.40612	0.7502
OLC	ρ_3	NA‡	-1.70940	0.6971
OLC*TRAN	ρ_4	+	1.49919	0.4255
TCC	ρ_5	NA‡	-3.18778	0.3818
TCC*TRAN	ρ_6	+	-1.59549	0.6288
AODTA	ρ_7	NA‡	**2.52609**	**0.0003****
AODTA*TRAN	ρ_8	+	0.96147	0.2092
VA	φ_3	NA‡	-0.51717	0.5467
VA*TRAN	φ_4	–	0.11827	0.5276
DTL	λ_3	NA‡	**-1.41619**	**0.0069****
DTL*TRAN	λ_4	–	1.48186	0.9788
OA	β_2	+	**1.63462**	**<.0001****
FA	β_3	+	**1.31838**	**<.0001****
AE	β_4	+	**1.37340**	**<.0001****
TRAN	β_5	?	3.97365	0.1133
BDE	β_6	–	1.39845	0.7244
BOWN	β_7	–	**-8.75993**	**0.0066****
HOST	β_8	+	2.79097	0.2854
CB	β_9	+	0.54289	0.4282
TEN	β_{10}	+	1.78133	0.1519
LEV	β_{11}	?	**-2.99014**	**<.0001****
ROE	β_{12}	?	**2.75331**	**0.0343***
BKMV	β_{13}	?	**-6.68637**	**<.0001****
SIC_i	Excluded			
$YEAR_j$	Excluded			
R^2	0.4761			
Adj-R^2	0.4572			
Obs (n)	690			

† *If coefficients do not have an expected sign, the p-value is two-tailed. However, if the coefficient has an expected sign, the p-value is one-tailed.*

NA‡: The coefficient is expected to be zero.

Notes:

Sample consists of 690 firms listed on New York or American Stock Exchanges and acquired during1997-2006.

Acquisition price (AP) represents the implied value of a transaction calculated by multiplying the number of common shares outstanding by the offering price. Net deferred taxes (DT) represents the net amount of the target's deferred tax assets minus deferred tax liability. OA represents the net operating assets of the target. Net operating assets are figured as book value of the

shareholders' equity plus net deferred tax liabilities minus net financial assets. FA represents the net financial assets of the target. Net financial assets are computed as cash and cash equivalents plus short-term investments, minus long-term debt, current portion of long-term debt, and preferred stock. Current abnormal earnings (AE), which are the current earnings in the year before the announcement year minus expected normal earnings (net operating assets at the beginning of the year before the announcement year times cost of capital). Current earnings are calculated as income before extraordinary items plus tax-adjusted interest expense minus tax-adjusted other nonoperating income. AP, OA, FA, and AE are deflated by the number of the target's common stock outstanding in the last annual report prior to the announcement date. Target's leverage (LEV) is the ratio of long-term debt to the target's market value 4 weeks prior to the announcement date. Return on market value of equity (ROE) is the ratio of the target's net income before extraordinary items to the target's market value 4 weeks prior to the announcement date. Ratio of the target's book value of equity to market value of equity (BKMV) is the target's book value of equity in the last annual report prior to the announcement date, divided by the target's market value 4 weeks prior to the announcement date.

Taxability of acquisition (TRAN) is an indicator variable which equals one for a non-taxable acquisition, otherwise zero. BDE is an indicator variable which equals one if the acquisition is classified as Type B, divisive Type D, or Type E reorganization, otherwise zero. BOWN, which is ranged between 0 and 1, represents the percentage of the target's common stock owned by the acquirer prior to the announcement date. Management hostility (HOST) is an indicator variable, which equals one if the target's management opposed the acquisition, otherwise zero. Competing bids (CB) is an indicator variable, which equals one if a competing bidder existed, otherwise zero. Tender offer (TEN) is an indicator variable, which equals one if the acquisition was initiated with a tender offer, otherwise zero.

DTL is the deferred tax liability of the target, deflated by the number of the target's common stock outstanding in the last annual report prior to the announcement date. VA is the valuation allowance of the target. NOL is the deferred tax assets from the target's NOL carryforwards. OLC is the deferred tax assets from the target's other loss carryforwards. TCC is the deferred tax assets from the target's tax credit carryforwards. AODTA is all other deferred tax assets of the target. All of these tax-related variables are deflated by the number of the target's common stock outstanding in the last annual report prior to the announcement date.

The coefficient on deferred tax-other in Amir et al. (1997) is $1.02, and it is significant at the 0.001 level. However, the definitions of deferred tax assets from all others in the current study and deferred tax-other in Amir et al. (1997) are different. Amir et al. (1997) classifies deferred taxes into seven categories: 1) depreciation and amortization, 2) losses, credits, and alternative minimum taxes carryforwards, 3) restructuring charges, 4) environmental charges, 5) employee benefits, 6) valuation allowance required by SFAS No. 109, and 7) all other components. On the other hand, the current study decomposes gross deferred tax assets into deferred tax assets from NOL carryforwards, deferred tax assets from other loss carryforwards, deferred tax assets from tax credit carryforwards, and all other deferred tax assets. Consequently, the results of deferred tax assets from all others in this study and deferred tax-other in Amir et al. (1997) may not be directly compared.

There are several possible explanations to this relatively high coefficient. First, De Waegenaere et al. (2003) argue that the market value is based on the "mean" level of

future tax benefits, but the book value is based on the "median" level of future tax benefits. Therefore, positive skewness in the distribution of future taxable income can cause the market-to-book ratio to exceed one. This "mean-median" effect can be one possible factor that escalates the coefficient of AODTA in the current study.

Second, the "substitution" effect illustrated in Table 4.11 may be another source of driving up the coefficient of AODTA. Companies T1 and T2 in Table 4.11 have identical financial information, except that Company T2 has an additional $100 of other expenses recorded for book purposes, but not for tax purposes. Equation (1) in Table 4.11 shows how those financial numbers are related in a price valuation model. Assume that the dependent variable (*Price*) and other control variables remain constant; Equation (2) indicates the differences of DT, OA, and AE between Companies T1 and T2. Further, assume the coefficients of AE and OA are equal (i.e., $\beta_4 = \beta_2$). After generalization, Equation (6) illustrates that the coefficient of deferred taxes is equal to two times the coefficient of net operating assets divided by the target's effective tax rate and, then, minus one. Therefore, with an effective tax rate of 35 percent, the coefficient of DT could be as high as 4.78 times of the coefficient of OA. In the current study, given that the coefficient of net operating assets is 1.63 in Model 7, it would be logical to see a ρ_7 coefficient as large as 7.79.

Table 4.11 An Illustration of the Value of Deferred Tax Assets

Basic Equation:

Net Operating Assets = Equity – Net Deferred Taxes – Net Financial Assets

Assume at the beginning of the year, both companies have:

Net Operating Assets = $2,100
Equity = 2,200
Net Deferred Taxes = 0
Net Financial Assets = 100

There is no difference between the Book and the Tax basis.

Company T1: At the end of the year, Company T1 has revenue $300, depreciation $100, and other expense $100. Assume the effective tax rate is 35 percent and the depreciation expense is the same for both Book and Tax purposes. Assume net financial assets remain unchanged.

	Book	Tax
Revenue	300	300
Depreciation	(100)	(100)
Other expense	(100)	(100)
Net Income before Tax	100	100
Tax provision	(35)	(35)
Net Income	65	65
At the end of the year, Company T1 has:		
Net Operating Assets	**2,165**	2,165
Equity	2,265	2,265
Net Deferred Taxes	**0**	0
Net Financial Assets	100	100

Company T2: Same as Company T1, except that the "other expense" for Book purposes is $200, but $100 for Tax purposes.

	Book	Tax
Revenue	300	300
Depreciation	(100)	(100)
Other expense	(200)	(100)
Net Income before Tax	0	100
Tax provision	0	(35)
Net Income	0	65
At the end of the year, Company T2 has:		
Net Operating Assets	**2,065**	2,165
Equity	2,200	2,265
Net Deferred Taxes[†]	**35**	0
Net Financial Assets	100	100

Table 4.11 An Illustration of the Value of Deferred Tax Assets (Continued)

Price Valuation Model:

$Price = \beta_0 + \beta_1 DT + \beta_2 OA + \beta_3 FA + \beta_4 AE + Control\ Variables$

At the end of the year, DT, OA, FA, AE are as follows.

$Price = \beta_0 + \beta_1 DT + \beta_2 OA + \beta_3 FA + \beta_4 AE + Control\ Variables$

Company T1	0	2,165	100	65 – (2,100 x CC)	
Company T2	35	2,065	100	0 – (2,100 x CC)	(1)

where AE= Net Income – Beginning OA x CC; CC=Cost of Capital.

I. Assume *Price* and other independent variables remain constant. Then, the difference between Companies T1 and T2 are:

$Price = \beta_0 + \beta_1 DT + \beta_2 OA + \beta_3 FA + \beta_4 AE + Control\ Variables$

Company T1		100	65
Company T2	35		(2)

Intuitively, since the change of OA ($100) and AE ($65) is greater than the change of DT ($35), β_1 should be greater than β_2 and β_4.

In a general form, it becomes:

$\Delta OA = \Delta$other expense

$\Delta AE = \Delta$other expense x (1 – ETR)

$\Delta DT = \Delta$other expense x ETR (3)

where ETR=Effective Tax Rate.

In a valuation model, the following relationship is held.

$$\beta_2 \text{ x } \Delta OA + \beta_4 \text{ x } \Delta AE = \beta_1 \text{ x } \Delta DT \quad (4)$$

With the substitution of equation (3) into (4), it becomes:

$$\beta_1 = (\beta_2 + \beta_4) \text{ x } ETR^{-1} - 1 \quad (5)$$

Assume $\beta_4 \approx \beta_2$, then

$$\beta_1 = 2\beta_2 ETR^{-1} - 1 \quad (6)$$

See some examples below.

ETR	Relationship
0.50	$\beta_1 = 3.00\beta_2$
0.45	$\beta_1 = 3.44\beta_2$
0.40	$\beta_1 = 4.00\beta_2$
0.38	$\beta_1 = 4.26\beta_2$
0.35	$\beta_1 = 4.71\beta_2$
0.30	$\beta_1 = 5.67\beta_2$
0.25	$\beta_1 = 7.00\beta_2$
0.20	$\beta_1 = 9.00\beta_2$
0.15	$\beta_1 = 12.33\beta_2$

II. Assume the future pretax cashflows are equal in both companies. Since deferred tax assets provide tax benefits, Company T2 would receive higher price. Then, the difference between Companies T1 and T2 are:

$Price = \beta_0 + \beta_1 DT + \beta_2 OA + \beta_3 FA + \beta_4 AE + Control\ Variables$

Company T1		100	65	
Company T2	ΔPrice	35		(7)

Since $\Delta Price > 0$, $\beta_1 > 2\beta_2 ETR^{-1} - 1$. That is, when ETR=0.35, $\beta_1 > 4.71\beta_2$.

