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Essay on the Persistence of Corporate Diversification Discount after Merger and Acquisition Transactions and Essay on the Capital Structure Properties of Real Estate Investment Trusts (REITs)

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Essay on the Persistence of Corporate Diversification Discount after Merger and Acquisition Transactions and
Essay on the Capital Structure Properties of Real Estate Investment Trusts (REITs)

A Dissertation

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Dedication

For the soul of my father, Mohammad Alhenawi who encouraged me to pursue higher education

For my mother, Amneh Katranji who sacrificed a lot for my education

For my sisters and brothers and my family who always supported me

Acknowledgement

This research has reached this point because of the help and patience of many people to whom I like to extend the deepest appreciation and thanks. I am thankful to my loving and supporting family. I would not be the person I am today without them.

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ABSTRACT

In the first chapter of this dissertation, I hypothesize that several non-tax-driven benefits of debt induce REITs managers to issue debt despite no apparent tax-driven benefit. Several methodologies and tests applied in capital structure literature are introduced to the literature of REITs capital structure. First, I investigate how the market prices leverage in absence of tax-deductibility benefit. Then, I diagnose the relative importance of several non-tax-driven benefits of leverage in deriving the capital structure decisions of REITs. Third, I conduct a thought investment experiment with debt-restricted vs. non-restricted REITs portfolios. I find weak evidence that leverage, by itself, creates value. Nevertheless, I find strong evidence that during financial crisis debt-restricted REITs perform better than non-restricted ones. Also I find evidence that lends support to the pecking order story of leverage. I conclude that REITs managers issue debt mainly to avoid issuing equity and to maximize wealth of existing shareholders.

The second chapter addresses corporate diversification discount. I present and test a hypothesis that diversifiers exchange immediate diversification discount with future value gain attributed to unanticipated financial and strategic advantages of diversification. Two implications of this hypothesis are tested in this dissertation. First, the initial diversification discount found in static methodologies should be attenuated in a dynamic analysis. Second, diversifier's value evolution patterns are driven by the materialization of certain financial and strategic efficiencies. The overall results indicate that there is value recovery over time. Diversifiers' performance and value evolution is dynamically linked to synchronous improvements in market power, internal capital market activities, and cost efficiencies. Further, consistent with current evidence in *diversification literature, related diversifiers outperform unrelated diversifiers. Moreover, related diversifiers witness faster value recovery relative to unrelated diversifiers.*

Key words: REITs, Capital Structure, Diversification Discount, Mergers and Acquisition.

Chapter 1: Essay on the Capital Structure Properties of Real Estate Investment Trusts (REITs)

I. Introduction

It is puzzling that the managers of REITs issue substantial amounts of debt despite no apparent benefits (Ott, Riddiough, and Yi, 2005). Classic capital structure theories (Modigilani and Miller, 1958 & 1963 and Miller 1977) suggest that leverage-increasing policies add value in the form of tax deductibility. Trade-off theory posits that an optimal level of leverage exists where the marginal benefit of debt (tax-deductibility) equals marginal costs of debt (costs of bankruptcy, agency costs of debt, and debt overhang). Due to their unique regulatory environment, REITs do not pay corporate income tax and thus do not enjoy the classical tax-deductibility benefit of leverage[1]. Therefore, the static trade-off theory of capital structure suggests that REITs use of debt should be minimal because tax saving does not exist (Howe and Shilling, 1988). However, anecdotal observation and the findings of previous studies (such as Howe and Shilling, 1988; Ghosh, Nag, and Sirmans, 2001; and Feng, Ghosh and Sirmans, 2007) suggest the opposite. An influential paper by Feng, Ghosh and Sirmans (2007) investigated the puzzling borrowing behavior of REITs and shows that REITs carry more than 50% of debt at IPO, and the debt ratio gradually increases to 65% in 10 years. They attribute this phenomenon to the special regulatory environment of REITs. Nonetheless, in their conclusion they concur with Ott, Riddiough, and Yi (2005) that there is no apparent benefit to debt and, thus, debt issuance by REITs is puzzling.

[1] REITs are tax-exempted if they pay 90% of earnings as dividend; this provision eliminates the tax-deductibility advantage of debt (Feng, Ghosh and Sirmans, 2007)

Feng, Ghosh and Sirmans (2007) suggest that one potential motivation for debt issuance in REITs is the monitoring benefit of debt. This claim fits well with the agency cost theory of Jensen and Meckling's (1976) which implies that mandatory interest payment restricts managers access to cash flow (Datta, Iskandar-Datta, and Ramman, 2005) as well as managers empire-building behavior (Hart and Moor, 1995). Further, Feng, Ghosh and Sirmans (2007) highlight that monitoring is a special concern in real estate sector because the market for corporate control is weak. In this dissertation, I respond to this particular research invitation but I also take a more comprehensive approach to explain REITs borrowing behavior. In particular, I investigate REITs leverage in three different approaches.

First, I investigate whether leverage-increasing policies in REITs create value. This has been tested, and almost confirmed, in non-REIT capital structure literature. Numerous studies report value gain associated with leverage-increasing policies in general samples[2] (such as Masulis (1980), Masulis (1983), Asquith and Mullins (1986), Mikkelson and Partch (1986), Pinegar and Lease (1986) Howe and Shilling (1988), and Ghosh, Nag, and Sirmans (2001)). In REITs literature, this implication has also been tested by few authors (such as Howe and Shilling, 1988; and Ghosh, Nag, and Sirmans, 2001) and supporting evidences where found. However, methodologies used in the REIT capital structure literature are limited to short-run event study. In contrast, the regression approach used in this dissertation captures the sustained leverage-induced value change (Fama and French, 1998). I use quarterly REITs data in OLS regression. The dependent variable is the

[2] Howe and Shilling (1988) and Feng, Ghosh and Sirmans (2007) note that little work has been done on non-tax-paying entities and capital structure literature has conventionally excluded REITs and, therefore, capital structure of REITs is largely unexplored

spread of market value over book value. The independent variables are proxies for investment, growth, dividend policy and leverage. I use models and specifications found in Fama and French (1998), the coefficient on change in capital structure variable measures the leverage-induced value gain. I expect to obtain significant positive coefficient that indicates existence of value gain of leverage in absence of apparent tax-driven benefits. However, unlike other REIT capital structure studies, the coefficients in this study capture only the non-tax-driven value gain of leverage.

Second, I ask which theory of capital structure seems to explain REITs' capital structure behavior. While classic capital structure theories focus on the tax consequences of leverage, non-tax-based theories of capital structure suggest that business entities issue debt for several plausible reasons including: 1) lowering the adverse selection cost of equity, 2) monitoring, and 3) signaling. I focus mainly on pecking order theory, agency cost theory, and signaling hypothesis. Lowering the adverse selection cost of equity is suggested by the pecking order theory of capital structure proposed by Myers and Majluf, 1984 who argue that market participants discount firm's new issues of securities because they suspect that managers are likely to issue equity only when stocks are overvalued. Consequently, managers refrain from issuing equity, in general, and choose to issue debt to reduce this adverse selection cost of equity. Debt issuance also mitigates agency problems such as the perquisite spending and empire building behavior (Jensen and Meckling, 1976) and free cash flow problem (Jensen, 1986) because debt payouts are mandatory (unlike equity payouts). Further, debt financing offers the benefit of monitoring undertaken by savvy lenders. In a sense, debt serves as a substitute to alternative monitoring mechanism (Feng, Ghosh and Sirmans, 2007) that reduces agency cost. Finally, under the signaling hypothesis (Ross 1977, Myers and Majluf, 1984, and Miller and Rock, 1985), managers are informationally advantaged relative to shareholders and other market participants. Managers do not explicitly disclose their information. Rather, they send signals to the market. Because debt payouts are mandatory while equity payouts are not, issuance of debt implies capability of bearing the mandatory burden of servicing the debt. Thus, debt issuance signals prosperous future and/or financial stability.

In order to address the second question, I investigate the determinants of REITs capital structure policy as predicted by extant theories of capital structure. Fama and French (2002) present a comprehensive model that accounts for different capital structure theories. If pecking order theory implications derive REITs capital structure, we should find that REITs with higher (lower) existing investment must, after controlling for profitability, be more (less) leveraged. Similarly, REITs with higher (lower) profitability must, after controlling for investment, issue less (more) debt. Further, REITs with higher (lower) *expected* investment opportunities must, controlling for existing investment and profitability, be less (more) leveraged. Under the agency costs theory the major benefits of debt is monitoring. Thus, REITs with more (less) investments must, controlling for profitability, need less (more) monitoring and issue less (more) debt. Similarly, REITs with higher (lower) profitability, controlling for investments, issue more (less) debt to restrict managers' spending. Finally, signaling theories implies that managers issue debt to signal a prosperous future or a financially stable firm. Therefore, REITs with higher (lower) existing and expected investments and profitability carry more (less) debt. In summary, we can use the predicted impact of profitability and investment opportunities on capital structure to judge which theory prevails and, consequently, what derives leverage issuance decisions. This approach is found in Fama and French (2002). Specifically, I regress changes on capital structure in REITs on several proxies of profitability and investment opportunities. I expect to be able to identify how the benefits of leverage (lowering adverse selection of equity, monitoring, mitigation of free cash flow problem, and signaling prosperous future) derive to the REITs capital structure.

Third, I conduct a thought experiment on debt-restricted REITs. I construct a debt-restricted portfolios and a non-restricted portfolios and track their performance over 1990-2010. I collect quarterly data on 163 active REIT's (CIS code 6798) from COMPUSTAT databases over the period 1990Q1-2009Q4 (there are 80 quarters). I create two debt-restricted REIT portfolio based on equal-weighting and value-weighting schemes. The filtering threshold is a maximum of 33% debt ratio. For the purpose of comparison, I form two non-restricted portfolios (one equally-weighted and one value-weighted) composed of all the REITs that do not pass the filtering criterion.

The contribution of my dissertation is three-folded. First, I am attempting the resolve the existing puzzle of observed REITs capital structure behavior (Ott, Riddiough, and Yi, 2005 and Feng, Ghosh and Sirmans, 2007). Second, Howe and Shilling (1988) note that little empirical work has been done on non-tax-paying entities. In addition, Feng, Ghosh and Sirmans (2007) note that capital structure literature has conventionally excluded REITs from studied samples due to their unique regulatory environment. As such, capital structure of REITs is largely unexplored and thus my work contributes to our knowledge in this area. Third, my work contributes to the broader corporate capital structure literature. In fact, after almost half a century from the seminal work of M&M (1958,

1963) we still cannot say for sure whether tax-driven advantages of leverage are of first-order importance in capital structure policy. Further, according to Fama and French (1988), there is little convincing evidence on how taxes affect the pricing of dividends and debt. A good deal of the ambiguity, in my opinion, is attributed to the mixed nature of leverage consequences. My work exploits the unique regulatory environment of REITs where the focus is on the magnitude and determinants of non-tax-driven value gain of leverage.

I found evidence that, in contrast with Fama and French (1998) findings with broader sample, REITs do not gain or loss value by altering their capital structure. The average of period slopes (the approach of Fama and MacBeth (1973) used by Fama and French, 1998) on current, past and future leverage are statistically insignificant. In fact, I found that only dividend policy (but not investment or leverage policy) contributes to value in REITs. Nevertheless, to overcome a potential smaller sample caveat[3], I re-run the regressions with all data points (REIT-quarter) in the sample to obtain "global slopes." I found that current and future (expected) increases in leverage policy add value but past increases do not. However, controlling for investment and profitability eliminates this value gain of current leverage policy. I conclude that current leverage, by itself, does not explain variation on value in REITs. I found, however, that past changes in leverage, controlling for investment and dividend and profitability, add value in REIT but the economical impact is very small. Future changes in leverage policy, controlling for investment and dividend and profitability, has negative impact on value.

[3] My sample includes REITs only and it is much smaller that Fama and French 2002 sample of all companies in Compustat excluding utilities and financials and regulated entities (such as REITs).

I also find evidence that lends support to pecking order theory in particular. This is consistent with previous findings in broader non-REIT samples (Long and Malitz (1985), Rajan and Zingales (1995) and Fama and French (2002). I conclude that REITs managers attempt to maximize wealth of existing shareholders by refraining from issuing equity (unless stocks are overvalued) and rely heavily on debt to finance investments.

In the thought investment experiment, I find that restricted portfolio performs better in value-weighted (but not in equal-weighted) portfolios in both average return and volatility. The BHR analysis reveals similar results where restricted equally-weighted portfolio always underperformed the non-restricted one while restricted value-weighted portfolio always outperformed the non-restricted one. During the recent crisis period, however, restricted portfolio outperformed the non-restricted one in both equally-weighting and value-weighting schemes. Using Jensen's alpha approach, I find that in equally-weighting portfolios non-constrained REITs outperform the constrained ones and there is no difference between restricted and non-restricted REITs in value weighted portfolios. Finally, I use Fama and French (1993 and 1996) three-factor model and Carhart (1997) four-factor market equilibrium model. I find that when other risk factors are controlled for, there is no convincing evidence that restricted portfolio's performance differ from the non-restricted one and that market-wide risk-return characteristics are more important than leverage (restricted vs. non-restricted) characteristics.

The rest of this dissertation unfolds as follows. Section II summarizes important capital structure theories and focuses on particular implications used in this dissertation. In particular, I focus on the distinction between tax-driven and non-tax-driven advantages of debt and the implications of each. Section III develops the hypotheses tested and explains the sample used. Section IV investigates the value-adding property of leverage. Section V investigate the determinants of leverage benefits. Section VI explains the thought investment experiment and its findings. Section VII summarizes my work and highlights major conclusions.

II. A Premier on Major Theories of Capital Structure (Literature Review)

In this section I summarize major theories of capital structure and highlight their implications that are relevant to this dissertation. I also document some empirical evidence. I start with classical Modigliani and Miller propositions then I move to trade-off theory. Next, I supply a brief discussion of recent not tax-based capital structure theories.