The substitution effect may happen in two ways. First, assume the acquirer does not want to succeed to the target's unrealized costs. Deferred tax assets from the contingent litigation costs are a good example to demonstrate this. Assume the additional $100 of other expenses recorded in Company T2 in Table 4.11 is contingent costs of the target firm. Also, postulate that the acquirer intends to purchase the target's assets in a taxable transaction such that the acquirer can avoid succeeding the target's contingent litigation costs. Therefore, when the acquirer evaluates the value of the target, financial data of Company T1 presented in Equation (1) in Table 4.11 are used by the acquirer. That is, the contingent litigation cost of $100 is added back to the net operating assets. However, this "add-back" is not noted by this study and, thereby, ignored in this study. Consequently, financial data of Company T2 in Equation (1) in Table 4.11 are used in the price valuation model for analysis in the current inquiry. Accordingly, the substitution effect may drive the coefficient of AODTA high. Second, assume the acquirer intends to utilize the target's tax attributes. Because the deferred tax assets can provide tax benefits to the acquirer, the acquirer is willing to pay higher price for a target with deferred tax assets, provided the future pretax cashflows are identical. Equation (7) in Table 4.11 shows that the substitution effect is more appealing in this scenario. That is, the coefficient of deferred taxes is greater than the coefficient of net operating assets divided by the target's effective tax rate.

In addition to the mean-median effect and the substitution effect, there can be a negotiation effect, especially in the cases where the target's BKMV ratio is low. A negotiation effect exists when the acquirer and the target have different preferences toward the taxability of acquisitions. The negotiation effect can be demonstrated through

the Scenarios A1 and A2 in Table 4.12.[35] The target's net present value to the acquirer and the net amount received by the target are computed in both Scenarios A1 and A2, where the acquisitions are assumed to be non-taxable and taxable, respectively. In non-taxable condition in Scenario A1, both the net present value to the acquirer and the net amount received by the target are $211,336. However, in the taxable condition in Scenario A2, the net present value to the acquirer is $240,880, whereas the net amount received by the target is $189,069, because the acquirer receives future tax savings through a step-up basis in the acquired assets and the target is subject to capital gains tax. Accordingly, the acquirer prefers a taxable transaction (i.e., Scenario A2), but the target prefers a non-taxable transaction (i.e., Scenario A1). Therefore, the acquirer and the target have conflicting interests in transaction preference. As shown in other scenarios in Table 4.12, the conflicting interests between the acquirer and the target exist regardless of the taxability of acquisitions or whether the target contains deferred tax assets or deferred tax liabilities. Table 4.13 summarizes the participating firms' transaction preferences as described in Table 4.12. Due to the conflicting interest of the participating firms' transaction preferences, the acquirer and the target have to negotiate and settle the acquisition price while determining the taxability of acquisitions. That is, the settled value of deferred taxes may not follow the "perceived" tax benefits to the acquirer. As a result, the negotiation effect may be a possible explanation on the findings in this study contrary to the transferability of target firms' tax attributes.

[35] For detailed information of these scenarios, see Appendix.

Table 4.12 Summary of Value Received by Participating Firms

The potential target firms have the following basic financial information.	Market Value of Assets[1]	Book Value of Assets[2]	Tax Basis of Assets	Deferred Tax Assets	Deferred Tax Liabilities
1. Fair Market Value of Assets > Book Value of Assets.					
Target A	211,336	100,000	100,000		
Target B	211,336	100,000	100,000	20,000	
Target C	211,336	100,000	50,000		17,500
2. Book Value of Assets > Fair Market Value of Assets > Tax Basis of Assets.					
Target D	80,744	100,000	100,000		
Target E	80,744	100,000	100,000	20,000	
Target F	80,744	100,000	50,000		17,500
3. Tax Basis of Assets > Fair Market Value of Assets.					
Target G	38,856	100,000	100,000		
Target H	38,856	100,000	100,000	20,000	
Target I	38,856	100,000	50,000		17,500

[1] *Effects of deferred taxes are not included.*
[2] *DTA and DTL are not included.*

For the following scenarios, assume discount rate = 10%, corporate income tax rate = 35%, and capital gains tax Rate = 20%. Target firms A, B, C (D, E, F, and G, H, I) are predicted to have net pretax cash flows of $75,000 (22,000, and 5,000) for the next five years and assume their residual values are zero. Assume target firms' assets are fully depreciated by the acquirers in five years with a straight-line method.

	Target with No DT		Target with DTA		Target with DTL	
	Non-Taxable	Taxable	Non-Taxable	Taxable	Non-Taxable	Taxable
1. Fair Market Value of Assets > Book Value of Assets.						
Scenario[3]	A1	A2	B1	B2	C1	C2
Net present value to the acquirer	211,336	**240,880**	226,500	**240,880**	198,069	**240,880**
Amount paid to the target	211,336	211,336	211,336	211,336	211,336	211,336
Net amount received by the target	**211,336**	189,069	**211,336**	209,069	**211,336**	179,069
2. Book Value of Assets > Fair Market Value of Assets > Tax Basis of Assets.						
Scenario	D1	D2	E1	E2	F1	F2
Net present value to the acquirer	**80,744**	75,634	**95,907**	75,634	67,476	**75,634**
Amount paid to the target	80,744	80,744	80,744	80,744	80,744	80,744
Net amount received by the target	80,744	**84,595**	80,744	**104,595**	**80,744**	74,595
3. Tax Basis of Assets > Fair Market Value of Assets.						
Scenario	G1	G2	H1	H2	I1	I2
Net present value to the acquirer	**38,856**	22,631	**54,019**	22,631	**25,588**	22,631
Amount paid to the target	38,856	38,856	38,856	38,856	38,856	38,856
Net amount received by the target	38,856	**51,084**	38,856	**71,084**	38,856	**41,084**

[3] *For detailed information of these examples, see Appendix.*

Table 4.13 Summary of Participating Firms' Transaction Preferences

	FMV > BV > 0[†]				BV > FMV > TB				TB > FMV			
	Acquirer		Target		Acquirer		Target		Acquirer		Target	
	Preference	Scenario	Preference	Scenario	Preference	Scenario	Preference	Scenario	Preference	Scenario	Preference	Scenario
Target with no deferred taxes	T	A2	NT	A1	NT	D1	T	D2	NT	G1	T	G2
Target with only deferred tax assets	T	B2	NT	B1	NT	E1	T	E2	NT	H1	T	H2
Target with only deferred tax liabilities	T	C2	NT	C1	T	F2	NT	F1	NT	I1	T	I2

[†] *551 of 690 observations are classified in this category, where FMV > BV > 0.*

Notes:

FMV: Fair market value of assets; BV: Book value of assets; TB: Tax basis of assets.

T: Taxable transaction; NT: Non-taxable transaction.

Scenarios are referred to the scenarios in Appendix.

Moreover, Table 4.14 illustrates that when the BKMV ratio, ratio of the target's book value of equity to its market value of equity, is lower, the impact of the negotiation effect on escalating the coefficients is more appealing. Scenarios J1 and J2 in Table 4.13 are similar to Scenarios A1 and A2 in Table 4.14, except that the annual net pretax cashflows are $500,000 instead of $75,000. The preferential benefits, defined as the marginal value that a participating firm could receive in the preferred scenario, are $307,425 and $231,708 for the acquirer and the target, respectively, in Scenarios J1 and J2. However, the preferential benefits for the acquirer and the target are $29,544 and $22,267, respectively, in Scenarios A1 and A2. Therefore, the leeway of the negotiated price is higher where the BKMV ratio is lower. This conclusion remains unchanged even when the targets have deferred tax assets (i.e., Scenarios B1, B2, K1, and K2) or deferred tax liabilities (i.e., Scenarios C1, C2, L1, and L2). Although how the participating firms negotiate the settled price is an unknown question, target's deferred tax attributes may be considered during the negotiation process, since the participating firms' perceived net values are affected by these tax attributes.[36] Due to the negotiation, the acquirers do not only pay the target's deferred tax attributes purely based on the tax benefits of these attributes, but also on something beyond these tax benefits. As a result, the coefficients of deferred tax attributes could be driven higher by the negotiation effect, where the target's BKMV ratio is lower. Therefore, the interaction of the negotiation effect and the target's BKMV ratio could be a potential explanation to the relatively high magnitudes of the coefficients on the deferred tax variables found in the current study.

[36] For example, stock price is related to future earning expectation, which is a function of valuation allowance (Bauman and Das, 2004). Also, deferred tax assets from NOL carryforwards may signal a higher likelihood of future losses and could negatively impact stock price (Amir and Sougiannis, 1999). Moreover, targets' DTA and DTL affect the amount of the participating firms' preferential benefits.

Table 4.14 The Impact of the Negotiation Effect and the BKMV Ratio

The potential target firms have the following basic financial information.

	Market Value of Assets[1]	Book Value of Assets[2]	Tax Basis of Assets	Deferred Tax Assets	Deferred Tax Liabilities
High BKMV Targets					
Target A	211,336	100,000	100,000		
Target B	211,336	100,000	100,000	20,000	
Target C	211,336	100,000	50,000		17,500
Low BKMV Targets					
Target J	1,258,541	100,000	100,000		
Target K	1,258,541	100,000	100,000	20,000	
Target L	1,258,541	100,000	50,000		17,500

[1] *Effects of deferred taxes are not included.*
[2] *DTA and DTL are not included.*

For the following scenarios, assume discount rate = 10%, corporate income tax rate = 35%, and capital gains tax Rate = 20%. Target firms A, B, C (J, K, L) are predicted to have net pretax cash flows of $75,000 (500,000) for the next five years and assume their residual values are zero. Assume target firms' assets are fully depreciated by the acquirers in five years with a straight-line method.