A. Tax-based Theories of Capital Structure – Modigliani and Miller (1958, 1963) and Miller (1977) Propositions

Academicians date capital structure debate to Modigliani and Miller (1958) proposition that in frictionless markets[4] firm's value, in equilibrium, is unaffected by their capital structure. Therefore, value of a leveraged firm equals the value of identical unleveraged one:

$$\boldsymbol{V_L = V_U = PV[Future\ Cash\ Flows]} \tag{E 1}$$

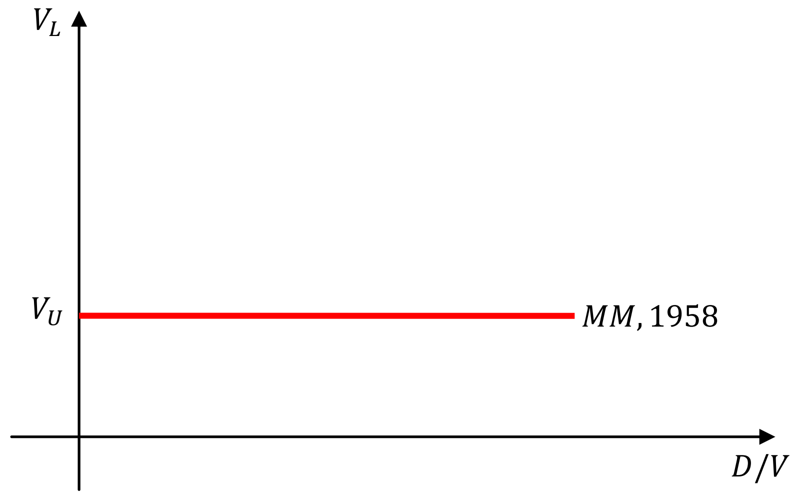
Where:

V_L	:	Value of leveraged firm
V_U	:	Value of identical but un-leveraged firm
$PV[.]$	:	Present value function

The main prediction of this model is that firm value is invariant with capital structure. Figure 1 below illustrates this notion.

[4] In particular, no corporate or personal taxes and no cost of bankruptcy or financial distress. In addition to other assumptions such as no information asymmetry and no transaction costs. In effect, investors have the same access to financial markets as firms, which allows for homemade leverage. Homemade leverage means that investors can alter firm-made capital structure decisions to fit their own preferences, thus firm-made capital structure is irrelevant.

Figure 1 – Illustration of the implications of Modigliani and Miller's (1958) Proposition



Modigliani and Miller (1963) introduced corporate tax (but not personal taxes and no financial distress and other costs of debt) into the capital structure model and show that the value of a leveraged firm equals the value of an identical unleveraged firm plus the value of debt's side effect: interest tax-deductibility.[5] They show that interests outlays lower total tax liability so that each $\$X$ paid in interest results in tax savings of $\$X \times T_c$. Hence:

$$\begin{aligned} V_L &= V_U + PV[T_c \times D \times R_D] \\ &= V_U + T_c D \end{aligned} \tag{E 2}$$[6]

[5] Under current corporate taxation system, debt payouts (interests) are paid out of before-tax income and equity payouts (dividends) are paid out of after-tax income. Hence, debt payouts reduce tax liability while equity payouts do not.

[6] If future benefits of tax savings $T_c \times D \times R_D$ are as risky as the debt that generates them (Modigliani and Miller, 1963), the proper discount rate is the cost of debt which is R_D. Hence:

$$PV[T_c D R_D] = \frac{TDR_D}{R_D} = T_c D$$

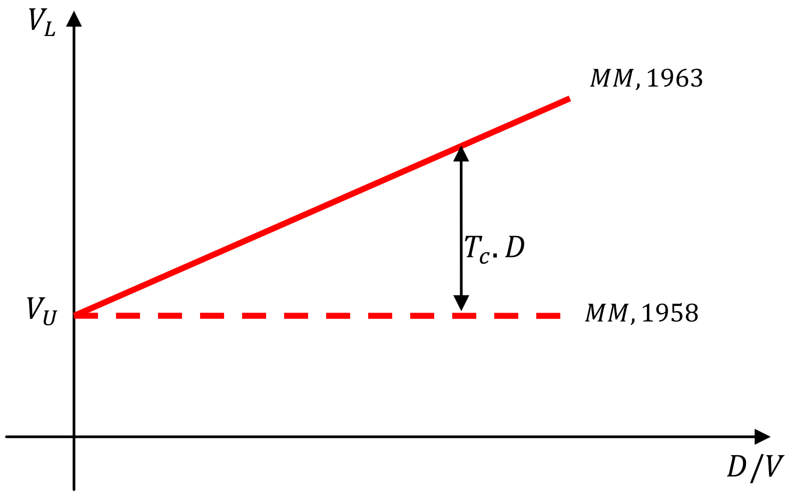
Miles and Ezzell (1985) present an argument that R_D might be too low to be used as a discounting rate and suggest using required return on equity instead. Grinblatt and Titman (2002) present a counter argument that R_D might be too high. Both arguments affect the magnitude but not the sign of the tax advantage of debt. In this dissertation, I do not consider these arguments. As long as the sign of the tax-driven advantage of debt is not altered, my discussions and analyses are still valid.

Where:

V_L	:	Value of leveraged firm
V_U	:	Value of identical but un-leveraged firm
T_c	:	Corporate statutory marginal tax rate
D	:	Value of debt
R_D	:	Interest rate (coupon rate)
$T_c \times D \times R_D$	:	Tax advantage of debt
$PV[.]$	:	Present value function

Ignoring offsetting costs of debt (cost of financial distress, agency cost of debt and underinvestment costs), Modigliani and Miller's (1963) model shown above has two key implications. First, firms have the incentive to use debt not equity. More precisely, since T_c is conventionally positive, firm's value is an increasing linear function of D. Second, the optimal capital structure policy is 100% debt. Figure 2 below illustrate these findings.

Figure 2 – Illustration of the implications of Modigliani and Miller's (1963) proposition



Miller (1977) expands the model by incorporating the effect of discriminating tax treatment of personal income from equity proceeds (dividend and capital gain) and from debt proceeds (interests). If T_E is tax rate on personal income from equity proceeds and T_I is tax rate on personal income from debt proceeds, the model becomes:

$$\boldsymbol{V_L = V_U + PV\big[[(1 - T_I) - (1 - T_c)(1 - T_E)]D\big]} \qquad \text{(E 3)}^{7}$$

OR

$$V_L = V_U + PV\left[\left[1 - \frac{(1 - T_c)(1 - T_E)}{(1 - T_I)}\right] D\right]$$

$$= V_U + PV[Tax\_driven\ Value\ Gain\ of\ Leverage] \qquad \text{(E 4)}$$

$$= V_U + TVGL$$

Where:

V_L	:	Value of leveraged firm
V_U	:	Value of identical but un-leveraged firm

[7] Miller and Scholes (1978) suggested a tax-avoidance scheme where investors avoid personal tax by borrowing via some tax-free vehicles. To narrow the discussion, personal tax affects and investors' tax-avoidance schemes are not considered in this dissertation.

T_I	:	Tax rate on personal income tax from bond return (interest)
T_c	:	Corporate statutory marginal tax rate
T_E	:	Tax rate on personal income tax from equity return (dividends and capital gain)
D	:	Value of debt
$PV[.]$	:	Present value function
$TVGL$	:	Tax-driven Value Gain of Leverage

This modification renders the model more realistic but it does not fundamentally change the fundamental two implications of Modigliani and Miller's (1963) argument. Personal taxes reduce, but do not completely eliminate, the advantage of debt financing so that firm's value still increases with debt and optimal capital structure is still 100% debt[8]. It is worthy to note, however, that all value gain of leverage introduced so far is attributed to tax-deductibility only. This model does not account for non-tax-driven advantages of debt. Therefore, the different between the value of leveraged firm and identical non-leveraged firm, within the confinement of this model, is only tax-driven value gain of leverage ($TVGL$). This component is linear and increasing in debt level. Figure 3 below illustrates the implications of MM (1958, 1963) and Miller (1977) propositions:

[8] Nevertheless, Miller's (1977) model introduces a third implication: if tax rate on personal income from interest is relatively high compared to tax rate on personal income from dividend and capital gain, the firm will have less incentive to issue debt. Mathematically:

$$T_I > T_E \quad \Rightarrow \quad (1 - T_I) < (1 - T_E) \quad \Rightarrow \quad \frac{(1 - T_E)}{(1 - T_I)} > 1$$

Obviously, the bracketed term in equation (3) becomes smaller and the value of tax advantage of debt becomes smaller. In some extreme cases, the tax advantages of debt might be completely wiped out or even turns negative. This possibility is unrealistic and is not considered in this dissertation. For tax advantage of debt to turn negative, personal and corporate tax rates must satisfy:

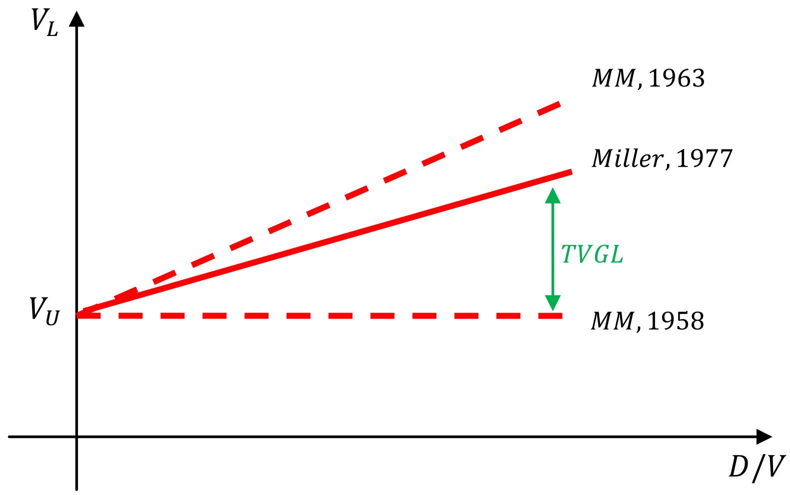
$$[(1 - T_I) - (1 - T_c)(1 - T_E)] < 0 \;\; \Rightarrow \;\; [(1 - T_I) < (1 - T_c)(1 - T_E)]$$

This possibility is unlikely because $(T_I), (T_c), (T_E) \in [0,1]$ by definition. Tax rates that satisfy this inequality must satisfy:

$$\frac{T_I - T_E}{(1 - T_E)} > T \quad OR \quad T_I > T + (1 - T_c)T_E$$

which implies that either T_I is too high relative to T_E and/or T is too small. Both possibilities are very unlikely.

Figure 3 – Illustration of the implications of Modigliani and Miller's (1958, 1963) and Miller's (1977) propositions



Despite its theoretical appeal, Modigliani and Miller's (1963) and Miller's (1977) suggestion of 100% debt policy is readily rejected by anecdotal evidence. Logically, there must be some *offsetting costs of excessive debt* that explains why firms refrain from adopting aggressive debt policies. This puzzle is solved by the "Trade-off Theories" of capital structure summarized next.

B. Trade-off Theory of Capital Structure

In trade-off theory, firms set up a "target ratio" of leverage which is not 100% as suggested by MM (1963) and Miller (1977). This target ratio occurs at an optimal level of debt (D^*) where marginal benefits of debt (tax-deductibility) is equal to marginal costs of debt. Mayer (1984) calls this *The Trade-off Theory* of capital structure which deviates from Modigliani and Miller's model by incorporating the costs of financial distress[9]

[9] The use of "financial distress" as a generic term describing the three components was first made by Bradley, Jarrell and Kim (1984) who supply the standard presentation of the trade-off theory.

including: 1) costs of bankruptcy, 2) agency costs of debt, and 3) debt overhang costs. A brief explanation of each cost is presented below.

i. *Costs of Bankruptcy*

Kraus and Litzenberger (1973) show that leverage increases the costs of bankruptcy and firms should "trade-off" these costs with tax-driven advantages proposed by MM (1963) and Miller (1977). Haugen and Senbet (1978) criticized this view by pointing out that these bankruptcy costs cannot exceed the cost of negotiating them. If they do, debtholders would prefer to avoid them by recapitalizing the firm outside bankruptcy. Titman (1984) responded to Haugen and Senbet's (1978) critique by suggesting additional indirect costs of bankruptcy. In result, we have a set of direct and indirect bankruptcy costs. Direct costs include legal and accounting expenses, liquidation costs[10] and physical deterioration of assets[11]. Indirect costs include management attempts to boost cash flow in the short-run in a manner that dilutes value in the long-run[12], plus adverse actions taken by managers and employees, suppliers and customer[13]. Several empirical studies support existence of direct and indirect costs of debt. Direct costs are estimated at 3% of firm value and total bankruptcy costs (direct and indirect) are estimated at 20% of firm value (see White (1983), Altman (1984), Weiss (1990) and Andrade and Kaplan (1988)).

ii. *Agency Cost of Debt*

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[10] Assets are usually sold at low prices in case of bankruptcy and/or re-organization.
[11] Assets are sold after long settlement time which further decreases their value because of rusting and vandalism.
[12] Such as lowering due maintenance activities and making cutbacks in R&D and training expenses (see Barclay and Smith (2005)).
[13] When a company is financially distressed, it is likely that managers and employees seek job at other companies (lower their productivity), suppliers tighten credit terms and consumers lessen loyalty.

Jensen and Meckling (1976) show that, in absence of any restriction, managers typically take actions that maximize shareholders wealth at the expense of debtholders. One classical example presented in this context is the asset substitution scheme where managers exchange low-risk projects for high-risk projects. This causes risk to be concentrated on debtholders because their return is fixed while shareholders' return is not. In an efficient well-functioning market, lenders would charge higher interest rate to compensate for additional risk. In addition, lenders would use "protective covenants" that incur additional costs of monitoring and restrictions-induced inefficiencies[14].

iii. *Debt Overhang*

Myers (1977) suggests that high levels of debt trigger a debt overhang problem. A debt overhang problem exists when a company forgoes a positive-NPV investment project due to an existing excessive debt position. Excessive debt causes earnings generated by new investment projects to be partially appropriated by existing debt holders. Debtholders would be reluctant to finance the firm because the face value of the existing debt is bigger than the expected payoff to debtholders. Stiglitz and Weiss (1981) claim that bondholders do not know ex-atne the quality of investment and, therefore, infer adverse selection, and ask for higher premium. Similarly, equityholders would also be reluctant to buy new stocks unless greater return is anticipated (larger price discount). Thus, the firm rejects positive-NPV projects that otherwise would be accepted.

C. Non-tax-based Theories of Capital Structure (non-tax-driven benefits of debt)

[14] Restriction on management protects lender rights but also lowers efficiency and/or hampers operations. In addition, preventing managers from doing the wrong things might as well prevent them from doing the right things.

The overwhelming evidence in capital structure literature supports the overall intuition of the trade-off model and advocates leverage's value-increasing property [Masulis (1980), Masulis (1983), Asquith and Mullins (1986), Mikkelson and Partch (1986), Pinegar and Lease (1986)]. Further, the market seems to respond positively to leverage-increasing moves (Howe and Shilling, 1988, Howton et al., 2000 and Ghosh, Nag, and Sirmans, 2001)[15]. However, little work is done on whether this value gain is attributed *solely* to tax-driven advantage of debt OR to a mix of tax-driven and non-tax-driven advantages. Empirical evidence as well as some theories supports the latter view i.e. leverage-induced value gain is NOT solely of tax-driven nature.

Equations E1 through E4 above suggest that leverage benefits are of tax-driven nature only. If this is true, non-tax paying entities (such as REITs) should have virtually no value gain attributed to leverage. In fact, if leverage has only tax-driven advantages, REITs managers should not use debt at all (Howe and Shilling, 1988). However, Feng, Ghosh and Sirmans (2007) find that REITs managers issue debt aggressively despite no apparent benefit. Specifically, they find that an average REIT carries 50% of debt in IPO and debt ratio reaches 65% after 10 years. Howe and Shilling (1988) document a positive stock price reaction to debt offerings in REITs. These evidences suggest that not all advantages of leverage are tax-driven and REITs managers may be issuing debt for some other non-tax-driven benefits. Fortunately, there is a strong theoretical ground of this claim. We have several outstanding capital structure theories that propose additional non-

[15] Nevertheless, some empirical work documents a weak relation between firm value and leverage (Shah (1994) and Cornett and Travlos (1989) and Fama and French (1998) I discuss those also in details in the next section.

tax-driven advantages of leverage. In the following, I am supplying a brief discussion of these theories and explain leverage advantages under each one.

Pecking Order Theory:

Myers and Majluf, 1984 and Myers 1984 observed that firms prefer to finance investment with internal sources of funds (retained earnings) and raise equity as a last resort. Cost of issuing new equity includes transaction costs as well as potential adverse reaction of investors. According to Myers and Majluf (1984), managers have superior information relative to investors and are inclined to act in best interest of existing (rather than future) shareholders. Thus, managers are likely to issue equity only as a last resort and more likely when stocks are overvalued. Market participants are aware of that and they discount firm's new issues of securities. This is known in literature as adverse selection costs of equity. Myers and Majluf (1984) show that because adverse selection costs are always larger for equity issues than for debt issues, issuing equity is never optimal. As a result, firms issue debt in order to reduce the adverse selection cost of equity suggested by the pecking order theory.

Arguing that costs of issuing new equity overwhelm costs of issuing debt, they developed the well-known Pecking Order Theory of capital structure. It states that companies prioritize their sources of financing in such a way that they first finance investment with internally-generated retained earnings, then, if outside funding is still needed, they prefer to issue safe debt, risky debt, and finally equity; in that order. Accordingly, cross-sectional and historical variation in capital structures is explained by needs for external finance not by companies' attempt to adjust their capital structure toward an optimum level. Obviously, this is a great departure from trade-off theory explanations of capital structure.

The pecking order theory implies that leverage is determined by the availability of internally-generated cash (profitability) and the need for cash (investment opportunities). According to Shyam-Sunder and Myers (1999) and Fama and French (2002), firms with higher (lower) existing investment must, after controlling for profitability, be more (less) leveraged. Similarly, firms with higher (lower) profitability must, controlling for investment, issue less (more) more debt. Further, firms with higher (lower) *expected* investment opportunities must, controlling for existing investment and profitability, be less (more) leveraged (as they are preserving their debt capacity to the expected investment)[16].

iv. *Agency Costs Models:*

[16] Evidence: Consistent with Myers and Majluf's (1984) argument, Masulis (1980) finds that the market responds positively to exchanges of debt for equity and negatively to exchanges of equity for debt. Further, Vermaelen (1981) show that equity repurchases produces positive return and Masulis and Korwar (1986) show that new equity issues produced negative return. Asquith and Mullins (1986) find that announcement of equity offerings reduces stock prices significantly. They look at 531 offerings (both primary and secondary offerings) from 1963-1981 and document negative reactions. More than 80% of the issues caused decreases in value of stock and overall two-day reaction was -2.7% (-3% for primary issues, -2% for secondary issues). They also find that the decline in stock price is proportional to the size of the equity offering. Mikkelson and Partch (1986) performed a longitudinal study on 360 firms and found positive stock returns around announcements of bank loans and negative return around announcements of equity and convertible bonds issuance. Pinegar and Lease (1986) analyze preferred-for-common exchange offers (leverage-increasing transactions) which include no corporate tax consequences and documents positive stock reaction. Eckbo (1986) document an even stronger evidence that supports Myers and Majluf's (1984) argument. In their sample, incidents of debt issuance not associated with reductions in equity produce weak stock price responses. Myers and Shyam-Sunder (1999) find evidence supporting pecking order theory. They show that large firms' rely on debt financing. Fama and French (2002) find that more profitable firms are less levered, firms with more investments have less market leverage, and short-term variation in investment and earnings is mostly absorbed by debt. Above-mentioned evidences are consistent with pecking order theory. Nevertheless, some authors report evidence against the predictions of the pecking order theory. For instance, Goyal and Frank (2003), show that small firms, where growth opportunity is high and information asymmetry problem is presumably large, issue less debt and, hence, pecking order theory fails.

Jensen and Meckling's (1976) theory of agency cost posits that firms incurs two distinct types of cost when shareholders (principals) hire expert managers (agents). On one hand, managers may use organizational resources to pursue their personal goals (perquisite spending and empire-building behavior) rather than shareholders' (share value maximization). On the other hand, in order to align managers' interest with shareholders', firms incur other costs attributed to monitoring techniques (e.g. production of financial statements and other reports) and executives' incentives (stock options). Jensen (1986) shows that the agency problems exacerbates with availability of abundant free cash flow. Specifically, free cash flows allow managers to finance spend on perquisites and select low-return projects. Examining the U.S. ten largest oil companies, which had earned substantial free cash flows in the 1970s and the early 1980s, he found that managers decided not to pay out the available excess cash to shareholders. Instead, they continued to spend heavily on exploration and development projects and acquisitions even though average returns were below the cost of capital.

Debt issuance mitigates agency costs in two ways. On one hand, Datta, Iskandar-Datta, and Raman (2005) show that short-term debt limits management's over-consumption or perquisites. Hart and Moore (1995) show that long-term debt limits management's empire-building behavior. In fact, mandatory debt payouts restrict manager's freedom in the use of available cash flow (while discretionary equity payouts impose less of such restriction). Therefore, leverage mitigates the free cash flow form of agency cost. On the other hands, lenders usually impose ex-ante and ongoing monitoring on managers. In the case of REITs monitoring is a very likely motivation of debt issuance because it is a real concern in real estate sector (Feng, Ghosh and Sirmans, 2007).

Agency cost theory implies that the use of debt is derived by the need for controlling managers' access to free cash flow not by desire to maintain optimal leverage ratio (as in the trade-off theory). Agency cost theory, just as the pecking order theory, links leverage use to the availability of cash (profitability) and need for cash (investment). However, agency cost theory's prediction on profitability effect is just the opposite of the pecking order theory prediction. According to Fama and French (2002), under the agency costs theory, firms with higher (lower) profitability, are in more need to control their managers and must, controlling for investments, issue more (less) debt. Yet, agency cost theory's prediction of investments effect is the same as the pecking order theory's prediction. Firms with more (less) investments are in less need to control their managers (cash flow is directed to investments and not left in managers' hands) and must, controlling for profitability, issue less (more) debt.

v. *Signaling Theories of Capital Structure:*

Under information asymmetry hypothesis, debt issuance conveys positive information to the market. Managers always have better information about the future of the company. For several practical and legal reasons, they do not expose this information. Instead, they send signals to the market (Ross, 1977). Since debt payouts are mandatory and equity payouts are not, a firm that issues debt sends a positive signal of financially stable firm and stock prices respond positively to this news[17]. Thus, leverage is driven by availability

[17] Evidence: Shah (1994) shows that leverage-increasing exchange offers convey positive information of reduced risk; hence the stock price increase. He also shows that leverage-decreasing exchange offers convey negative information of reduced future cash flows; hence the negative stock price reaction. In a sense, these findings indicate that future cash- and risk-related information, not capitalization of future tax savings, causes stock price reactions to leverage-increasing events. Cornett and Travlos (1989) regress event stock returns on the change in debt and two information control variables: the ex-post change in insider ownership and ex-post abnormal earnings. They find that change in debt coefficient is insignificant

of expected investment not by optimum-seeking behavior (trade-off theory), not by cash availability and need concerns (pecking order theory), and not be desire to control managers access to free cash flow (agency cost theory). The signaling theory predicts that firms with higher (lower) existing and expected investments carry more (less) debt.

while the other two information control variables coefficients are positive and significant. They conclude that positive stock price reaction to debt-increasing actions is related to positive information conveyed by the exchange not to change in leverage itself.

III. Hypothesis Development and Sample Description

Hypothesis

The main contribution of this dissertation is the attempt to explain observed behavior of REITs in terms of their capital structure. REITs, by virtue of their regulations, are non-tax-paying entities. Thus, the significant level of debt financing (50% to 65% as shown in Feng, Ghosh and Sirmans (2007)) used by REITs is puzzling because under classic tax-driven theories of capital structure REITs debt financing should be minimal, if any.

What entices managers of REITs to issue debt just as regularly as any non-regulated entity when REITs do not enjoy the tax deductibility benefit of leverage? Feng, Ghosh and Sirmans (2007) suggested that monitoring benefit of leverage could be the answer. I hypothesis that, beside monitoring, a set of non-tax-driven benefits of debt motivate managers of REITs to issue debt. In the previous section, I showed how those benefits stem from extant theories of capital structure. Non-tax-driven theories of capital structure, therefore, offer some potential explanations that could solve the puzzle. Two implications of this hypothesis are tested in this dissertation. First, the market looks favorably at leverage-increasing policies in REITs. Second, variation in capital structure is explained by non-tax-driven benefits of leverage. Both implications are discussed in more details below.

D. Sample Description

I use Compustat database to obtain quarterly accounting data on REITs' (SIC Code 6798) over the period 1990Q1 to 2009Q2[18]. Accordingly, $t = 1,2,3, \dots 78$ is a period identifier that identifies a certain quarter. The final sample includes 8922 REIT-quarter data points from 216 REITs over the said period. The following table shows descriptive statistics of the sample. Panel A lists level variables used in this dissertation. REITs used in the sample have an average market value of about $1,048 million with a minimum of about $0.0142 million and a maximum of $24,851 million. In terms of total assets, REITs have an average asset of $2,260 million with a minimum of $1.343 million and maximum of $68,267 million. In terms of profitability, REITs in this sample have an average of about $31.724 million in earnings before interest and taxes, an average of about $29.685 million in earnings before interest and extraordinary items and after depreciation, and an average of about $0.42 million in depreciation. Finally, REITs in the sample have distributed an average of about $15.746 million in dividend.

[18] In fact, the original sample covers the period 1989Q3-2009Q3. The first two quarters (1989Q3 and 1989Q4) as well as the last quarters (2009Q3) are used only to construct difference variables necessary for this dissertation. See the methodology section for more details.