	Target with No DT		Target with DTA		Target with DTL	
	Non-Taxable	Taxable	Non-Taxable	Taxable	Non-Taxable	Taxable
High BKMV Scenario[3]	A1	A2	B1	B2	C1	C2
Net present value to the acquirer	211,336	**240,880**	226,500	**240,880**	198,069	**240,880**
Amount paid to the target	211,336	211,336	211,336	211,336	211,336	211,336
Net amount received by the target	**211,336**	189,069	**211,336**	209,069	**211,336**	179,069
PB to the acquirer[4]		**29,544**		**14,380**		**42,811**
PB to the target	**22,267**		**2,267**		**32,267**	
Low BKMV Scenario	J1	J2	K1	K2	L1	L2
Net present value to the acquirer	1,258,541	**1,565,966**	1,273,704	**1,565,966**	1,258,273	**1,585,966**
Amount paid to the target	1,258,541	1,258,541	1,258,541	1,258,541	1,258,541	1,258,541
Net amount received by the target	**1,258,541**	1,026,833	**1,258,541**	1,046,833	**1,258,541**	1,016,833
PB to the acquirer		**307,425**		**292,262**		**327,693**
PB to the target	**231,708**		**211,708**		**241,708**	

[3] *For detailed information of these examples, see Appendix.*
[4] *PB: Preferential Benefit, which is the marginal value that a participating firm could receive in the preferred scenario.*

In this study, the sample has 551 (79.86 percent) and 197 (28.55 percent) firms with the BKMV ratios lower than one and one-third, respectively. According to the BKMV ratio, the sample is divided into three groups: low, normal, and high BKMV groups. The base model and Models 5-7 are rerun on these three groups and results are

reported in Table 4.15. Generally, these empirical results confirm that the magnitude of the coefficients of the target's tax attributes is associated with the target's BKMV ratio.

Table 4.15 The BKMV Ratio and the Coefficients of Deferred Tax Variables

Variable	BKMV < 1/3[†]	1/3 < BKMV < 1	1 < BKMV
	Coefficient[‡] (p-value)	Coefficient (p-value)	Coefficient (p-value)
Base Model			
DT	4.20** (<.0001)	2.45** (<.0001)	1.29** (0.0006)
Model 5			
NDTA	3.56 (0.0880)	2.50** (<.0001)	1.31** (0.0010)
DTL	-5.74** (0.0004)	-2.55** (<.0001)	-2.24** (<.0001)
Model 6			
GDTA	4.14 (0.0508)	2.49** (<.0001)	1.16** (0.0086)
VA	-9.32* (0.0330)	-2.34** (<.0001)	-0.83 (0.2556)
Model 7			
NOL	1.29 (0.8106)	3.00** (0.0044)	0.89 (0.0688)
OLC	-6.49 (0.5160)	1.16 (0.6504)	-4.18 (0.5876)
TCC	11.69 (0.3640)	0.40 (0.8722)	-0.43 (0.8316)
AODTA	4.71 (0.0570)	2.51** (<.0001)	1.61* (0.0186)
Obs (n)	197	354	112

[†]27 observations which have a negative BKMV ratio are deleted, because negative BKMV ratios make the comparison meaningless.

[‡] If coefficients do not have an expected sign, the p-value is two-tailed. However, if the coefficient has an expected sign, the p-value is one-tailed.

Notes:

Sample consists of 690 firms listed on New York or American Stock Exchanges and acquired during1997-2006.

Ratio of the target's book value of equity to market value of equity (BKMV) is the target's book value of equity in the last annual report prior to the announcement date, divided by the target's market value 4 weeks prior to the announcement date. Net deferred taxes (DT) represents the net amount of the target's deferred tax assets minus deferred tax liability. DTL is the deferred tax liability of the target, deflated by the number of the target's common stock outstanding in the last annual report prior to the announcement date. VA is the valuation allowance of the target. NOL is the deferred tax assets from the target's NOL carryforwards. OLC is the deferred tax assets from the target's other loss carryforwards. TCC is the deferred tax assets from the target's tax credit carryforwards. AODTA is all other deferred tax assets of the target. All of these tax-related variables are deflated by the number of the target's common stock outstanding in the last annual report prior to the announcement date.

Table 4.15 presented above shows the association between the target's BKMV ratio and the coefficients of deferred tax variables. A notable thing is that NOL becomes significant where the subsamples have relatively high BKMV ratio. However, OLC and TCC remain insignificant irrespective of the level of the target's BKMV ratio. These

findings imply that NOL is assigned positive value by the participating firms when the target's BKMV ratio is high, but NOL is ignored when the BKMV ratio is relatively low. Since the BKMV ratio indicates the capability of the target to generate future pretax cashflows, a possible explanation to these findings is that the acquirers are attracted by targets' NOL when the targets have high BKMV ratios. Therefore, it appears that acquirers are willing to price the target's NOL. However, when the targets have lower BKMV ratios, the acquirers are more interested in targets' earnings capability than their tax attributes. Another possible explanation is that when the target's BKMV ratio is lower, the negotiation effect is more appealing, making target's tax attributes irrelevant to the settled acquisition price. Consequently, the target's NOL carryforwards are ignored by the participating firms when the target's BKMV ratio is relatively low.

Moreover, the relatively high magnitude of the coefficient on AODTA indicates that this variable might capture information about other variables such as net operating assets and net financial assets (Amir et al., 1997). Finally, the high coefficient of AODTA may imply a model misspecification. A potential missing variable may be correlated to the AODTA such that the coefficient of AODTA is escalated.

NOL, OLC, and TCC. The results indicate that none of the coefficients on deferred tax assets from NOL carryforwards (NOL), deferred tax assets from other loss carryforwards (OLC), deferred tax assets from tax credit carryforwards (TCC) are significant. The interaction terms between these three components and taxability of acquisition are not significant either. The evidence does not indicate that participating firms price these three components of deferred tax assets. The relatively few firms containing the OLC and TCC information (104 and 240 observations, respectively) may

contribute to the insignificant coefficients on these two variables. While NOL and tax credit carryforwards may be valuable in business valuation, Section 382 limitation on the use of these carryovers may reduce the value of these tax attributes (Moore and Pruitt, 1987). The statutory restraint might be the reason the participating firms do not give value to these deferred tax assets components in non-taxable acquisitions. Furthermore, the mixed information signals by the existence of NOL, OLC, and TCC may negate the expectation on future earnings (Amir and Sougiannis, 1999), driving the coefficients of these variables to zero in taxable acquisitions.

These findings are inconsistent with prior research showing that NOL carryforwards are priced by the market (Moore and Pruitt, 1987; Haw et al., 1987; Hayn, 1989). However, those studies differ from the current research in threefold. First, the prior literature used the event study methodology but the current study employs price valuation models. Second, the dependent variable in these studies is cumulative abnormal returns, while acquisition price is the dependent variable in the current study. Third, these studies focus on the viewpoint of the market in pricing the NOL carryforwards. Conversely, this study emphasizes on the value of deferred tax assets from NOL carryforwards given by the participating firms during the M&A process. Overall, the different results between prior studies and the current study suggest that the market and the participating firms have different perspectives in pricing the value of target firms' NOL carryforwards.

Also, this study's results are different from Zeng (2003) in which NOL carryforwards are priced by the market. While Zeng (2003) employs a price valuation model, Canadian data is used in his study. Conversely, Amir et al. (1997) presents a

comparable result where deferred tax-loss, credit, and AMT carryforwards are not significant. In the current study, deferred tax assets from NOL carryforwards, deferred tax assets from other loss carryforwards, and deferred tax assets from tax credit carryforwards are combined to establish a new variable, which is equivalent to deferred tax-loss, credit, and AMT carryforwards in Amir et al. (1997). Nevertheless, neither the new variable nor the interaction term between the new variable and taxability of acquisition are significant (p-values=0.8697 and 0.2715, respectively).

VA. While significant in Model 6, the valuation allowance is not significant in Model 7. Consequently, the results for hypothesis two are mixed. Multicollinearity could be a possible factor, especially in that the valuation allowance and the deferred tax assets from NOL carryforwards are highly correlated (Pearson (Spearman) correlations = 0.82 (0.59)). Miller and Skinner (1998) find that the most important explanatory variable for the valuation allowance is the level of firms' tax credit and tax loss carryforwards. Consequently, in this study, the valuation allowance and the deferred tax assets from NOL carryforwards are added to create a new variable.[37] Including this new variable in Model 7 mitigates the multicollinearity concern, but the coefficient on the new variable is not significant (p-value=0.6415).

Amir et al. (1997) combines the valuation allowance as well as the deferred tax-loss, credit, and AMT carryforwards to become the net realizable value of deferred tax assets from losses and credits carryforwards. Likewise, the current study includes in Model 7 a new variable which combines the valuation allowance, deferred tax assets from NOL carryforwards, deferred tax assets from other loss carryforwards, and deferred

[37] That is, the new variable = NOL – VA.

tax assets from tax credit carryforwards.[38] Similar to Amir et al. (1997), the coefficient of this new variable is not significant (p-value=0.7861).

Summary

The empirical findings in this chapter support H_{1a}. Results of H_{2a} and H_{3a} are mixed. That is, participating firms view target firms' net deferred tax assets as real assets and assign it value in acquisitions. Also, participating firms view a target firm's deferred tax liabilities as real liabilities and assign negative value in an acquisition. Additionally, the valuation allowance is priced negatively by participating firms against target firms' deferred tax assets. Nevertheless, tax credit carryforwards are not priced by participating firms. Deferred tax assets from NOL carryforwards are assigned value by the participating firms when the target's BKMV ratio is high, but NOL is ignored by the participating firms when the target's BKMV ratio is low.

Table 4.16 presents the comparisons of the current study and prior research. There are several major differences between this study and prior research. First, this study applies the price valuation models to M&A settings. Second, the current study investigates the participating firms' viewpoints rather than the market's. Third, prior research in M&A focuses on NOL and tax credit carryforwards, but this study emphasizes deferred tax assets from NOL and tax credit carryforwards as well as deferred tax liabilities.

The next chapter, Chapter 5, provides a summary and discussions of the implication of this study. Also, the limitations of this study are noted and opportunities for future research are presented.

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[38] The new variable = NOL + OLC + TCC – VA.

Table 4.16 Comparison of the Current Study to Prior Research

Study	Settings	Methodology	Viewpoint	Priced (Yes/No)
Amir et al. (1997)	Non-M&A	Price Valuation Model	The Market	DT: Yes. VA: Yes. TTA: No.
Amir and Sougiannis (1999)	Non-M&A	Price Valuation Model	The Market	TTA: Yes. VA: Yes.
Zeng (2003)	Non-M&A	Price Valuation Model	The Market	NOL: Yes. ITC: No.
Givoly and Hayn (1992)	Non-M&A	Event Study	The Market	DTL: Yes.
Espahbodi et al. (1995)	Non-M&A	Event Study	The Market	DTL: Yes. NOL: Yes.
Moore and Pruitt (1987)	M&A	Event Study	The Market	NOL: Yes.
Haw et al. (1987)	M&A	Event Study	The Market	NOL: Yes.
Hayn (1989)	M&A	Event Study	The Market	TTA: Yes, but only for short-lived portion.
Plummer and Robinson (1990)	M&A	Event Study	The Market	TTA: No.
The Current Study (2008)	M&A	Price Valuation Model	Participating firms	DT: Yes. NDTA: Yes. DTL: Yes, but only in taxable acquisitions. VA: mixed results NOL: Yes, but only when BKMV is high. OLC: No. TCC: No.