Table 1 – Sample Descriptive Statistics

Panel A – Level Variables

	Mean	Std Dev	Minimum	Maximum	Median	1st Qrt	3rd Qrt	IQ Range
V	1048.460	1950.617	0.0142	24851.805	432.756	120.379	1137.972	1017.593
E	29.685	63.457	-1787.177	780.700	13.435	3.445	33.240	29.795
A	2260.394	4285.231	1.343	68267.258	898.781	268.069	2415.875	2147.805
I	19.755	42.571	0.000	709.007	7.293	1.713	20.551	18.838
D	15.746	27.837	0.000	796.996	7.345	1.258	18.558	17.300
ET	31.724	80.250	-2814.188	933.820	13.433	3.520	36.316	32.796
DP	0.420	3.611	0.000	88.000	0.000	0.000	0.000	0.000

Panel B – Variables Scaled by Total Assets

	Mean	Std Dev	Minimum	Maximum	Median	1st Qrt	3rd Qrt	IQ Range
(V-A)/A	-0.387	0.722	-1.00	32.471	-0.471	-0.690	-0.208	0.482
E/A	0.0145	0.0213	-0.358	0.996	0.0156	0.0105	0.0198	0.00930
I/A	0.00873	0.0104	0.000	0.466	0.00824	0.00627	0.0105	0.00425
D/A	0.0118	0.150	0.000	13.937	0.00880	0.00445	0.0129	0.00849
L/A	0.456	0.232	0.000	2.279	0.484	0.339	0.599	0.260
V/A	0.613	0.722	0.000	33.471	0.529	0.310	0.792	0.482
ET/A	0.0149	0.0456	-3.154	0.912	0.0160	0.0112	0.0207	0.00958
DP/A	0.000	0.00214	0.000	0.0803	0.000	0.000	0.000	0.000

IV. Non-tax-driven Value Gain (Market Response) of Leverage

One underlying assumption of the hypothesis presented in this dissertation is that debt-increasing changes in capital structure of REITs are value-creating. In particular, I investigate whether there is long-term sustainable increase in value associated with leverage increase. Previous studies have already documented existence of value gain of leverage. In non-regulated entities, similar findings are found in Masulis (1980), Masulis (1983), Asquith and Mullins (1986), Mikkelson and Partch (1986), Pinegar and Lease (1986) and Howton et al. (2000). However, in all of these studies it is not clear how the value gain is derived from tax-driven and non-tax-driven advantages of debt mainly due to the mixed nature of the two. Further, these studies conventionally exclude regulated entities such as utility and financial firms. REITs, being a regulated entity, are also conventionally excluded from samples of capital structure studies. Yet, we do have some literature on capital structure of REITs. Howe and Shilling (1988), and Ghosh, Nag, and Sirman (2001) report value gain associated with leverage-increasing policies in REITs in absence of apparent tax-driven benefits. Howe and Shilling (1988) investigate the short-term market reaction to debt offering in REITs. They find that two-day excess return is positive 1.72% in response to REIT debt offerings and negative 1.9% in response to equity offering. Ghosh, Nag, and Sirman (2001) uses sample from 1991-1997 REITs and event study methodology. They also document a positive market reaction to debt-increasing announcements in REITs. However, these are event studies that measure short-term market reaction to announcement of change of debt but do not capture the long-term cumulative value consequences of leverage changes.

My work is methodologically different from above-mentioned studies on REIT leverage. I start with re-testing the value-creation assumption using an approach that is commonly used in capital structure literate but never been used in REITs (as far as I am concerned). Specifically, I use OLS technique to regress REITs' value on quarterly levels and changes in capital structure. In this model, the coefficient on changes in leverage represents value gain of leverage.

The general approach of regressing holding period returns on changes in leverage is common in capital structure literature that generally exclude regulated entities, like REITs, from studied samples. Masulis (1983) uses a linear model to estimate the firm valuation effect from capital structure changes using OLS. Specifically, he regresses stock returns on changes in debt and finds that the slope coefficient on debt change is significantly positive. He concludes that firm's value is positively related to leverage. Further, he finds that the magnitude of the coefficient is close to statutory corporate tax rate at the time (about 0.4). This result strongly supports MM propositions that leverage increase firm's value through tax-savings[19]. Fama and French (1998) regress leveraged firm value (market value minus book value) on debt interest, dividends, and several proxies for identical unleveraged firm. In a sample of all Compustat companies over the period 1965 to 1992, they found that value, after good control of profitability, is negatively related to leverage and change in leverage and conclude that there is no indication that debt has net tax benefits. They conclude that negative debt slopes support

[19] Masulis (1980) also finds similar results with different approach. He utilizes a sample of exchange offers during 1960's and 1970's. Since exchange offers are pure leverage-changing transactions, they provide an excellent sample for studying the wealth effects that result strictly from a change in a firm's capital structure i.e. any market response can be attributed only to the change in the firm's leverage. He uses *Mean Adjusted Abnormal Return (MAAR)* methodology and finds that leverage-increasing exchange offers increase equity value by 7.6% and leverage-decreasing exchange offers decrease value by 5.4%. He also finds that larger leverage-increasing transactions are associated with larger gains in stock value.

Miller's (1997) hypothesis of no tax benefit of debt because personal tax cost of debt just offset corporate tax benefit. However, they still think that because they cannot fully control for the profitability information of debt, the negative debt slopes may also support the hypothesis that increasing debt is negatively received in the market (Myers, 1984, Myers and Majluf 1984, and Miller and Rock, 1985) and triggers an agency problem effect (Fama and Miller, 1972, Jensen and Meckling, 1976, and Myers 1977).

I use a model very similar to that of Fama and French (1998). I regress market value minus book value on quarterly changes in capital structure as well as other control variables. As the literature above indicates, the coefficient on change in capital structure variable measures the leverage-induced value gain. In REITs, this would be safely called the non-tax-driven leverage-induced value gain. In a sense, this work has also a by-product of contributing to the broader capital structure literature because tax-driven and non-tax-driven benefits of debt are commonly not disentangled.

I use OLS regression model derived from the model used by Fama and French (1998) to assess the value-adding property of debt in REITs. Fama and French (1998) argue that their cross-sectional regressions approach has advantages over event studies. Specifically, while event studies measure only the effects of unexpected changes in leverage, regression techniques measure the fully anticipated longer-term (two years in their study) effect of a firm's observed leverage changes on value. Thus, the value effects observed in regressions are larger and more reliable than those of event studies. Controlling for profitability and investment, they use cross-sectional regressions to study how a firm's value is related to debt (and dividends). Specifically, they regress firm value on earnings, investment, and financing variables to measure tax effects in the pricing of debt (and dividends). The coefficient on debt variable captures information about value not captured by earnings, investment, and dividends variables.

When Fama and French's (1998) model is applied to a sample of REITs, it captures the non-tax-driven value gain of leverage, if any. The model used in this dissertation is very similar in terms of specifications to the model of Fama and French, 1998 with modest modifications. I regress spread of market value over book value of existing assets on current, past, and future changes in earnings, investment, leverage, and dividends. The model is,

$$
\begin{aligned}
\frac{V_t - A_t}{A_t} = \alpha + \alpha_1 \frac{E_t}{A_t} \quad &+ \alpha_2 \frac{dE_t}{A_t} \quad + \alpha_3 \frac{dE_{t+1}}{A_t} \\
&+\alpha_4 \frac{dA_t}{A_t} \quad + \alpha_5 \frac{dA_{t+1}}{A_t} \\
+b_1 \frac{I_t}{A_t} \quad &+ b_2 \frac{dI_t}{A_t} \quad + b_3 \frac{dI_{t+1}}{A_t} \\
+b_4 \frac{D_t}{A_t} \quad &+ b_5 \frac{dD_t}{A_t} \quad + b_6 \frac{dD_{t+1}}{A_t} \\
&+c_1 \frac{dV_{t+1}}{A_t} + e_t
\end{aligned}
\qquad \text{(E 5)}
$$

Where:

V_t	:	Market Value in quarter t[20] Calculated as[21]: $V = ShrOut \times ShrPrc$ $ShrOut$ = Shares outstanding (Item CSHOQ in Compustat) $ShrPrc$ = Share price (Item PRCCQ in Compustat)
A_t	:	Book value of assets in quarter t (Item ATQ in Compustat)
E_t	:	Earnings before interest and extraordinary items but after depreciation and taxes in quarter t Calculated as: $E = OIAD - Tax$

[20] In Fama and French 1998 model, t refers to years while in this model t refers to quarters.

[21] In fact, Compustat does supply a separate item MKVALTQ that represents market value. However, not all entries are available. Thus, I calculate market value as common shares outstanding times price. I tested my calculated market value and found that it is identical to MKVALTQ in Compustat when it is supplied.

$OIAD$ = Operating Income after Depreciation (item OIADPQ in Compustat)
Tax = Income Taxes (Item TXTQ in Compustat)

I_t	:	Interest expenses in quarter t (Item INTQ in Compustat)
D_t	:	Total dividends paid in quarter t calculated as[22]: $D = ShrOut \times DivShr$ $ShrOut$ = Shares outstanding (Item CSHOQ in Compustat) $DivShr$ = Dividend per share (Item DVPSPQ in Compustat)
$\frac{X_t}{A_t}$	:	one quarter current change in X scaled by total assets
$\frac{dX_t}{A_t} = \frac{X_t - X_{t-1}}{A_t}$	:	one quarter past change in X scaled by total assets
$\frac{dX_{t+1}}{A_t} = \frac{X_{t+1} - X_t}{A_t}$	:	one quarter future change in X scaled by total assets

All variables are scaled by total book value of assets A_t in order to avoid potential large-size firm bias and heteroskedasticity problems (see Fama and French, 1998 for more explanation on this point). The dependent variable ($\frac{V_t - A_t}{A_t}$) represents spread of market value over book value. Current, past, and future earnings ($\frac{E_t}{A_t}$, $\frac{dE_t}{A_t}$, and $\frac{dE_{t+1}}{A_t}$) are used to capture the impact of current, past, and expected growth of profitability on value. Similarly, past and future changes in assets ($\frac{dA_t}{A_t}$ and $\frac{dA_{t+1}}{A_t}$) proxy for the net investment component of value gain. Current, past, and future interest expenses ($\frac{I_t}{A_t}$, $\frac{dI_t}{A_t}$ and $\frac{dI_{t+1}}{A_t}$) represent level and changes in leverage policy. Current, past, and future dividends

[22] Compustat does supply a separate item DVTQ that shows total dividends. However, not all entries are available. Thus, I calculate total dividends as common shares outstanding times dividends per share. I tested my calculated total dividends and found that it is identical to DVTQ in Compustat when it is supplied.

($\frac{D_t}{A_t}$, $\frac{dD_t}{A_t}$ and $\frac{dD_{t+1}}{A_t}$) represent level and changes in dividend policy[23]. Finally, ($\frac{dV_{t+1}}{A_t}$) captures future changes in value.

In Fama and French (1998) context, the coefficient of interest are $\mathrm{b}_1, \mathrm{b}_2, \mathrm{b}_3, \mathrm{b}_4, \mathrm{b}_5$ and b_6 because they model the leverage and dividend policy jointly. In this dissertation, the focus is on leverage-induced value gain hence the focus is on $\mathrm{b}_1, \mathrm{b}_2$ and b_3 while dividend variable are kept as control variables. In fact, Fama and French (1998) state that they are more comfortable with using $\frac{I_t}{A_t}$ as a measure of leverage policy than they are with using $\frac{D_t}{A_t}$ as a measure of dividends policy. The later notion assures that the selection of this model for the purpose of this dissertation is justifiable.

Following the spirit of Fama and MacBeth (1973) and the methodology of Fama and French (1998) I run the regression above for each quarter t in the sample period 1990-2009. In each period, I use data on all REITs available in that quarter to obtain a "period slope." Next, average of all 78 periods slopes is calculated, I call this the "average of periods slopes." This value is used in making inferences (see Fama and French (1998) for more details) about the value-adding properties of debt in REITs. I run the model in several forms: restricted forms with current, past, and future changes of a single variable and extended form with all variables together. Further, for the purpose of this dissertation, I run another regression (not done by Fama and French (1998)). I run a

[23] In addition to above variables, Fama and French (1998) include three variables for current, past and future research and development expenses ($\frac{RD_t}{A_t}$, $\frac{dRD_t}{A_t}$, and $\frac{dRD_{t-2}}{A_t}$). In my sample, I found that REITs do not have R&D expenses (all entries are zeros in Compustat) and, therefore, I eliminated this variable. This does not change the validity of this regression because Fama and French (1998) include R&D expenses to capture their specific impact on value (i.e. not as proxy of certain determinant of value). Since R&D expenditure is zero as shown in Compustat, it is safe to eliminate these items (if Fama and French (1998) had used these items as proxy of another effect on value, it would have been necessary to replace them with another proxy to preserve the model specifications).

pooled regression (time-series and cross sectional) of all data point in my smaller sample of REITs to obtain a “global slope.” This “global slope” along with the “average of periods slopes” are used to make general inferences on the value-adding properties of leverage in REITs. The results are shown in the table below,

Table 2 – Regression with Restricted and Extended Forms

	α	$\frac{E_t}{A_t}$	$\frac{dE_t}{A_t}$	$\frac{dE_{t+1}}{A_t}$	$\frac{dA_t}{A_t}$	$\frac{dA_{t+1}}{A_t}$	$\frac{I_t}{A_t}$	$\frac{dI_t}{A_t}$	$\frac{dI_{t+1}}{A_t}$	$\frac{D_t}{A_t}$	$\frac{dD_t}{A_t}$	$\frac{dD_{t+1}}{A_t}$	$\frac{dV_{t+1}}{A_t}$
	Panel A – Average of Period Slopes												
Average Slope	-0.643	14.062	-2.642	5.580									0.093
(t)	(-4.175)	(1.686)	(-0.419)	(0.718)									(0.059)
Average Slope	-0.422				0.000	0.315							0.155
(t)	(-2.589)				(-0.112)	(0.274)							(0.090)
Average Slope	-0.150						-30.877	0.016	-9.548				0.281
(t)	(-0.598)						(-1.905)	(0.000)	(-0.204)				(0.173)
Average Slope	-0.778									35.312	-5.957	12.292	-0.045
(t)	(6.377)									(3.218)	(-.547)	(.603)	0.036
Average Slope	-0.71	2.95	-0.15	2.19	0.00	0.21	-11.12	-2.20	-12.71	32.94	-6.35	10.82	0.000
(t)	(-3.68)	(0.42)	(-0.02)	(0.35)	(0.11)	(0.25)	(-0.67)	(-0.13)	(-0.35)	(2.49)	(-0.53)	(0.61)	(0.00)
	Panel B – Global Slopes												
Global Slope	-.433	3.230	.008	.355									-.025
(t)	(46.77)	(8.887)	(.377)	(4.766)									(-5.856)
Global Slope	-.387				0.000	0.008							-.033
(t)	(-50.67)				(-2.030)	(6.481)							(-7.437)
Global Slope	-.401						1.669	.009	.493				-.024
(t)	(-40.13)						(2.268)	(.3899)	(4.569)				(-5.961)
Global Slope	-.417									2.882	-.046	2.708	-.035
(t)	(-52.45)									(12.69)	(-1.984)	(12.29)	(-10.06)
Global Slope	-0.47	3.68	-0.09	0.99	0.00	0.07	-0.64	0.13	-6.73	3.76	-0.09	3.73	-0.12
(t)	(-38.60)	(8.29)	(-1.83)	(5.19)	(-2.03)	(12.24)	(-0.80)	(2.31)	(-9.63)	(14.94)	(-2.93)	(15.39)	(-17.52)

The dependent variable in the regressions above is $V - A/A$. It is the spread of market value over book value. The results of the "average of periods slopes" – in panel A of the table above - are not very impressive in both restricted and extended forms. It reveals that only current dividend policy has positive effect on REITs value. The slopes on leverage variables are statistically insignificant in both restricted and extended from which indicates that, in contrast with Fama and French 1998 findings with broader sample, REITs do not gain or loss value by altering their capital structure. This finding, by itself, is not surprising; REITs do not enjoy tax deductibility benefits and should not witness an increase in value attributed to leverage policy. The puzzle, therefore, is still unresolved. What entices REITs' managers to issue debt? Nevertheless, I admit that insignificance of slopes might be an artifact of much smaller sample (REITs only) used in this dissertation compared to the sample used in Fama and French's paper (all Compustat companies). The insignificance of all other slopes used in the restricted and extended regressions make us suspect that sample size might be the problem here. To overcome this caveat, I run restricted and extended forms of the regressions with all data point (REIT-quarter) available in the sample to obtain "global slopes."