Note:
ITC: Investment Tax Credit
TTA: Total Tax Carryforwards

CHAPTER 5

SUMMARY AND CONCLUSIONS

The purpose of this chapter is to summarize this study's research findings concerning the value relevance of deferred taxes in M&A. The primary research objective is to investigate whether participating firms give value to target firms' deferred tax assets and its components when determining acquisition price. Steps toward meeting this objective are outlined in the chapter summaries below. Furthermore, conclusions relative to the hypothesis tests are discussed, implications and limitations of the study are disclosed, and suggestions for future research are presented.

Summary of Previous Chapters

As discussed in Chapter 1, the main concern in an M&A transaction is how to determine the economic benefits and burdens contained in the transaction and allocate them among the participating parties. Part of this concern is revealed in the question of how the participating firms price the target firm's tax attributes when determining the acquisition price. Since SFAS No. 109 requires companies to disclose in their financial statements the approximate tax effect of each type of temporary difference and carryforwards, answers to the aforementioned question can provide insights as to whether the mandatory tax disclosures give value relevance information to the participating parties in M&A.

Chapter 2 includes a selected literature review of the value relevance of deferred taxes. Prior research in non-M&A as well as M&A settings is examined. Studies in non-M&A scenarios show that the market views firms' deferred tax liabilities as real liabilities. However, results on deferred tax assets from NOL carryforwards are mixed (e.g., Amir et al., 1997; Zeng, 2003). On the other hand, prior research on the effects of deferred taxes in M&A indicates that the market reacts positively to tax carryforwards. Overall, prior studies find that the market gives value to firms' deferred taxes. Nevertheless, whether participating firms price target firms' deferred taxes and the components of deferred tax assets in determining the acquisition price has not been empirically investigated.

The methodology and models used in this study are developed and outlined in Chapter 3. Two research methodologies employed in prior research are price valuation models and event studies. Although both methodologies are adopted in non-M&A settings, only event studies have been applied to this question in M&A scenarios. Since this study focuses on the viewpoints of participating firms rather than those of the market, using price valuation models is more appropriate than using event studies.

Based upon the work of Feltham and Ohlson (1995), Amir et al. (1997), and Ayers et al. (2003), this inquiry develops a base model which relates acquisition price to deferred taxes, net operating assets, net financial assets, current abnormal earnings, and other control variables. Furthermore, net deferred taxes are decomposed into several items to test the incremental value of these deferred tax components. Therefore, deferred taxes are partitioned into net deferred tax assets and deferred tax liabilities (DTL) in Model 5; separated into gross deferred tax assets, a valuation allowance (VA), and DTL

in Model 6; and into deferred tax assets from NOL carryforwards (NOL), deferred tax assets from other loss carryforwards (OLC), deferred tax assets from tax credit carryforwards (TCC), and all other deferred tax assets (AODTA), VA, and DTL in Model 7.

Chapter 4 presents an analysis of the research results. Summary statistics show that the acquisition price is 47 percent higher than the target firms' market value four weeks before the announcement date. Results of the base model indicate that deferred taxes are given value in the acquisition price. Results of Model 5 suggest that the target firms' deferred tax assets are viewed as real assets and given a positive price by participating firms. The target firms' deferred tax liabilities are viewed as real liabilities and valued negatively in taxable acquisitions, but they are ignored in non-taxable acquisitions. Findings in Model 6 confirm that the valuation allowance is priced negatively by participating firms, whereas these results are not confirmed in Model 7. Finally, results of Model 7 do not find that value is given to the target firms' deferred tax assets from other loss carryforwards (OLC) and deferred tax assets from tax credit carryforwards (TCC), whereas deferred tax assets from all others (AODTA) is priced positively. Deferred tax assets from NOL are assigned value when the target's BKMV ratio is high, but ignored when the target's BKMV ratio is low.

Summary of Conclusions

Three research questions presented in this study for investigation are as follows.

1. Are target firms' deferred tax assets (liabilities) priced as assets (liabilities) in M&A?
2. Are target firms' valuation allowance accounts priced in M&A?

3. Are target firms' deferred tax assets from NOL and tax credit carryforwards priced in M&A?

With the application of price valuation models, this study finds that the target firms' deferred tax assets and its components are generally priced by participating firms in determining the acquisition price. Specifically, findings in the base model show that participating firms give value to the target firms' deferred taxes while determining the acquisition price. However, further investigation discloses that the general results in the base model are driven by the AODTA, which may be caused by the mean-median effect, substitution effect, and negotiation effect rather than the tax savings of target firms' deferred taxes.

The stock market views firms' deferred tax assets as real assets and assigns value to them (Amir et al., 1997; Ayers, 1998). Moreover, firms' deferred tax liabilities are considered as real liabilities and priced negatively (Givoly and Hayn, 1992; Chaney and Jetter, 1994; Ayers, 1998; Citron, 2001). While the current study is involved with M&A settings, the results of Model 5 are consistent with non-M&A scenarios. That is, the participating firms view the target firms' deferred tax assets as real assets and price it positively in determining the acquisition price regardless of the taxability of acquisitions. However, the target firms' deferred tax liabilities are priced negatively in taxable acquisitions, but ignored in non-taxable transactions.

Similar to Amir et al. (1997), results of Model 6 in this study show that participating firms regard the target firms' valuation allowance as a deduction against the target firms' deferred tax assets and price it negatively. However, when gross deferred tax assets are decomposed into deferred tax assets from NOL carryforwards (NOL),

deferred tax assets from other loss carryforwards (OLC), deferred tax assets from tax credit carryforwards (TCC), and all other deferred tax assets (AODTA) in Model 7, the valuation allowance becomes non-significant. This change may imply that multicollinearity between valuation allowance and other variables is present. Following Amir et al. (1997), a new variable, net realizable value of deferred tax assets from losses and credits carryforwards, is created by combining valuation allowance, deferred tax assets from NOL carryforwards (NOL), deferred tax assets from other loss carryforwards (OLC), and deferred tax assets from tax credit carryforwards (TCC). Compatible to Amir et al. (1997), the results indicate that acquiring firms do not assign value to the target firms' net realizable deferred tax assets from losses and credits carryforwards. Nevertheless, findings in Model 7 show that the target firms' deferred tax assets from all others are priced positively by acquiring firms, although its relatively high coefficient may be caused by a model misspecification. For a summary of empirical results in this study, see Table 5.1.

Table 5.1 Summary of Results in the Current Study

Variable	Coefficient	Expected Sign†	Variable included in			
			Base Model	Model 5	Model 6	Model 7
Intercept	β_0	?	17.47879	18.42526	18.40666	18.73420
			(<.0001)	(<.0001)	(<.0001)	(<.0001)
DT	β_1	+	**1.33791****			
			(0.0002)			
OA	β_2	+	**1.73017****	**1.69775****	**1.69949****	**1.63462****
			(<.0001)	**(<.0001)**	**(<.0001)**	**(<.0001)**
FA	β_3	+	**1.39199****	**1.37555****	**1.37656****	**1.31838****
			(<.0001)	**(<.0001)**	**(<.0001)**	**(<.0001)**
AE	β_4	+	**1.26751****	**1.36473****	**1.37097****	**1.37340****
			(<.0001)	**(<.0001)**	**(<.0001)**	**(<.0001)**
TRAN	β_5	?	**7.21774****	2.93829	2.75301	3.97365
			(0.0003)	(0.2268)	(0.2681)	(0.1133)
BDE	β_6	–	1.22709	2.54682	2.55456	1.39845
			(0.7016)	(0.8617)	(0.8621)	(0.7244)
BOWN	β_7	–	**-9.17304****	**-9.25726****	**-9.24027****	**-8.75993****
			(0.0050)	**(0.0046)**	**(0.0047)**	**(0.0066)**
HOST	β_8	+	6.01675	3.07195	3.06187	2.79097
			(0.1077)	(0.2665)	(0.2675)	(0.2854)
CB	β_9	+	0.44740	0.55731	0.57900	0.54289
			(0.4414)	(0.4267)	(0.4240)	(0.4282)
TEN	β_{10}	+	2.60376	2.38466	2.40486	1.78133
			(0.0668)	(0.0838)	(0.0831)	(0.1519)
LEV	β_{11}	?	**-3.00176****	**-2.97230****	**-2.97163****	**-2.99014****
			(<.0001)	**(<.0001)**	**(<.0001)**	**(<.0001)**
ROE	β_{12}	?	2.50611	2.44580	2.44986	**2.75331***
			(0.0559)	(0.0605)	(0.0608)	**(0.0343)**
BKMV	β_{13}	?	**-6.69758****	**-6.60023****	**-6.60329****	**-6.68637****
			(<.0001)	**(<.0001)**	**(<.0001)**	**(<.0001)**
NDTA	λ_1	NA‡		**1.49574****		
				(0.0086)		
NDTA*TRAN	λ_2	+		0.62153		
				(0.2738)		
DTL	λ_3	NA‡		**-1.69917****	**-1.70221****	**-1.41619****
				(0.0008)	**(0.0008)**	**(0.0069)**
DTL*TRAN	λ_4	–		1.54597	1.56049	1.48186
				(0.9847)	(0.9852)	(0.9788)
GDTA	φ_1	NA‡			**1.49473****	
					(0.0093)	
GDTA*TRAN	φ_2	+			0.61208	
					(0.2776)	
VA	φ_3	NA‡			**-1.49520***	-0.51717
					(0.0440)	(0.5467)
VA*TRAN	φ_4	–			-0.24179	0.11827
					(0.4338)	(0.5276)

NOL	ρ_1	NA‡				0.08306
						(0.9277)
NOL*TRAN	ρ_2	+				-1.40612
						(0.7502)
OLC	ρ_3	NA‡				-1.70940
						(0.6971)
OLC*TRAN	ρ_4	+				1.49919
						(0.4255)
TCC	ρ_5	NA‡				-3.18778
						(0.3818)
TCC*TRAN	ρ_6	+				-1.59549
						(0.6288)
AODTA	ρ_7	NA‡				**2.52609****
						(0.0003)
AODTA*TRAN	ρ_8	+				0.96147
						(0.2092)
SIC_i			Excluded	Excluded	Excluded	Excluded
$YEAR_j$			Excluded	Excluded	Excluded	Excluded
R^2			0.4533	0.4625	0.4627	0.4761
Adj-R^2			0.4427	0.4497	0.4482	0.4572
Obs (n)			690	690	690	690

† If coefficients do not have an expected sign, the p-value is two-tailed. However, if the coefficient has an expected sign, the p-value is one-tailed.
‡N/A: Coefficient is expected to be zero.
Notes:
Sample consists of 690 firms listed on New York or American Stock Exchanges and acquired during1997-2006.
Acquisition price (AP) represents the implied value of a transaction calculated by multiplying the number of common shares outstanding by the offering price. Net deferred taxes (DT) represents the net amount of the target's deferred tax assets minus deferred tax liability. OA represents the net operating assets of the target. Net operating assets are figured as book value of the shareholders' equity plus net deferred tax liabilities minus net financial assets. FA represents the net financial assets of the target. Net financial assets are computed as cash and cash equivalents plus short-term investments, minus long-term debt, current portion of long-term debt, and preferred stock. Current abnormal earnings (AE), which are the current earnings in the year before the announcement year minus expected normal earnings (net operating assets at the beginning of the year before the announcement year) times cost of capital). Current earnings are calculated as income before extraordinary items plus tax-adjusted interest expense minus tax-adjusted other nonoperating income. AP, OA, FA, and AE are deflated by the number of the target's common stock outstanding in the last annual report prior to the announcement date. Target's leverage (LEV) is the ratio of long-term debt to the target's market value 4 weeks prior to the announcement date. Return on market value of equity (ROE) is the ratio of the target's net income before extraordinary items to the target's market value 4 weeks prior to the announcement date. Ratio of the target's book value of equity to market value of equity (BKMV) is the target's book value of equity in the last annual report prior to the announcement date, divided by the target's market value 4 weeks prior to the announcement date.*
Taxability of acquisition (TRAN) is an indicator variable which equals one for a non-taxable acquisition, otherwise zero. BDE is an indicator variable which equals one if the acquisition is classified as Type B, divisive Type D, or Type E reorganization, otherwise zero. BOWN, which is ranged between 0 and 1, represents the percentage of the target's common stock owned by the acquirer prior to the announcement date. Management hostility (HOST) is an indicator variable, which equals one if the target's management opposed the acquisition, otherwise zero. Competing bids (CB) is an indicator variable, which equals one if a competing bidder existed, otherwise zero. Tender offer (TEN) is an indicator variable, which equals one if the acquisition was initiated with a tender offer, otherwise zero.
DTL is the deferred tax liability of the target, deflated by the number of the target's common stock outstanding in the last annual report prior to the announcement date. VA is the valuation allowance of the target. NOL is the deferred tax assets from the target's NOL carryforwards. OLC is the deferred tax assets from the target's other loss carryforwards. TCC is the deferred tax assets from the target's tax credit carryforwards. AODTA is all other deferred tax assets of the target. All of these tax-related variables are deflated by the number of the target's common stock outstanding in the last annual report prior to the announcement date.

Prior research (Moore and Pruitt, 1987; Haw et al., 1987; Hayn, 1989) shows that NOL carryforwards are priced by the market. Nevertheless, the current study finds that participating firms do not assign value to deferred tax assets from NOL carryforwards in determining the acquisition price. The fact that these findings are different suggests that

the market and the participating firms have different perspectives when evaluating the tax benefits of the target firms' NOL carryforwards.

The results of this inquiry point out that the coefficients of deferred taxes and its components are greater than one. This study identifies three possible factors that may escalate the coefficients: the mean-median effect (De Waegenaere et al., 2003), the negotiation effect, and the substitution effect. Nevertheless, this study cannot rule out the possibility that these tax related variables may capture some information about other variables.

Prior research (e.g., Amir et al., 1997; Ayers, 1998) suggests that reporting deferred tax components as required by SFAS No. 109 provides value relevance information to the market. By and large, this study confirms their findings. However, this research examination does extend the extant literature from non-M&A to M&A settings. That is, this study finds that deferred taxes and its components, as required by SFAS No. 109, provide value relevance information to the participating firms in determining the value of these deferred tax items.

Implications

The results of this study show that the target firms' deferred taxes are given value by participating firms in determining the acquisition price. In practice, the models developed in the current study can be used to set the benchmark when the participating firms are negotiating the acquisition price. Specifically, for every one dollar of the target firms' deferred taxes, acquiring firms should be expected to pay $1.34. The amount of $1.34 holds irrespective of the year of acquisition or the industries in which the target is classified, but it is worthwhile to note that the standard error of deferred taxes is $0.38.

Therefore, the concurrent value of target firm's deferred taxes by the participating firms could have some deviation from $1.34, but the standard error of $0.38 should provide guidance on this deviation.

This study finds that the pricing of target firms' deferred tax liabilities is related to the taxability of acquisitions. That is, participating firms assign negative value to target firms' deferred tax liabilities in taxable acquisitions, but ignore them in non-taxable acquisitions. Therefore, acquirers and targets should note the impact of taxability of acquisitions on the pricing of deferred tax liabilities.

Results of decomposing the target firms' deferred taxes indicate that participating firms do not give value to the targets' deferred tax assets other loss carryforwards and tax credit carryforwards. Moreover, the participating firms assign price to deferred tax assets from NOL carryforwards only when the target's BKMV ratio is high. These findings are different from prior research (Moore and Pruitt, 1987; Haw et al., 1987; Hayn, 1989), which shows the market gives value to target firms' NOL and tax credit carryforwards. Therefore, the different perspectives between the participating firms and the market should be noted. Specifically, when determining the acquisition price, potential acquirers and targets should value the target firms' deferred taxes in accordance with the viewpoint of participating firms rather than the market. Findings in this study could be used as a yardstick to guide the participating firms through the valuation and negotiation process.

Limitations

The sample is limited to the target firms delisted from the New York or American Stock Exchanges. That is, targets categorized as private firms or relatively small public firms are not represented in the study. Therefore, findings in the current study may not be

generalized to explain the value of deferred taxes for these types of targets. Also, following Amir et al. (1997), this inquiry does not include target firms classified as financial institutions or electric utilities. Thus, results shown in this study may not be used to interpret the value relevance of deferred taxes in acquisitions involving a target considered as a financial institution or electric utility firm.

Findings in the current study show that the coefficient of deferred tax assets from all others (AODTA) is relatively high. The present examination interprets this high magnitude as being driven by the mean-median effect, the negotiation effect, and the tax rate effect. However, a potential model misspecification might not be ruled out.

Suggestions for Future Research

The limitations noted above suggest possible extensions for this study. For example, since the coefficient of deferred tax assets from all others (AODTA) is relatively high, AODTA might capture the information of other variables. This indicates that a model misspecification may be present. Further investigation into identifying these potential missing variables could improve the understanding of how the participating firms price the target firms' deferred taxes in M&A. Specifically, the relationship between acquisition price and the target firm's R&D expenses and onetime write-off could be scrutinized.

This study finds that the target firms' gross deferred tax assets are priced by participating firms when determining the acquisition price. However, decomposing gross deferred tax assets into four components indicate that these results are driven solely by the deferred tax assets from all others. Amir et al. (1997) list 25 deferred tax items obtained from notes in the targets' financial statements and categorize 7 deferred tax

components in their study, but the current study only uses 4 deferred tax assets items. Further decomposing of AODTA in this study may reveal more value relevance information from tax footnotes in financial statements.

Congress has been concerned with the tax benefits taken by merging firms and has established some constraints on the use of the target firms' tax attributes by the acquirers. For example, Sections 382 limits the annual amount of the targets' tax carryover (e.g., NOL, capital loss, tax credit carryforwards, and so on) that could be utilized by the acquiring firms following acquisitions. However, findings in this study indicate that participating firms do not give value to target firms' deferred tax assets from other loss carryforwards and tax credit carryforwards in determining the acquisition price. Additionally, the acquirers assign value to deferred tax assets from NOL carryforwards only when the target's BKMV ratio is high. This implies that participating firms do not expect the utilization of the tax benefits associated with these target firms' tax attributes. However, since data analyzed in this study are all restricted by Section 382, one cannot conclude whether these restrictions have effectively decreased the value of the target firms' tax carryovers. Therefore, further research could be taken to investigate the effectiveness of the Section 382 limitation, especially in the perspectives of participating firms rather than the market.

The objective of the FASB Interpretation No. 48 ("FIN 48," FASB, 2006a) is to establish a consistent threshold for recognizing current and deferred taxes. FIN 48 is intended to increase the relevance and comparability in financial reporting of income taxes (FASB, 2006a). Further research can be pursued in determining whether FIN 48 provides incremental value relevance information in non-M&A as well as M&A settings.

Summary

This study provides evidence that participating firms give value to target firms' deferred taxes in determining the acquisition price, although the valuation may be driven by the negotiation effect rather than the tax savings of the target firms' tax attributes. Particularly, this inquiry reveals the viewpoints of the participating firms rather than the market in pricing the tax benefits from the target firms' NOL carryforwards, other loss carryforwards, and tax credit carryforwards. Prior research shows that the market gives value to the target firms' NOL and tax credit carryforwards in deciding the stock price. However, the current study finds that participating firms do not give value to the target firms' deferred tax assets from other loss carryforwards and tax credit carryforwards. Moreover, the participating firms assign value to deferred tax assets from NOL carryforwards only when the target's BKMV ratio is high. Findings in this study can help us understand the participating firms' pricing of the target firms' deferred taxes. In practice, the results could provide a yardstick for the potential acquiring and target firms in determining the value of the target firms' deferred taxes.

APPENDIX

NUMERIC EXAMPLES

APPENDIX

NUMERIC EXAMPLES

1. Fair Market Value of Assets > Book Value of Assets.

Assume there are three potential target firms with basic financial information as follows.

	Market Value of Assets[1]	Book Value of Assets	Tax Basis of Assets	Deferred Tax Assets	Deferred Tax Liabilities
Target A	211,336	100,000	100,000		
Target B	211,336	100,000	100,000	20,000	
Target C	211,336	100,000	50,000		17,500

[1] Effects of deferred taxes are not included.

For the following scenarios, assume discount rate = 10%, corporate income tax rate = 35%, and capital gains tax Rate = 20%. Target firms are predicted to have net pretax cash flows of $75,000 for the next five years and assume their residual values are zero. Assume target firms' assets are fully depreciated by the acquirers in five years with a straight-line method.