The "global slopes" calculated from the pooled regression of all data points (REIT-Quarter) are shown in panel B of the table above. Expectedly, current and future (expected) changes in profitability ($a1$ and $a3$) have positive impact on REITs value in the restricted form. Further, current changes have much stronger impact on value than expected changes does. Past changes in profitability (see $a2$) has insignificant impact on value. Past and future changes in investment (look at $a4$ and $a5$) have minimal economic impact on value (although it is statistically significant). Similar to profitability, current and future changes in leverage policy and dividend policy are positively related to value but past changes are insignificantly different form zero. In summary, it looks like the market immediately prices current changes in profitability, investment, leverage policy, and dividend policy. Expected changes are discounted in present prices but past changes are not (probably because they are already priced in previous period). More importantly, the strong relation between these variables and value in the restricted models ensures that they provide good control for profitability, investment and dividend and therefore, when used as control variable in the full unrestricted regression, we can isolated the impact of leverage on value.

The results of the extended model almost support the results of the restricted ones with some differences. Past changes in investment and dividend policies ($a2$ and $b5$) now become slightly more significant (at 10%) but are economically insignificant. More interestingly, however, current changes in leverage now losses statistical significance. This indicates that current leverage impact on value found in the restricted model is captured by other control variables in the extended model. Hence, current leverage, by itself, does not explain variation in value of REITs.

V. The Determinants of REITs Capital Structure Decisions

The second implication of the hypothesis presented in this dissertation states that REITs capital structure decisions are fueled by non-tax-driven advantages of debt proposed by extant theories of capital structure. Under the pecking order theory, REITs managers are likely to issue debt to avoid issuing equity and to lower adverse selection cost of equity. Because REITs pays all internally-generated funds as dividends (in order to exploit the tax exemption provision), debt is their next choice of financing under pecking order theory (Feng, Ghosh and Sirmans, 2007). Howton, Howton, and McWilliams (2003) examine the determinants of the security issue decision for REITs. Using a sample of 664 REIT security issuances in the 1993–2001 period, they find that, consistent with pecking order theory, the decision to issue equity is directly related to the expected cost of issuing debt and inversely related to the costs of issuing equity.

In the context of this dissertation, I am testing whether REITs issuance of debt is explained by the predictions of the pecking order theory, agency cost models, or signaling theory. I use a model and discussion borrowed from Fama and French (2002). If pecking order theory implications derive REITs capital structure, then, we should find that REITs with higher (lower) *existing* investment must, after controlling for profitability, be more (less) leveraged. The intuition here is that existing investment must have been financed with debt; hence the positive relationship. Similarly, REITs with higher (lower) profitability must, after controlling for investment, issue less (more) more debt. This is because higher profitability implies existence of internally generated cash flows that can be used to cover capital expenditure before debt financing is needed. Therefore, we anticipate a negative relationship between profitability and debt level. Finally, REITs with higher (lower) *expected* investment opportunities must, controlling for existing investment and profitability, be less (more) leveraged. In an attempt to avoid issuing equity, REITs with promising future investment opportunities are likely to reserve their borrowing capacity. In effect, there is negative relationship between expected investment and current level of leverage.

Under the agency costs models, lenders bear part of the monitoring burden of shareholders. Debt also mandates regular payments that put restrictions on managers' access to free cash flow. Monitoring, then, is thought of as a big benefit to debt financing. As suggested by Feng, Ghosh and Sirmans (2007), the monitoring benefit of mandatory interest payment on debt is of particular importance in real estate industry. I have shown in the previous section, that under the agency costs theory, REITs with higher (lower) profitability, controlling for investments, issue more (less) debt. This is because shareholders would like to rely on debt as a monitoring tool to ensure that managers do not expense excess cash flow on bad investments. On the other hand, REITs with more (less) *existing/expected* investments must, controlling for profitability, issue less (more) debt. The intuition here is that shareholders know that monitoring and restriction on access to cash flow are less needed when managers are busy with existing/expected investment.

Finally, signaling theories implies that managers issue debt to signal a prosperous future of financially stable firm that can sustain mandatory payments of debt. REITs with higher (lower) existing and expected investments carry more (less) debt. Similarly, REITs with higher profitability carries more debt. Managers of companies with high investments and high profitability issue more debt to signal their companies' strength[24].

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[24] Ghosh, Giambona, Harding, and Sirmans (2010) use REIT panel data to estimate a system of simultaneous equations for leverage and maturity. They find that firms with entrenched CEOs use less leverage and shorter maturity debt. This is consistent with the management self interest story of capital structure choices.

The following table summarizes the predictions of the three theories (a similar, but more comprehensive, table is found in Fama and French (2002)).

Table 3 - The Implications of Capital Structure Theories

	Trade-off Theory	**Pecking Order Theory**	**Agency Cost Models**	**Signaling Hypothesis**
	Benefit(s) of Leverage			
	Tax-deductibility	Reducing adverse selection cost of issuing new equity	Restricting access to cash flow and monitoring	signaling prosperous future and financial stability
	Impacts on Leverage			
Existing Investment	-	+	_	+
Profitability	+	_	+	+
Expected investment	-	_	_	+

Linear cross-sectional regression of leverage, as dependent variable, on potential determinants is common in capital structure literature. Various forms of this approach can be found in Bradley, Jarrell, and Kim (1984), Long and Malitz (1985), Rajan and Zingales (1995), and Fama and French (2002). The model I use in this dissertation is borrowed from Fama and French (2002). Specifically, I use, with some modifications, model 8 in their paper that describes how leverage varies across firms (REIT in this dissertation) as function of profitability, investment opportunities, and other control variables. This model fits well the purpose of this dissertation i.e. identifying the determinants of REITs capital structure[25].

The model is,

$$\left(\frac{L}{A}\right)_{t+1} = \alpha + \alpha_1 \left(\frac{V}{A}\right)_t + \alpha_2 \left(\frac{ET}{A}\right)_t + \alpha_3 \left(\frac{Dp}{A}\right)_t + \alpha_4 \left(\frac{A_t - A_{t-1}}{A_t}\right) + \alpha_5 ln(A)_t + e_{t+1} \qquad \text{(E 6)}$$

Where:

L_t	:	Total long term debt in quarter t (Item DLTTQ in Compustat)
A_t	:	Book value of assets in quarter t (Item ATQ in Compustat)
$(V/A)_t$	:	Market to book ratio in quarter t Calculated as: $\frac{M}{B} = \frac{ShrOut \times ShrPrc}{A}$ $ShrOut$ = Shares outstanding (Item CSHOQ in Compustat) $ShrPrc$ = Share price (Item PRCCQ in Compustat)
ET	:	Earning before interest and taxes in quarter t Calculated as: $ET = NI + Int + Tax$ NI = Net Income (Item NIQ in Compustat) Int = Interest expenses (Item INTQ in Compustat) Tax = Income Taxes (Item TXTQ in Compustat)
Dp	:	Depreciations in quarter t (Item … in Compustat)

[25] I did not borrow the entire methodology of Fama and French's (2002). This is because their paper jointly models dividend policy and leverage policy to test the pecking order theory vs. trade-off theory. In this dissertation, I focus on the determinants of leverage policy and I test whether trade-off theory, pecking order theory, agency models, or signaling hypothesis explain REITs capital structure behavior. This modification is justified by the fact that dividend payout in REITs is not as discretionary as it is in non-regulated firms. REITs have incentive to pay more than 90% of income in dividends to benefit from tax exemption.

All variables are scaled by total assets to account for size impact. Model specifications are slightly different from Fama and French (2002) specifications. The V/A, ET/A, and $A_t - A_{t-1}/A_t$ variables proxies for expected investment opportunities, profitability, and current investments, respectively. Depreciation (Dp/A) captures non-debt tax shield and log of assets captures volatility of earnings and net cash flow on top of size effect. In Fama and French (2002), an additional variable of target payout (TP) is included. In REITs, most income available to shareholder is distributed (to benefit from the tax exemption provision) so this variable is omitted from my regression[26].

The focus in this regression is on the signs and significance of coefficients α_1, α_2, and α_4. Jointly, they determine which theory dominates the capital structure behavior of REITs. Fama and French (2002) argue that single cross-sectional estimation of the model above (as done by other authors) suffers from correlation of the residuals. Instead, they suggest using a Fama-MacBeth (1973) year-by-year time-series regression. Accordingly, I run the multiple regressions using data on all REITs available in each quarter t in the sample period 1990-2009. The result is a set of "period slopes." Next I take average of all period slopes (I call it "average of period slopes"). I also run a regression on the entire sample (all REITs in all time periods) and obtain "global slopes." I use "average of periods slopes" and "global slopes" in making inference on the determinants of capital structure behavior in REITs. The results are show in the table below,

[26] They also use an RD/A variable which is R&D expenses scaled by assets as a second proxy for investment opportunities. They also include an RDD variable that reports no R&D expenses. I eliminate these two variables for the same reason I eliminated R&D variables in the previous model. That is, in my sample REITs have zero R&D expenses. This does not change the validity of this regression because Fama and French (2002) include R&D as a proxy for investment opportunities along with V/A. They also use it a proxy for tax shield along with Dp/A. Since both V/A and Dp/A are present in my model and R&D expenses are zero in Compustat, the removal of this variable is justified.

Table 4 – Regression with Restricted and Extended Forms

	$\boldsymbol{\alpha}$	$\frac{V_t}{A_t}$	$\frac{ET_t}{A_t}$	$\frac{Dp_t}{A_t}$	$\frac{A_t - A_{t-1}}{A_t}$	$ln(A_t)$
Average Slope	0.319	-0.120	1.102	1.742	0.000	0.0299
(t)	(1.68)	(-1.57)	(0.471)	(0.105)	(0.125)	(1.083)
Global Slope	0.2474	0.007	-.2269	8.158	-0.000	.0312
(t)	(2.005)	(.003)	(-4.331)	(7.292)	(-1.893)	(22.48)

The economical (sign and magnitude) and statistical significance of coefficients a_1 and a_2 in conjunction with the contents of table 1 are used to answer the question of what derives capital structure decisions in REITs. First we note that the results of the average slopes are not impressive in terms of statistical significance and we believe that this is merely attributed to the small size of REITs-only sample. The global slopes however are significant and seem to supply good ground for interpretation. As table 3 above shows, trade-off model, agency model, and signaling hypothesis predict positive relationship between leverage and profitability while pecking order theory predicts a negative correlation (see Fama and French, 2002 for more discussions). The slope on profitability (ET/A) is negative and statistically significant. This result lends support to pecking order theory which is consistent with the finding of Long and Malitz (1985), Rajan and Zingales (1995) and Fama and French (2002). Under the pecking order story of leverage, REITs issue debt to reduce the adverse selection cost of equity. Myers and Majluf (1984) argue that managers, on the quest to satisfy exiting shareholders, issue equity only as a last resort and more likely when stocks are overvalued. Consequently, market participants discount new issues of equity and, thus, issuing equity is never optimal. This also supports the Feng, Ghosh and Sirmans, 2007 proposition that REITs have the incentive of paying all internally-generated funds as dividends (to benefit from tax exemption provision) and therefore debt is their next choice of financing under pecking order theory.

On the other hand, pecking order theory and agency cost model predict negative correlation between leverage and investment while pecking order theory predicts negative correlation between leverage and expected investment and positive correlation between leverage and existing investment (see Fama and French, 2002 for more discussions). In the table above we note that the slope on V/A is statistically insignificant and therefore investment does not seem to be correlated with leverage.

VI. Thought Investment Experiment

Description of Thought Experiment

Using a slightly different sample, I conduct a thought investment approach in terms of pursuing an experimental design to obtain relevant data. The sample used in this section is slightly different from that used in above sections because of different imposed requirements. I collect quarterly data on 163 active REIT's (CIS code 6798) from COMPUSTAT databases over the period 1990Q1-2009Q4. In each quarter (there are 80 quarters) I obtain REITs total assets, long-term debt, quarter closing price, and market value. I eliminate all missing and irregular entries (such as negative values for stock price and zeros for total assets). I calculate debt ratio as long-term debt divided by total assets. Since this variable is the main selection filter (as will be shown later), I eliminated the upper and lower 0.5% outliers. Table 1 below shows the descriptive statistics of this sample.