Target A

Scenario A1: An acquirer pays $211,336 to acquire Target A in a non-taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	75,000	75,000	75,000	75,000	75,000
Depreciation	(20,000)	(20,000)	(20,000)	(20,000)	(20,000)
Taxable income	55,000	55,000	55,000	55,000	55,000
Tax expense	(19,250)	(19,250)	(19,250)	(19,250)	(19,250)
Net tax payment	(19,250)	(19,250)	(19,250)	(19,250)	(19,250)
Net cash flows	55,750	55,750	55,750	55,750	55,750
Net present value to the acquirer:		**211,336**			
Amount paid to the target:		**211,336**			
Taxable gains to the target:		0			
Capital gains tax of the target:		0			
Net amount received by the target:		**211,336**			

Scenario A2: An acquirer pays $211,336 to acquire Target A in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	75,000	75,000	75,000	75,000	75,000
Depreciation[2]	(42,267)	(42,267)	(42,267)	(42,267)	(42,267)
Taxable income	32,733	32,733	32,733	32,733	32,733
Tax expense	(11,456)	(11,456)	(11,456)	(11,456)	(11,456)
Net tax payment	(11,456)	(11,456)	(11,456)	(11,456)	(11,456)
Net cash flows	63,544	63,544	63,544	63,544	63,544
Net present value to the acquirer:		**240,880**			
Amount paid to the target:		**211,336**			
Taxable gains to the target:		111,336			
Capital gains tax of the target:		(22,267)			
Net amount received by the target:		**189,069**			

[2] Depreciation = $211,336/5 = $42,267. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

Scenario A3: An acquirer pays $240,880 to acquire Target A in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	75,000	75,000	75,000	75,000	75,000
Depreciation[3]	(42,267)	(42,267)	(42,267)	(42,267)	(42,267)
Amortization of goodwill from acquisition[4]	(5,909)	(5,909)	(5,909)	(5,909)	(5,909)
Taxable income	26,824	26,824	26,824	26,824	26,824
Tax expense	(9,388)	(9,388)	(9,388)	(9,388)	(9,388)
Net tax payment	(9,388)	(9,388)	(9,388)	(9,388)	(9,388)
Net cash flows	65,612	65,612	65,612	65,612	65,612
Net present value to the acquirer:		**248,720**			
Amount paid to the target:		**240,880**			
Taxable gains to the target:		140,880			
Capital gains tax of the target:		(28,176)			
Net amount received by the target:		**212,704**			

[3] The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.
[4] Amortization of goodwill from acquisition = ($240,880-211,336)/5 = $5,909.

Target B

Scenario B1: An acquirer pays $211,336 to acquire Target B in a non-taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	75,000	75,000	75,000	75,000	75,000
Depreciation	(20,000)	(20,000)	(20,000)	(20,000)	(20,000)
Taxable income	55,000	55,000	55,000	55,000	55,000
Tax expense	(19,250)	(19,250)	(19,250)	(19,250)	(19,250)
Amortization of Deferred Tax Assets[5]	4,000	4,000	4,000	4,000	4,000
Net tax payment	(15,250)	(15,250)	(15,250)	(15,250)	(15,250)
Net cash flows	59,750	59,750	59,750	59,750	59,750
Net present value to the acquirer:		**226,500**			
Amount paid to the target:		**211,336**			
Taxable gains to the target:		0			
Capital gains tax of the target:		0			
Net amount received by the target:		**211,336**			

[5] Deferred tax assets of $20,000 are amortized over the five years via a straight-line method.

Scenario B2: An acquirer pays $211,336 to acquire Target B in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	75,000	75,000	75,000	75,000	75,000
Depreciation[6]	(42,267)	(42,267)	(42,267)	(42,267)	(42,267)
Taxable income	32,733	32,733	32,733	32,733	32,733
Tax expense	(11,456)	(11,456)	(11,456)	(11,456)	(11,456)
Net tax payment	(11,456)	(11,456)	(11,456)	(11,456)	(11,456)
Net cash flows	63,544	63,544	63,544	63,544	63,544
Net present value to the acquirer:		**240,880**			
Amount paid to the target:		**211,336**			
Taxable gains to the target:		111,336			
Capital gains tax of the target:		(22,267)			
Deferred tax assets:		20,000			
Net amount received by the target:		**209,069**			

[6] Depreciation = $211,336/5 = $42,267. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

Scenario B3: An acquirer pays $240,880 to acquire Target B in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	75,000	75,000	75,000	75,000	75,000
Depreciation[7]	(42,267)	(42,267)	(42,267)	(42,267)	(42,267)
Amortization of goodwill from acquisition[8]	(5,909)	(5,909)	(5,909)	(5,909)	(5,909)
Taxable income	26,824	26,824	26,824	26,824	26,824
Tax expense	(9,388)	(9,388)	(9,388)	(9,388)	(9,388)
Net tax payment	(9,388)	(9,388)	(9,388)	(9,388)	(9,388)
Net cash flows	65,612	65,612	65,612	65,612	65,612
Net present value to the acquirer:		**248,720**			
Amount paid to the target:		**240,880**			
Taxable gains to the target:		140,880			
Capital gains tax of the target:		28,176			
Deferred tax assets:		20,000			
Net amount received by the target:		**232,704**			

[7] The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.
[8] Amortization of goodwill from acquisition = ($240,880-211,336)/5 = $5,909.

Target C

Scenario C1: An acquirer pays $211,336 to acquire Target C in a non-taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	75,000	75,000	75,000	75,000	75,000
Depreciation	(10,000)	(10,000)	(10,000)	(10,000)	(10,000)
Taxable income	65,000	65,000	65,000	65,000	65,000
Tax expense	(22,750)	(22,750)	(22,750)	(22,750)	(22,750)
Net tax payment	(22,750)	(22,750)	(22,750)	(22,750)	(22,750)
Net cash flows	52,250	52,250	52,250	52,250	52,250
Net present value to the acquirer:		**198,069**			
Amount paid to the target:		**211,336**			
Taxable gains to the target:		0			
Capital gains tax of the target:		0			
Net amount received by the target:		**211,336**			

Scenario C2: An acquirer pays $211,336 to acquire Target C in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	75,000	75,000	75,000	75,000	75,000
Depreciation[9]	(42,267)	(42,267)	(42,267)	(42,267)	(42,267)
Taxable income	32,733	32,733	32,733	32,733	32,733
Tax expense	(11,456)	(11,456)	(11,456)	(11,456)	(11,456)
Net tax payment	(11,456)	(11,456)	(11,456)	(11,456)	(11,456)
Net cash flows	63,544	63,544	63,544	63,544	63,544
Net present value to the acquirer:		**240,880**			
Amount paid to the target:		**211,336**			
Taxable gains to the target:		161,336			
Capital gains tax of the target:		(32,267)			
Net amount received by the target:		**179,069**			

[9] Depreciation = $211,336/5 = $42,267. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

Scenario C3: An acquirer pays $240,880 to acquire Target C in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	75,000	75,000	75,000	75,000	75,000
Depreciation[10]	(42,267)	(42,267)	(42,267)	(42,267)	(42,267)
Amortization of goodwill from acquisition[11]	(5,909)	(5,909)	(5,909)	(5,909)	(5,909)
Taxable income	26,824	26,824	26,824	26,824	26,824
Tax expense	(9,388)	(9,388)	(9,388)	(9,388)	(9,388)
Net tax payment	(9,388)	(9,388)	(9,388)	(9,388)	(9,388)
Net cash flows	65,612	65,612	65,612	65,612	65,612
Net present value to the acquirer:		**248,720**			
Amount paid to the target:		**240,880**			
Taxable gains to the target:		190,880			
Capital gains tax of the target:		(38,176)			
Net amount received by the target:		**202,704**			

[10] The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.
[11] Amortization of goodwill from acquisition = ($240,880-211,336)/5 = $5,909.

2. Book Value of Assets > Fair Market Value of Assets > Tax Basis of Assets.
Assume there are three potential target firms with basic financial information as follows.

	Market Value of Assets[1]	Book Value of Assets[2]	Tax Basis of Assets	Deferred Tax Assets	Deferred Tax Liabilities
Target D	80,744	100,000	100,000		
Target E	80,744	100,000	100,000	20,000	
Target F	80,744	100,000	50,000		17,500

[1] Effects of deferred taxes are not included.
[2] DTA and DTL are not included.

For the following scenarios, assume discount rate = 10%, corporate income tax rate = 35%, and capital gains tax Rate = 20%. Target firms are predicted to have net pretax cash flows of $22,000 for the next five years and assume their residual values are zero. Assume target firms' assets are fully depreciated by the acquirers in five years with a straight-line method.

Target D

Scenario D1: An acquirer pays $80,744 to acquire Target D in a non-taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	22,000	22,000	22,000	22,000	22,000
Depreciation	(20,000)	(20,000)	(20,000)	(20,000)	(20,000)
Taxable income	2,000	2,000	2,000	2,000	2,000
Tax expense	(700)	(700)	(700)	(700)	(700)
Net tax payment	(700)	(700)	(700)	(700)	(700)
Net cash flows	21,300	21,300	21,300	21,300	21,300
Net present value to the acquirer:		**80,744**			
Amount paid to the target:		**80,744**			
Taxable gains to the target:		0			
Capital gains tax of the target:		0			
Net amount received by the target:		**80,744**			

Scenario D2: An acquirer pays $80,744 to acquire Target D in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	22,000	22,000	22,000	22,000	22,000
Depreciation[2]	(16,149)	(16,149)	(16,149)	(16,149)	(16,149)
Taxable income	5,851	5,851	5,851	5,851	5,851
Tax expense	(2,048)	(2,048)	(2,048)	(2,048)	(2,048)
Net tax payment	(2,048)	(2,048)	(2,048)	(2,048)	(2,048)
Net cash flows	19,952	19,952	19,952	19,952	19,952
Net present value to the acquirer:		**75,634**			
Amount paid to the target:		**80,744**			
Taxable gains to the target:		(19,256)			
Capital gains tax of the target:		(3,851)			
Net amount received by the target:		**84,595**			

[2] Depreciation = $80,744/5 = $16,149. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

Scenario D3: An acquirer pays $75,634 to acquire Target D in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	22,000	22,000	22,000	22,000	22,000
Depreciation[3]	(15,127)	(15,127)	(15,127)	(15,127)	(15,127)
Taxable income	6,873	6,873	6,873	6,873	6,873
Tax expense	(2,406)	(2,406)	(2,406)	(2,406)	(2,406)
Net tax payment	(2,406)	(2,406)	(2,406)	(2,406)	(2,406)
Net cash flows	19,594	19,594	19,594	19,594	19,594
Net present value to the acquirer:		**74,278**			
Amount paid to the target:		**75,634**			
Taxable gains to the target:		(24,366)			
Capital gains tax of the target:		(4,873)			
Net amount received by the target:		**80,507**			

[3] Depreciation= $75,634/5 = $15.127. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

Target E

Scenario E1: An acquirer pays $80,744 to acquire Target E in a non-taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	22,000	22,000	22,000	22,000	22,000
Depreciation	(20,000)	(20,000)	(20,000)	(20,000)	(20,000)
Taxable income	2,000	2,000	2,000	2,000	2,000
Tax expense	(700)	(700)	(700)	(700)	(700)
Amortization of Deferred Tax Assets[4]	4,000	4,000	4,000	4,000	4,000
Net tax payment	(3,300)	(3,300)	(3,300)	(3,300)	(3,300)
Net cash flows	25,300	25,300	25,300	25,300	25,300
Net present value to the acquirer:		**95,907**			
Amount paid to the target:		**80,744**			
Taxable gains to the target:		0			
Capital gains tax of the target:		0			
Net amount received by the target:		**80,744**			

[4] Deferred tax assets of $20,000 are amortized over the five years via a straight-line method.

Scenario E2: An acquirer pays $80,744 to acquire Target E in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	22,000	22,000	22,000	22,000	22,000
Depreciation[5]	(16,149)	(16,149)	(16,149)	(16,149)	(16,149)
Taxable income	5,851	5,851	5,851	5,851	5,851
Tax expense	(2,048)	(2,048)	(2,048)	(2,048)	(2,048)
Net tax payment	(2,048)	(2,048)	(2,048)	(2,048)	(2,048)
Net cash flows	19,952	19,952	19,952	19,952	19,952
Net present value to the acquirer:		**75,634**			
Amount paid to the target:		**80,744**			
Taxable gains to the target:		(19,256)			
Capital gains tax of the target:		(3,851)			
Deferred tax assets:		20,000			
Net amount received by the target:		**104,595**			

[5] Depreciation = $80,744/5 = $16,149. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

Scenario E3: An acquirer pays $75,634 to acquire Target E in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	22,000	22,000	22,000	22,000	22,000
Depreciation[6]	(15,127)	(15,127)	(15,127)	(15,127)	(15,127)
Taxable income	6,873	6,873	6,873	6,873	6,873
Tax expense	(2,406)	(2,406)	(2,406)	(2,406)	(2,406)
Net tax payment	(2,406)	(2,406)	(2,406)	(2,406)	(2,406)
Net cash flows	19,594	19,594	19,594	19,594	19,594
Net present value to the acquirer:		**74,278**			
Amount paid to the target:		**75,634**			
Taxable gains to the target:		(24,366)			
Capital gains tax of the target:		(4,873)			
Deferred tax assets:		20,000			
Net amount received by the target:		**100,507**			

[6] Depreciation= $75,634/5 =$15,127. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

Target F

Scenario F1: An acquirer pays $80,744to acquire Target F in a non-taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	22,000	22,000	22,000	22,000	22,000
Depreciation	(10,000)	(10,000)	(10,000)	(10,000)	(10,000)
Taxable income	12,000	12,000	12,000	12,000	12,000
Tax expense	(4,200)	(4,200)	(4,200)	(4,200)	(4,200)
Net tax payment	(4,200)	(4,200)	(4,200)	(4,200)	(4,200)
Net cash flows	17,800	17,800	17,800	17,800	17,800
Net present value to the acquirer:		**67,476**			
Amount paid to the target:		**80,744**			
Taxable gains to the target:		0			
Capital gains tax of the target:		0			
Net amount received by the target:		**80,744**			

Scenario F2: An acquirer pays $80,744 to acquire Target F in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	22,000	22,000	22,000	22,000	22,000
Depreciation[7]	(16,149)	(16,149)	(16,149)	(16,149)	(16,149)
Taxable income	5,851	5,851	5,851	5,851	5,851
Tax expense	(2,048)	(2,048)	(2,048)	(2,048)	(2,048)
Net tax payment	(2,048)	(2,048)	(2,048)	(2,048)	(2,048)
Net cash flows	19,952	19,952	19,952	19,952	19,952
Net present value to the acquirer:		**75,634**			
Amount paid to the target:		**80,744**			
Taxable gains to the target:		30,744			
Capital gains tax of the target:		(6,149)			
Net amount received by the target:		**74,595**			

[7] Depreciation = $80,744 /5 = $16,149. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

Scenario F3: An acquirer pays $75,634 to acquire Target F in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	22,000	22,000	22,000	22,000	22,000
Depreciation[8]	(15,127)	(15,127)	(15,127)	(15,127)	(15,127)
Taxable income	6,873	6,873	6,873	6,873	6,873
Tax expense	(2,406)	(2,406)	(2,406)	(2,406)	(2,406)
Net tax payment	(2,406)	(2,406)	(2,406)	(2,406)	(2,406)
Net cash flows	19,594	19,594	19,594	19,594	19,594
Net present value to the acquirer:		**74,278**			
Amount paid to the target:		**75,634**			
Taxable gains to the target:		25,634			
Capital gains tax of the target:		5,127			
Net amount received by the target:		**70,507**			

[8] Depreciation = $75,634/5 = $15,127. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

3. Tax Basis of Assets > Fair Market Value of Assets.

Assume there are three potential target firms with basic financial information as follows.

	Market Value of Assets[1]	Book Value of Assets[2]	Tax Basis of Assets	Deferred Tax Assets	Deferred Tax Liabilities
Target G	38,856	100,000	100,000		
Target H	38,856	100,000	100,000	20,000	
Target I	38,856	100,000	50,000		17,500

[1] Effects of deferred taxes are not included.

[2] DTA and DTL are not included.

For the following scenarios, assume discount rate = 10%, corporate income tax rate = 35%, and capital gains tax Rate = 20%. Target firms are predicted to have net pretax cash flows of $5,000 for the next five years and assume their residual values are zero. Assume target firms' assets are fully depreciated by the acquirers in five years with a straight-line method.

Target G

Scenario G1: An acquirer pays $38,856 to acquire Target G in a non-taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	5,000	5,000	5,000	5,000	5,000
Depreciation	(20,000)	(20,000)	(20,000)	(20,000)	(20,000)
Taxable income	(15,000)	(15,000)	(15,000)	(15,000)	(15,000)
Tax benefit	5,250	5,250	5,250	5,250	5,250
Net cash flows	10,250	10,250	10,250	10,250	10,250
Net present value to the acquirer:		**38,856**			
Amount paid to the target:		**38,856**			
Taxable gains to the target:		0			
Capital gains tax of the target:		0			
Net amount received by the target:		**38,856**			

Scenario G2: An acquirer pays $38,856 to acquire Target G in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	5,000	5,000	5,000	5,000	5,000
Depreciation[2]	(7,771)	(7,771)	(7,771)	(7,771)	(7,771)
Taxable income	(2,771)	(2,771)	(2,771)	(2,771)	(2,771)
Tax benefit	970	970	970	970	970
Net cash flows	5,970	5,970	5,970	5,970	5,970
Net present value to the acquirer:		**22,631**			
Amount paid to the target:		**38,856**			
Taxable gains to the target:		(61,144)			
Capital gains tax of the target:		(12,229)			
Net amount received by the target:		**51,084**			

[2] Depreciation = $38,856/5 = $7,771. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

Scenario G3: An acquirer pays $22,631 to acquire Target G in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	5,000	5,000	5,000	5,000	5,000
Depreciation[3]	(4,526)	(4,526)	(4,526)	(4,526)	(4,526)
Taxable income	474	474	474	474	474
Tax expense	(166)	(166)	(166)	(166)	(166)
Net tax payment	(166)	(166)	(166)	(166)	(166)
Net cash flows	4,834	4,834	4,834	4,834	4,834
Net present value to the acquirer:		**18,325**			
Amount paid to the target:		**22,631**			
Taxable gains to the target:		(77,369)			
Capital gains tax of the target:		(15,474)			
Net amount received by the target:		**38,104**			

[3] Depreciation = $22,631/5= $4,526. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

Target H

Scenario H1: An acquirer pays $38,856 to acquire Target H in a non-taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	5,000	5,000	5,000	5,000	5,000
Depreciation	(20,000)	(20,000)	(20,000)	(20,000)	(20,000)
Taxable income	(15,000)	(15,000)	(15,000)	(15,000)	(15,000)
Tax benefit	5,250	5,250	5,250	5,250	5,250
Amortization of Deferred Tax Assets[4]	4,000	4,000	4,000	4,000	4,000
Net cash flows	14,250	14,250	14,250	14,250	14,250
Net present value to the acquirer:		**54,019**			
Amount paid to the target:		**38,856**			
Taxable gains to the target:		0			
Capital gains tax of the target:		0			
Net amount received by the target:		**38,856**			

[4] Deferred tax assets of $20,000 are amortized over the five years via a straight-line method.

Scenario H2: An acquirer pays $38,856 to acquire Target H in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	5,000	5,000	5,000	5,000	5,000
Depreciation[5]	(7,771)	(7,771)	(7,771)	(7,771)	(7,771)
Taxable income	(2,771)	(2,771)	(2,771)	(2,771)	(2,771)
Tax benefit	970	970	970	970	970
Net cash flows	5,970	5,970	5,970	5,970	5,970
Net present value to the acquirer:		**22,631**			
Amount paid to the target:		**38,856**			
Taxable gains to the target:		(61,144)			
Capital gains tax of the target:		(12,229)			
Deferred tax assets:		20,000			
Net amount received by the target:		**71,084**			

[5] Depreciation = $38,856/5 = $7,771. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

Scenario H3: An acquirer pays $22,631 to acquire Target H in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	5,000	5,000	5,000	5,000	5,000
Depreciation[6]	(4,526)	(4,526)	(4,526)	(4,526)	(4,526)
Taxable income	474	474	474	474	474
Tax expense	(166)	(166)	(166)	(166)	(166)
Net tax payment	(166)	(166)	(166)	(166)	(166)
Net cash flows	4,834	4,834	4,834	4,834	4,834
Net present value to the acquirer:		**18,325**			
Amount paid to the target:		**22,631**			
Taxable gains to the target:		(77,369)			
Capital gains tax of the target:		(15,474)			
Deferred tax assets:		20,000			
Net amount received by the target:		**58,104**			

[6] Depreciation = $22,631/5= $4,526. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

Target I

Scenario I1: An acquirer pays $38,856 to acquire Target I in a non-taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	5,000	5,000	5,000	5,000	5,000
Depreciation	(10,000)	(10,000)	(10,000)	(10,000)	(10,000)
Taxable income	(5,000)	(5,000)	(5,000)	(5,000)	(5,000)
Tax benefit	1,750	1,750	1,750	1,750	1,750
Net cash flows	6,750	6,750	6,750	6,750	6,750
Net present value to the acquirer:		**25,588**			
Amount paid to the target:		**38,856**			
Taxable gains to the target:		0			
Capital gains tax of the target:		0			
Net amount received by the target:		**38,856**			