Table 5 Variables Descriptive Statistics

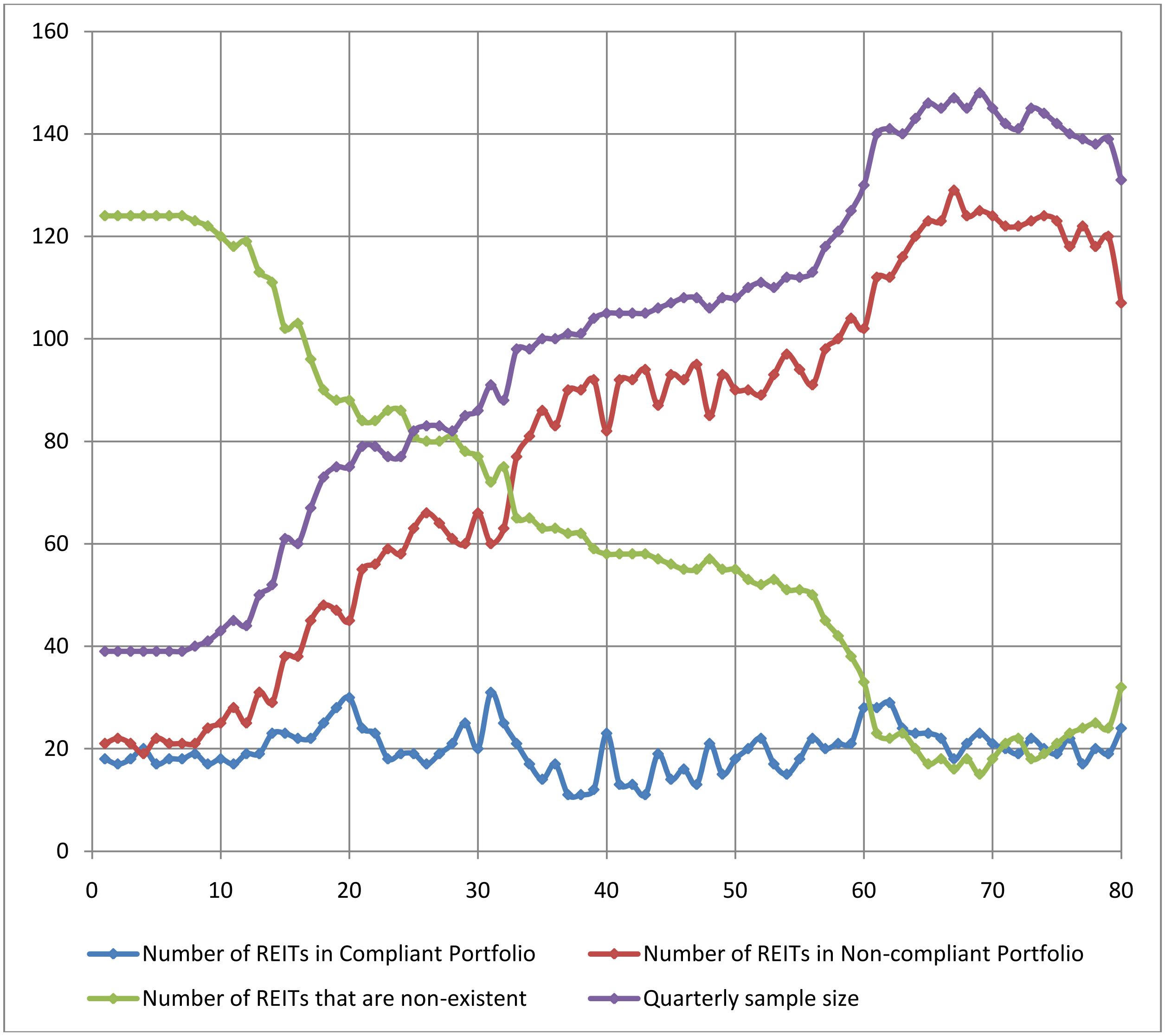
	Debt Ratio	Price (USD)	Market Capitalization (million USD)
Mean	0.47948	23.61666	1178.63828
Std Dev	0.19644	23.16358	2109.44201
Minimum	0.010073	0.039000	0.14640
Maximum	0.95085	419.64999	24851.80469
Median	0.49115	19.80500	490.12221
1st Quartile	0.37003	10.13750	140.48590
3rd Quartile	0.60992	30.80000	1297.52463
IQ Range	0.23989	20.66250	1157.03873

The final sample includes 7,870 data points of 163 REITS in the period 1990Q1-2009Q4 (80 quarters). Average debt ratio of all REITs in all time points (quarters) is about 48% with a standard deviation of about 19.6%. The highest and lowest debt ratios in the sample are about 95% and 1%, respectively. About 50% of all data points fall between 37% and 61%. Average stock price is about $23.61 with a minimum of about $.04 and a maximum of about $420. Average market capitalization is about $1178.7 million with a minimum and maximum of about $24,851 million and $0.146 million, respectively.

I split the REITs sample into two portfolios: one is restricted REIT and the other is non-restricted REIT. I use gross interest-bearing debt as a percentage of total assets as filtering criterion. My filtering threshold is 33%. I assume that a hypothetical investor is composing debt-restricted equally-weighted and value–weighted portfolios of available REITs. She selects only REITs that pass the criteria of having less than 33% of debt ratio. Every quarter, she screens available REITs for compatibility with this criterion and re-composes her portfolios accordingly. The frequency of data used in this study is slightly lower than other studies (weekly and monthly as in Hassan and Tag el-din (2005) and monthly in Hassan (2002)). The rational of using quarterly updating is that our criteria are derived from balance sheet data available on quarterly basis only. Later in this paper we will show that increasing the updating frequency from quarterly to monthly do not change the overall results that we obtain.

For the purpose of comparison, I form two additional none-restricted portfolios (one equally-weighted and one value-weighted) composed of all the REITs that do not pass as compliant in each quarter. Figure 1 below shows the number of REITs avaialble in each qurarter (quarterlly sample size), REITs that pass as resitriced, and REITs that do not; across time horizon of this study. It also shows number of REITs that are non-existent in certain quarter due to missing data.

Figure 4 – Number of REITs in the Restricted and Non-Restricted Portfolios across Time



The figure shows how 163 REITs included in this study are distributed over the Compliant and Non-compliant portfolios over time. We start with a sample of 39 REITs in 1990Q1 where 18 are compliant REITs and 21 are non-compliant. Over time, sample increases as more data become available every quarter. However, we notice that most of the sample size increase goes to non-compliant REITs (more than 33% of debt). At the end of the analysis period, fourth quarter of 2009, we have 24 REITs that pass as compliant and 107 that do not and a total sample size of 131 REITs.

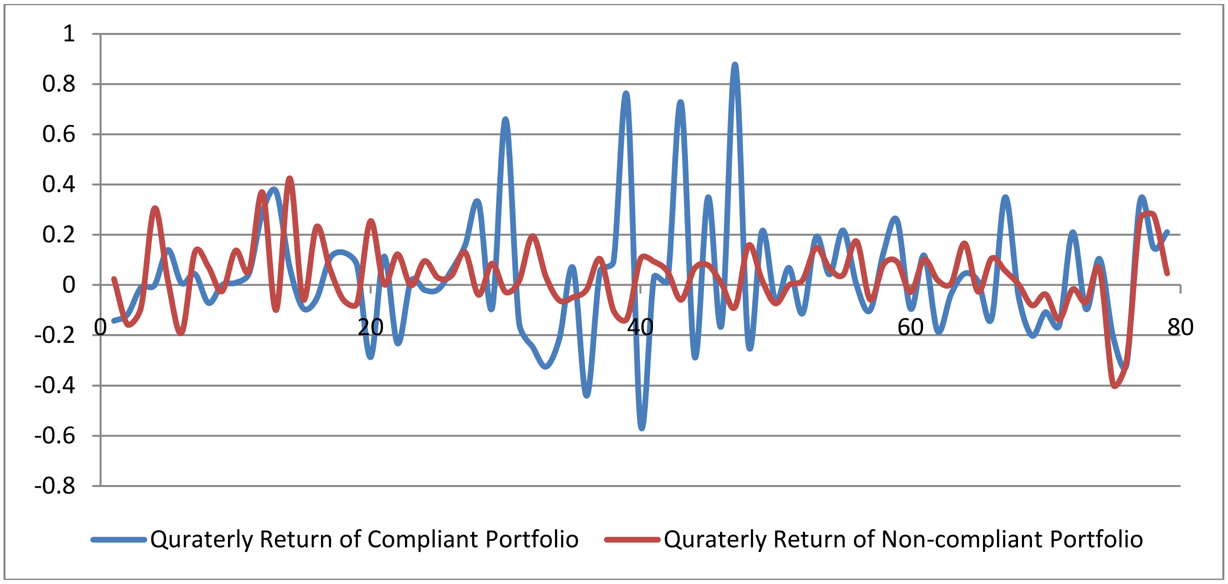
The four portfolios formed and tracked in this paper are: 1) **REW:** restricted equlaly-weighted 2) **NEW:** non-constrained equally-weighted 3) **RVW:** restricted value-weighted 4) **NVW:** non-constrained value-wieghted. In the equally weighted portfolio **REW**, we assume that our investor invest equally in all the RIETs that pass as compliant (and we do the same in the non-compliant portfolio **NEW**). In the value-weighted protfolio **RVW**, we assume that our investor distributes her investment over compliant REIT in such a way that each REIT receives a fraction of total investment equals the percentage of that REIT's marekt value to all compliant REITs' market value in each quarter (and we do the same in the non-compliant portfolio **NVW**).

E. Historical Portfolios Performance

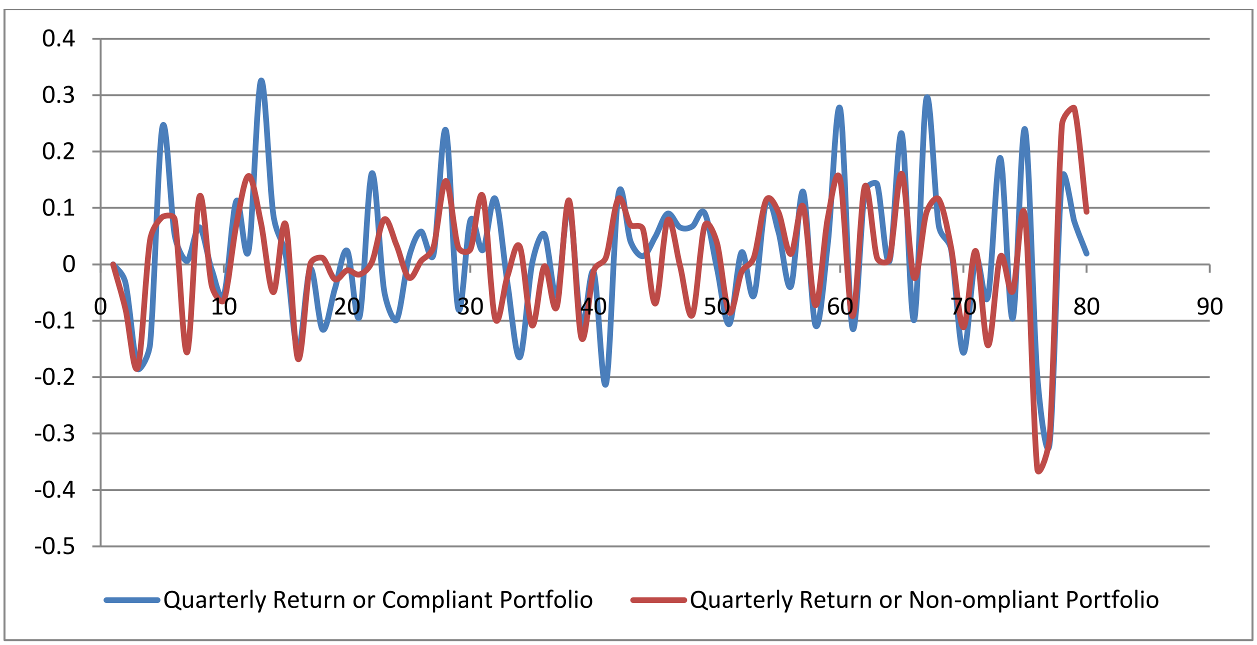
We start with initial investment of $1 in each portfolio in the first quarter of 1990. Then we update each portfolio quarterly by including REITs that do (do not) comply in the compliant (non-compliant) and exculding REITs otherwise. We report the over all value of each portfolio, then we calculate quarterly return and analysis period cumulative return.The following figure shows the quarterly return of the four portfolios created.

Figure 5 – Quarterly Returns of the Four Portfolios

Equally-weighted portfolios



Value-weighted portfolios



The following table illustrates the four portfolios created and descriptive statistics of their quarterly returns. The average quarterly return on the **REW** portfolio is about 3.27% while the average quarterly return on the **NEW** portfolio is 3.33%. The difference between the two is only 6 basis points per quarter equivalent to about .32% annually in favor of the non-compliant portfolio. In the value-weighted portfolios, the difference is much larger. The **RVW** portfolio realized an average quarterly return of 1.97% compared to 1.23% in the **NVW** portfolio. The difference is about 66 basis point equivalent to about 2.64% annually in favor of the compliant portfolio. Looking at other descriptive statistics, coefficient of variation in particular, we notice that the **REW** portfolio is almost twice as much volatile as the **NEW** portfolio. However, **RVW** portfolio is slightly less volatile than **NVW** portfolio. We conclude that when equal weighting is used, restricted portfolio performs worse in both average return and volatility. In value-weighted portfolios, restricted REITs perform better in both average return and volatility.