Scenario I2: An acquirer pays $38,856 to acquire Target I in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	5,000	5,000	5,000	5,000	5,000
Depreciation[7]	(7,771)	(7,771)	(7,771)	(7,771)	(7,771)
Taxable income	(2,771)	(2,771)	(2,771)	(2,771)	(2,771)
Tax benefit	970	970	970	970	970
Net cash flows	5,970	5,970	5,970	5,970	5,970
Net present value to the acquirer:		**22,631**			
Amount paid to the target:		**38,856**			
Taxable gains to the target:		(11,144)			
Capital gains tax of the target:		(2,229)			
Net amount received by the target:		**41,084**			

[7] Depreciation = $38,856/5 = $7,771. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

Scenario I3: An acquirer pays $22,631 to acquire Target I in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	5,000	5,000	5,000	5,000	5,000
Depreciation[8]	(4,526)	(4,526)	(4,526)	(4,526)	(4,526)
Taxable income	474	474	474	474	474
Tax expense	(166)	(166)	(166)	(166)	(166)
Net tax payment	(166)	(166)	(166)	(166)	(166)
Net cash flows	4,834	4,834	4,834	4,834	4,834
Net present value to the acquirer:		**18,325**			
Amount paid to the target:		**22,631**			
Taxable gains to the target:		(27,369)			
Capital gains tax of the target:		(5,474)			
Net amount received by the target:		**28,104**			

[8] Depreciation = $22,631/5 = $4,526. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

4. Targets with Extremely Low BKMV Ratios

Assume there are three potential target firms with basic financial information as follows.

	Market Value of Assets[1]	Book Value of Assets[2]	Tax Basis of Assets	Deferred Tax Assets	Deferred Tax Liabilities
Target J	1,258,541	100,000	100,000		
Target K	1,258,541	100,000	100,000	20,000	
Target L	1,258,541	100,000	50,000		17,500

[1] Effects of deferred taxes are not included.

[2] DTA and DTL are not included.

For the following scenarios, assume discount rate = 10%, corporate income tax rate = 35%, and capital gains tax Rate = 20%. Target firms are predicted to have net pretax cash flows of $500,000 for the next five years and assume their residual values are zero. Assume target firms' assets are fully depreciated by the acquirers in five years with a straight-line method.

Target J

Scenario J1: An acquirer pays $1,258,541 to acquire Target J in a non-taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	500,000	500,000	500,000	500,000	500,000
Depreciation	(20,000)	(20,000)	(20,000)	(20,000)	(20,000)
Taxable income	480,000	480,000	480,000	480,000	480,000
Tax expense	(168,000)	(168,000)	(168,000)	(168,000)	(168,000)
Net tax payment	(168,000)	(168,000)	(168,000)	(168,000)	(168,000)
Net cash flows	332,000	332,000	332,000	332,000	332,000
Net present value to the acquirer:		**1,258,541**			
Amount paid to the target:		**1,258,541**			
Taxable gains to the target:		0			
Capital gains tax of the target:		0			
Net amount received by the target:		**1,258,541**			

Scenario J2: An acquirer pays $1,258,541 to acquire Target J in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	500,000	500,000	500,000	500,000	500,000
Depreciation[1]	(251,708)	(251,708)	(251,708)	(251,708)	(251,708)
Taxable income	248,292	248,292	248,292	248,292	248,292
Tax expense	(86,902)	(86,902)	(86,902)	(86,902)	(86,902)
Net tax payment	(86,902)	(86,902)	(86,902)	(86,902)	(86,902)
Net cash flows	413,098	413,098	413,098	413,098	413,098
Net present value to the acquirer:		**1,565,966**			
Amount paid to the target:		**1,258,541**			
Taxable gains to the target:		1,158,541			
Capital gains tax of the target:		231,708			
Net amount received by the target:		**1,026,833**			

[1] Depreciation = $1,258,541/5 = $251,708. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

Scenario J3: An acquirer pays $1,565,966 to acquire Target J in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	500,000	500,000	500,000	500,000	500,000
Depreciation[2]	(251,708)	(251,708)	(251,708)	(251,708)	(251,708)
Amortization of Goodwill from acquisition[3]	(61,485)	(61,485)	(61,485)	(61,485)	(61,485)
Taxable income	186,807	186,807	186,807	186,807	186,807
Tax expense	(65,382)	(65,382)	(65,382)	(65,382)	(65,382)
Net tax payment	(65,382)	(65,382)	(65,382)	(65,382)	(65,382)
Net cash flows	434,618	434,618	434,618	434,618	434,618
Net present value to the acquirer:		**1,647,543**			
Amount paid to the target:		**1,565,966**			
Taxable gains to the target:		1,465,966			
Capital gains tax of the target:		293,193			
Net amount received by the target:		**1,272,773**			

[2] Depreciation = $1,258,541/5= $251,708. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

[3] Amortization of goodwill from acquisition = ($1,565,966-1,258,541)/5 = $61,485.

Target K

Scenario K1: An acquirer pays $1,258,541 to acquire Target K in a non-taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	500,000	500,000	500,000	500,000	500,000
Depreciation	(20,000)	(20,000)	(20,000)	(20,000)	(20,000)
Taxable income	480,000	480,000	480,000	480,000	480,000
Tax expense	(168,000)	(168,000)	(168,000)	(168,000)	(168,000)
Amortization of Deferred Tax Assets[4]	4,000	4,000	4,000	4,000	4,000
Net tax payment	(164,000)	(164,000)	(164,000)	(164,000)	(164,000)
Net cash flows	336,000	336,000	336,000	336,000	336,000
Net present value to the acquirer:		**1,273,704**			
Amount paid to the target:		**1,258,541**			
Taxable gains to the target:		0			
Capital gains tax of the target:		0			
Net amount received by the target:		**1,258,541**			

[4] Deferred tax assets of $20,000 are amortized over the five years via a straight-line method.

Scenario K2: An acquirer pays $1,258,541 to acquire Target K in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	500,000	500,000	500,000	500,000	500,000
Depreciation[5]	(251,708)	(251,708)	(251,708)	(251,708)	(251,708)
Taxable income	248,292	248,292	248,292	248,292	248,292
Tax expense	(86,902)	(86,902)	(86,902)	(86,902)	(86,902)
Net tax payment	(86,902)	(86,902)	(86,902)	(86,902)	(86,902)
Net cash flows	413,098	413,098	413,098	413,098	413,098
Net present value to the acquirer:		**1,565,966**			
Amount paid to the target:		**1,258,541**			
Taxable gains to the target:		1,158,541			
Capital gains tax of the target:		231,708			
Deferred tax assets:		20,000			
Net amount received by the target:		**1,046,833**			

[5] Depreciation = $1,258,541/5 = $251,708. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

Scenario K3: An acquirer pays $1,565,966 to acquire Target K in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	500,000	500,000	500,000	500,000	500,000
Depreciation[6]	(251,708)	(251,708)	(251,708)	(251,708)	(251,708)
Amortization of Goodwill from acquisitions	(61,485)	(61,485)	(61,485)	(61,485)	(61,485)
Taxable income	186,807	186,807	186,807	186,807	186,807
Tax expense	(65,382)	(65,382)	(65,382)	(65,382)	(65,382)
Net tax payment	(65,382)	(65,382)	(65,382)	(65,382)	(65,382)
Net cash flows	434,618	434,618	434,618	434,618	434,618
Net present value to the acquirer:		**1,647,543**			
Amount paid to the target:		**1,565,966**			
Taxable gains to the target:		1,465,966			
Capital gains tax of the target:		293,193			
Deferred tax assets:		20,000			
Net amount received by the target:		**1,292,773**			

[6] Depreciation = $1,258,541/5= $251,708. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

Target L

Scenario L1: An acquirer pays $1,245,273 to acquire Target L in a non-taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	500,000	500,000	500,000	500,000	500,000
Depreciation	(10,000)	(10,000)	(10,000)	(10,000)	(10,000)
Taxable income	490,000	490,000	490,000	490,000	490,000
Tax expense	(171,500)	(171,500)	(171,500)	(171,500)	(171,500)
Net tax payment	(171,500)	(171,500)	(171,500)	(171,500)	(171,500)
Net cash flows	328,500	328,500	328,500	328,500	328,500
Net present value to the acquirer:		**1,245,273**			
Amount paid to the target:		**1,258,541**			
Taxable gains to the target:		0			
Capital gains tax of the target:		0			
Net amount received by the target:		**1,258,541**			

Scenario L2: An acquirer pays $1,258,541 to acquire Target L in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	500,000	500,000	500,000	500,000	500,000
Depreciation[7]	(251,708)	(251,708)	(251,708)	(251,708)	(251,708)
Taxable income	248,292	248,292	248,292	248,292	248,292
Tax expense	(86,902)	(86,902)	(86,902)	(86,902)	(86,902)
Net tax payment	(86,902)	(86,902)	(86,902)	(86,902)	(86,902)
Net cash flows	413,098	413,098	413,098	413,098	413,098
Net present value to the acquirer:		**1,565,966**			
Amount paid to the target:		**1,258,541**			
Taxable gains to the target:		241,708			
Capital gains tax of the target:		0			
Net amount received by the target:		**1,016,833**			

[7] Depreciation = $1,258,541/5 = $251,708. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

Scenario L3: An acquirer pays $1,565,966 to acquire Target L in a taxable acquisition.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net pretax cash flows	500,000	500,000	500,000	500,000	500,000
Depreciation[8]	(251,708)	(251,708)	(251,708)	(251,708)	(251,708)
Amortization for Goodwill from acquisitions	(61,485)	(61,485)	(61,485)	(61,485)	(61,485)
Taxable income	186,807	186,807	186,807	186,807	186,807
Tax expense	(65,382)	(65,382)	(65,382)	(65,382)	(65,382)
Net tax payment	(65,382)	(65,382)	(65,382)	(65,382)	(65,382)
Net cash flows	434,618	434,618	434,618	434,618	434,618
Net present value to the acquirer:		**1,647,543**			
Amount paid to the target:		**1,565,966**			
Taxable gains to the target:		1,515,966			
Capital gains tax of the target:		303,193			
Net amount received by the target:		**1,262,773**			

[8] Depreciation = $1,258,541/5 = $251,708. The acquirers' additional step-up basis from the capital gains tax paid by the target is neglected.

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