Table 6 - Portfolios Descriptive Statistics

	Equally-weighted Portfolio		Value-weighted Portfolio	
	Restricted Portfolio	Non-restricted Portfolio	Restricted Portfolio	Non-restricted Portfolio
	R-EW	N-EW	R-VW	N-VW
Mean	0.032710	0.033317	0.019710	0.012266
Std Dev	0.24638	0.13106	0.12241	0.10546
Coefficient of Variation	7.545	3.927	6.211	8.598
Minimum	-0.55604	-0.39675	-0.31852	-0.36251
Maximum	0.87758	0.42510	0.32581	0.27706
Median	0.011505	0.021467	0.018109	0.013314
1st Qrt	-0.11211	-0.046678	-0.055625	-0.045324
3rd Qrt	0.13005	0.099704	0.089567	0.081976
IQ Range	0.24216	0.14638	0.14519	0.12730

F. Statistical Measures of Performance

In the following we conduct more sophisticated tests of performance. We start with buy-and-hold return (BHR) then we use Jensen Alpha measure of performance with various versions of CAPM.

i. Buy-and-hold Returns

We start our analysis of the historical performance by calculating the buy-and-hold return BHR of the four portfolios over the studied period. We calculate BHR as follows:

$$BHR_{i,t} = \left[\left(\prod_{t=1}^{t}(1 + R_{i,t})\right) - 1\right] \tag{1}$$

Where:

$BHR_{i,t}$	:	buy-and-hold return for portfolio i in period t
$t = 1$	:	indicates the first quarter of the study period
$R_{i,t}$	:	return for portfolio i in period t

The results are reported in the table below. The BHR analysis confirms our earlier finding that restricted equally-weighted portfolio underperforms the non-restricted one but restricted value-weighted portfolio outperforms the non-restricted one. If our hypothetical investor had invested one dollar in the 1990Q1 in each of the four portfolios, she would end up with \$1.5 in the **REW** portfolio, \$7.136 in the **NEW** portfolio, \$2.675 in the **RVW** portfolio, and \$1.667 in the **NVW** portfolio. This result, coupled with the earlier results in Table 2 above indicates that portfolio weight composition is an important determinant of success in investment. The investors can not earn the excess return generated by compliant REITs, unless their compliant REITs weights are proportional to their market capitalization values.

Table 7 Performance of Portfolios Measured by BHR (1990Q1-2009Q4)

		Equally-weighted Portfolio			**Value-weighted Portfolio**	
		Restricted Portfolio	**Non-restricted Portfolio**		**Restricted Portfolio**	**Non-restricted Portfolio**
		R-EW	**N-EW**		**R-VW**	**N-VW**
Initial investment value ($)	1990Q1	1	1	1990Q1	1	1
Maximum Value ($)	1997Q3	2.796		2007Q1		2.656
Maximum Value ($)	2007Q1		13.520	2008Q2	3.875	
Portfolio's Value at the End of the Analysis Period ($)	2009Q4	1.500	7.136	2009Q4	2.675	1.669

Table 3 also shows the maximum value that each portfolio reaches during the studied period. The **REW** portfolio reaches a maximum value of 2.796 in 1997Q3. The **NEW** portfolio reaches a maximum of 13.520 in 2007 Q1. The **RVW** portfolio reaches a maximum value of 3.875 in 2008Q2. The **NVW** portfolio reaches a maximum value of 2.656 in 2007Q1.

Figures 3 and 4 below plot the historical performance of the studied portfolios in terms of cumulative return. Consistent with earlier findings, in equally-weighted portfolios restricted portfolio always underperformed the non-restricted one. In value-weighted portfolios, restricted portfolio always outperformed the non-restricted one.

Figure 6 – Historical Performance of Equally-weighted Portfolios

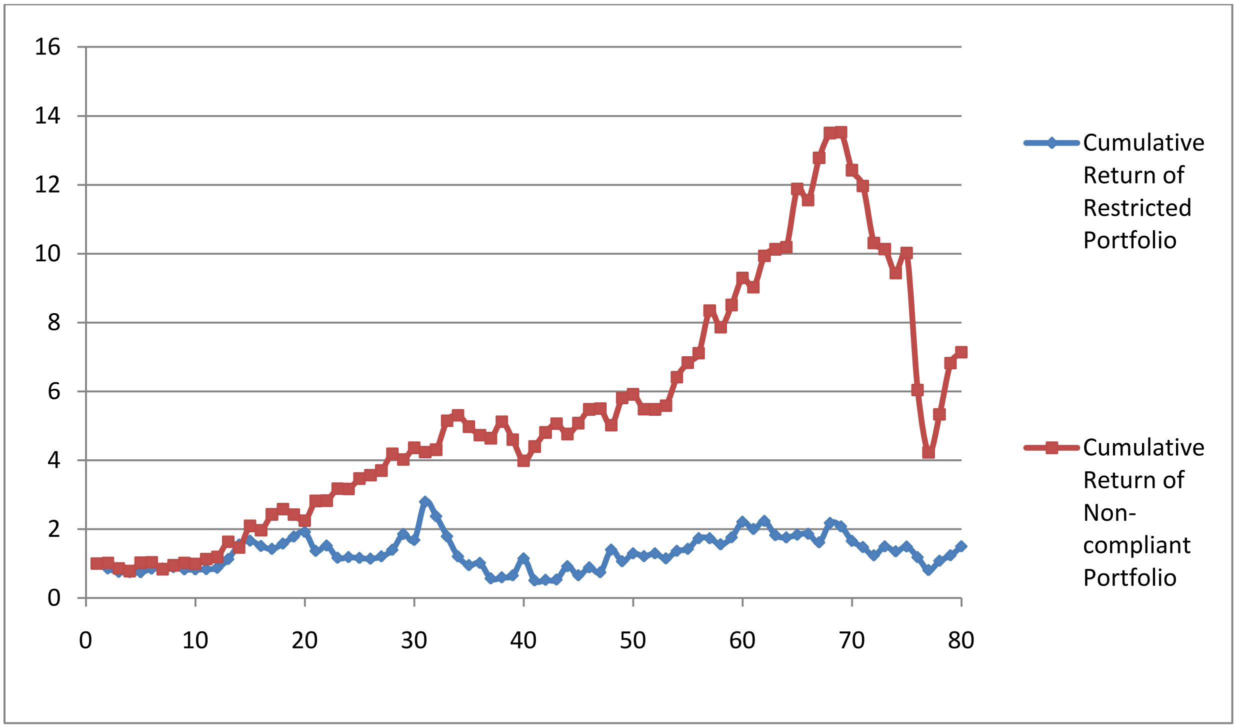
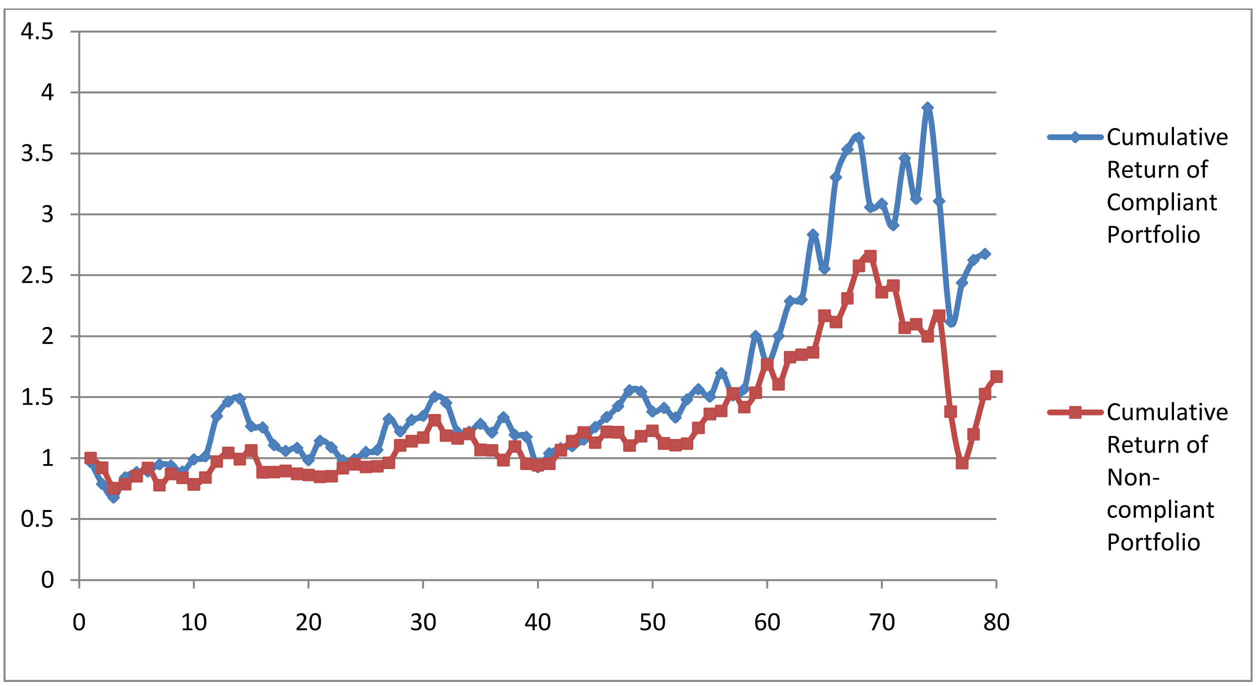


Figure 7 – Historical Performance of Value-weighted Portfolios

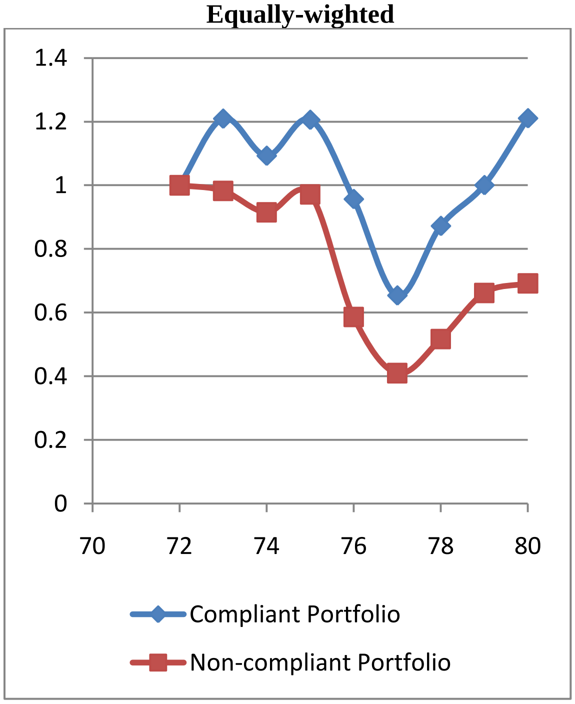


Looking at the figures above, we notice that during the last 8 quarters of analysis, the performance of the portfolios seems to have different pattern. These are the eight quarters that cover 2008Q1 to 2009Q4 i.e. the time of the financial crisis. We notice that all four portfolios witnessed losses as expected. To have a closer look at this period, we run separate analysis. This time we assume that our investor starts her investment in the beginning of 2008. She puts $1 in each portfolio and follows the same re-balancing policy described above. The results are interesting. Restricted portfolio seems to offer better investment in both equally-weighting and value-weighting schemes. Results are reported in table 4 below.

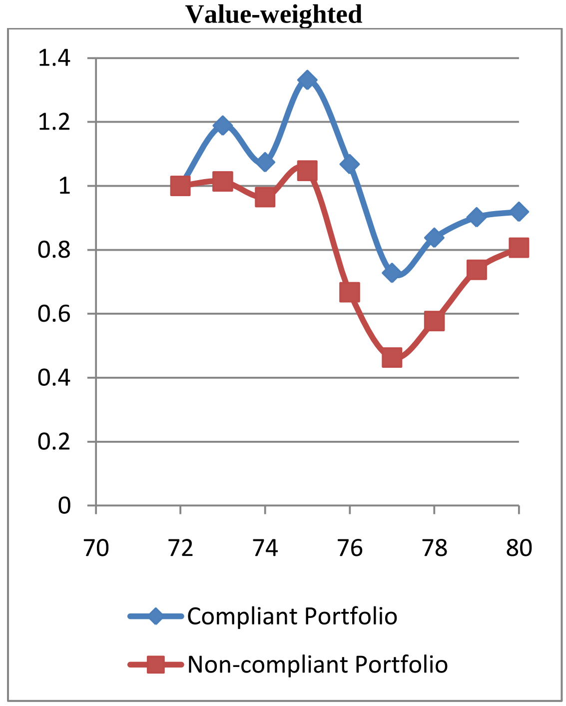
Table 8 Performance of Portfolios Measured by Value (2008Q1-2009Q4)

	Equally-weighted Portfolio		**Value-weighted Portfolio**	
	Restricted Portfolio	**Non-restricted Portfolio**	**Restricted Portfolio**	**Non-restricted Portfolio**
	R-EW	**N-EW**	**R-VW**	**N-VW**
Beginning of 2008	1	1	1	1
2008Q1	1.209495902	0.982744098	1.188792467	1.013715982
2008Q2	1.092824485	0.915163841	1.074108243	0.96518108
2008Q3	1.205816275	0.971639038	1.331509588	1.04745945
2008Q4	0.956656528	0.58613838	1.067943051	0.667741277
2009Q1	0.653777622	0.409896625	0.727778192	0.463140732
2009Q2	0.872248999	0.517120948	0.837908437	0.57755785
2009Q3	1.000526336	0.661610577	0.901909793	0.737575495
2009Q4	1.210755222	0.692053579	0.919090747	0.806414578

Equally-wighted



Value-weighted



A dollar invested in the beginning of 2008 in REW (NEW) would become \$1.211 (\$0.692) by the end of 2009. Obviously the difference is huge and meaningful. The restricted portfolio end with a gain of about 21% in two years during the crisis period when the non-restricted portfolio end with a loss of about 31% of its value. On the value weighted portfolios, both restricted and non-restricted portfolios witnessed a loss. However, the restricted portfolio lost only 9% of its value while the non-restricted portfolio lost about 19% of its value.

ii. *<u>Jensen's Alpha</u>*

We compute Jensen's alpha (Jensen 1968) of the compliant portfolios and compare it to Jensen's alpha of the non-compliant portfolio. If "alpha" is statistically significant and positive (negative), then the portfolio is comprised of outperforming (underperforming) REITs. We start with the simple single-factor CAPM model. We run,

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \varepsilon_{it}$$

where

R_{it}	:	Return of portfolio i over period t
R_{ft}	:	Risk-Free Return Rate
$R_{mt} - R_{ft}$	:	Excess Return on the Market Portfolio for period t
β_i	:	Beta of Portfolio i
α_i	:	Jensen's Alpha of Portfolio i

Since this analysis requires use of market portfolio that is mostly available in monthly frequency (not quarterly frequency), we slightly change our way of tracking portfolios illustrated above. We still assume that our investor updates her portfolios every quarter (the highest frequency of data available in Compustat). However, we track each REIT on a monthly basis. Specifically, after we determine that a certain REIT complies (does not comply) with our selection criterion and thus is included in the compliant (non-complaint) portfolio, we track its performance on a monthly basis until the next quarter. We obtain its monthly market price from CRSP and, thus, obtain monthly values of our portfolios over the period March 1990 to December 2009. As a result, we are able to obtain monthly returns of our four portfolios over the period April 1990 to December 2009. These monthly return are used in calculating Jensen's Alpha in the rest of this paper[27].

The CAPM is an *ex-ante* model, the beta coefficient reflects the expected volatility of portfolio i's return versus the return on the well-diversified risk-free market portfolio. In academia, we calculate betas using historical data. Next, if projection is the goal of the study, we make the crucial assumption that historical relative volatility will not change significantly in the future. In pure statistical terms, β_i measures the amount by which portfolio i's return increases for a one unit increase in the return of a perfectly diversified portfolio (market portfolio returns). In portfolio theory, β_i measures the "relative" risk of portfolio i compared to the market portfolio. A higher (lower) beta indicates that investors has been - or should be - asking for higher (lower) return on portfolio i and is generally interpreted as portfolio i being more (less) risky.

The intercept a_i captures the average return on a portfolio i over and above that predicted by the capital asset pricing model (CAPM). In a sense, it is a performance measure that analyzes the performance of portfolio i by estimating the excess average gain (loss) that investors realize by choosing to invest in portfolio i (given its beta and the average market return). A positive (negative) a_i indicates that portfolio i offers, on average, higher (lower) risk compensation than predicted by its own beta and the average return on market portfolio.

[27] We repeat the analysis of average period returns and cumulative returns with monthly data. We do not find any significant difference from the results obtained with quarterly data. In fact, the overall conclusions are identical to those illustrated before with quarterly data. We chose not to report these results for clarity of presentation.

We run the model above with monthly returns of all four portfolios REW, NEW, RVW, and NVW. We use several proxies of monthly returns of market portfolio including the monthly returns of S&P Composite Index (from CRSP), CRSP all-securities value-weighted market index (from CRSP), Nasda1 composite index, FTSE NAREIT U.S. Real Estate Index (from the NAREIT website www.reit.com) and Fama-French's returns on the market (from CRSP). Risk free rate is proxied by one month Treasury Bill rate.

Table 5 shows estimated values of slopes, Jensen Alpha, and other regression statistics for the four portfolios with each proxy of market returns.

Table 9 Jensen Alpha of Portfolios under Different Criteria

		Equally-weighted Portfolio		Value-weighted Portfolio	
Proxy of Perfectly Diversified Portfolio (Market Portfolio)		**Restricted Portfolio REW**	**Non-restricted Portfolio NEW**	**Restricted Portfolio RVW**	**Non-restricted Portfolio NVW**
S&P market return	α	.006076(1.15)	.006478**(2.34)	.002602(0.98)	-.000442(-0.20)
	β	.286637**(2.36)	.270461***(4.26)	.180891***(2.97)	.251072***(4.96)
	R^2	.023203	.071542	.036214	.094887
CRSP All-securities Value-weighted return	α	.005262(0.99)	.005939**(2.14)	.002255(0.85)	-.000971 (-.44)
	β	.313923***(2.69)	.267754***(4.38)	.177333***(3.02)	.252126***(5.19)
	R^2	.029902	.075335	.037394	.102806
NASDAQ Composite Index	α	.006231(1.18)	.007071**(2.50)	.003000(1.12)	.000098(0.04)
	β	.164271**(2.19)	.107856***(2.69)	.071955*(1.89)	.101278***(3.15)
	R^2	.020005	.029866	.015042	.040530
FTSE NAREIT U.S. Real Estate Index	α	.004445(.85)	.004585*(1.80)	.000665(.27)	-.002190(-1.12)
	β	.364705***(3.83)	.382853***(8.25)	.329190***(7.37)	.354389***(9.94)
	R^2	.058800	.224402	.187739	.295926
Fama-French Market Return	α	.006193(1.18)	.006752**(2.45)	.002789(1.06)	-.002061(-.09)
	β	.323027***(2.77)	.271665***(4.44)	.180770***(3.079)	.255936***(5.27)
	R^2	.031591	.077380	.038771	.105702

All betas are positive and statistically significant in all four portfolios and with all market proxies. Understandably, they are higher when NAREIT is used and lower when NASDAQ is used as proxy of market return. This is simply because NAREIT contain REIT only while NASDAQ index includes technology stocks that fluctuate, in aggregate, for causes different from those of the real estate sectors.

Positive beta is loosely interpreted as evidence that the portfolio “follows” the market. This indicates a positive correlation between our REIT portfolios return and market return. However, all betas’ magnitudes are relatively smaller than 1. This means that only smaller portion of the variance of the portfolio cannot be mitigated by the diversification provided by the market portfolio. Hence, all of our portfolios are generally deemed as less volatile than the market portfolio. Yet, in equally weighted portfolio, betas of restricted portfolios are generally higher (in all five proxies of market return except NAREIT) than the betas of the unrestricted portfolio. The inverse observation is found in value weighted portfolio (in all five proxies of market return). We conclude that constrained value-weighted portfolio of REIT are less volatile than the non-constrained one.

We find that all alphas are statistically insignificant in REW portfolio but positive and significant when in NEW portfolio. Restricted portfolio is not generating any excess return while non-restricted portfolio generates excess return of about 65, 59, 70, 46, and 67 basis points per month depending on which proxy is used. This is equivalent to about 7.8%, 7.08%, 8.4%, 5.52%, and 8.04% annual excess return depending on which market proxy is used. This is also in line with our earlier findings (derived from average period return and cumulative return) that in equally-weighting portfolios non-constrained REITs outperform the constrained ones. We also find that all alphas are statistically insignificant in RVW and NVW portfolios. This is slightly different from our earlier findings derived from average period return and cumulative return. There seem to be no difference between restricted and non-restricted REITs in value weighted portfolios.

iii. *Extended asset Pricing Models*

We start with Fama and French (1993 and 1996) three-factor model:

$$R_{it} - R_{ft} = \alpha_i + \beta_{i,1}(R_{mt} - R_{ft}) + \beta_{i,2}HML + \beta_{i,3}SMB + \varepsilon_{it}$$

where

R_{it}	:	Return of portfolio i over period t
R_{ft}	:	Risk-Free Return Rate (Ibbotson One Month Treasury Bill Rate)
$R_{mt} - R_{ft}$	:	Excess Return on the Market for period t
$\beta_{i,j}$	:	Beta of Portfolio i of factor j
HML	:	difference in return between a portfolio of high book-to-market stocks and one of low book-to-market stocks at time t
SMB	:	difference in return between a small cap portfolio and a large cap portfolio at time t
ε_{it}	:	Random error term for REIT i over period t with an expected value of zero.

Carhart (1997) extends CAPM by including Fama and French (1993 and 1996) factors, and a momentum factor of Jegadeesh and Titman (1993). The resulting model is a 4-factor market equilibrium model, where the coefficients provide indication of the style focus of a portfolio. This model is formally described as follows:

$$R_{it} - R_{ft} = \alpha_i + \beta_{i,1}(R_{mt} - R_{ft}) + \beta_{i,2}HML + \beta_{i,3}SMB + \beta_{i,4}MOM + \varepsilon_{it}$$

where

MOM	:	difference in return between a portfolio of past 12 month winners and a portfolio of past 12 month losers at time t

Results are shown in table 5.

Table 10 Jenson Alpha of portfolios using the three-factor and four-factor models

I regress portfolio returns on market return, book-to-market factor, size factor using three-factor model (Panel A):

$$R_{it} - R_{ft} = \alpha_i + \beta_{i,1}(R_{mt} - R_{ft}) + \beta_{i,2}HML + \beta_{i,3}SMB + \varepsilon_{it}$$

Then, we regress portfolio returns on market return, book-to-market factor, size factor and momentum factor using four-factor model (Panel B):

$$R_{it} - R_{ft} = \alpha_i + \beta_{i,1}(R_{mt} - R_{ft}) + \beta_{i,2}HML + \beta_{i,3}SMB + \beta_{i,4}MOM + \varepsilon_{it}$$

	Equally-weighted Portfolio		**Value-weighted Portfolio**	
	Restricted Portfolio	**Non-restricted Portfolio**	**Restricted Portfolio**	**Non-restricted Portfolio**
	REW	**NEW**	**RVW**	**NVW**
	Panel A - Three-factor Model			
a	.003732 (0.72)	.004198 (1.64)	.000800(.32)	-.002247(-1.11)
B_1	.350259***(2.91)	.341051***(5.75)	.226651*** (3.86)	.309308***(6.58)
B_2	.475572***(2.85)	.536149***(6.35)	.409066***(5.04)	.426453***(6.56)
B_3	.425101***(2.73)	.261958***(3.42)	.239518***(3.16)	.218574***(3.60)
R^2	.078660	.226123	.142418	.252297
	Panel B - Four-Factor model			
a	.004300(.81)	.004278(1.64)	.001056(.41)	-.002187(-1.06)
B_1	.323713**(2.51)	.337348***(5.31)	.214742***(3.42)	.306505***(6.09)
B_2	.452325***(2.64)	.532906***(6.30)	.398638***(4.77)	.423999***(6.33)
B_3	.428883***(2.75)	.262486*** (3.41)	.241214***(3.17)	.218973***(3.60)
B_4	-.059930(-.58)	-.008360(-.16)	-.026884(-.54)	-.006327 (-.16)
R^2	.080005	.226213	.143479	.252377

*** indicate significance at 1%; ** indicates significance at 5%; * indicates significance at 10%

The table shows that alphas are statistically insignificant whether we use equally-weighted or value-weighted portfolios. This finding does not change whether we use three-factor model (Panel A) or four-factor model (Panel B). Consistent with Ibrahim and Ong (2008), we conclude that when other risk factors are controlled for, there is no convincing evidence that restricted portfolio's performance differ from the non-restricted one. Since betas are all significant (and positive) in all four regressions, we conclude that market-wide risk-return characteristics are more important than compliance vs. non-compliance characteristics. In other words, although we have shown that compliant portfolio outperforms non-compliant, the difference become insignificant when we control for broad economic factors. In practical terms, investors who invest exclusively in REITs securities make higher return if they choose to invest in debt-conservative REITs. This is not true for investors with more diversified portfolios.

G. Summary and findings of the thought investment experience

I collect quarterly data on 163 active REIT's (CIS code 6798) from COMPUSTAT databases over the period 1990Q1-2009Q4 (there are 80 quarters). I create two debt-restricted REIT portfolios based with equal-weighting and value-weighting. The filtering threshold is a maximum of 33% debt ratio. For the purpose of comparison, I form two non-restricted portfolios (one equally-weighted and one value-weighted) composed of all the REITs that do not pass as compliant.

I that find restricted portfolio performs better in value-weighting (but not in equal-weighting) in both average return and volatility. The BHR analysis reveals similar results. Restricted equally-weighted portfolio always underperformed the non-restricted one while restricted value-weighted portfolio always outperformed the non-restricted one. During the recent crisis period, however, restricted portfolio outperformed the non-restricted one in both equally-weighting and value-weighting schemes. The restricted equally weighted portfolio generated a gain of about 21% in two years during the crisis period when the non-restricted portfolio end with a loss of about 31% of its value. The restricted value weighted portfolios lost only 9% of its value while the non-restricted portfolio lost about 19% of its value in two years during the crisis period.

I compute Jensen's alpha of all four portfolios several proxies of monthly returns of market portfolio and one month Treasury Bill rate as a proxy for risk-free rate. I find that constrained value-weighted portfolio of REIT are less volatile than the non-constrained one. Again I find that in equally-weighting portfolios non-constrained REITs outperform the constrained ones. However, there seem to be no difference between restricted and non-restricted REITs in value weighted portfolios. Finally, I use Fama and French (1993 and 1996) three-factor model and Carhart (1997) four-factor market equilibrium model. I find that when other risk factors are controlled for, there is no convincing evidence that restricted portfolio's performance differ from the non-restricted one and that market-wide risk-return characteristics are more important than compliance vs. non-compliance characteristics.

VII. Conclusion

Classic capital structure theories (Modigilani and Miller, 1958 & 1963 and Miller 1977) suggest that REITs use of debt should be minimal because REITs do not pay corporate income tax and thus do not enjoy the classical tax-deductibility benefit of leverage (Howe and Shilling, 1988). However, anecdotal observation and the findings of previous studies (Howe and Shilling, 1988; Ghosh, Nag, and Sirmans, 2001; and Feng, Ghosh and Sirmans, 2007) suggest the opposite. Feng, Ghosh and Sirmans (2007) concur with Ott, Riddiough, and Yi (2005) that there is no apparent benefit (tax-deductibility savings) and, therefore, REITs appetite to debt issuance is puzzling. Further, they suggested that monitoring benefits of debt is the potential motivation for high leverage ratios in REIT.

I investigate REITs leverage in three different approaches. First, I investigate how the market prices leverage in absence of tax-deductibility benefit. The OLS approach I use here has been applied extensively in previous studies that investigated leverage. However, these studies conventionally excluded REITs from their samples because REITs are regulated entity. The REITs capital structure literature, previous methodologies applied are limited to event studies. I use a sample of REITs over 1990-2010 and a regression model similar to that used by Fama and French (1998). Using a period's average slope, I found evidence that, in contrast with Fama and French 1998 findings with broader sample, REITs do not gain or loss value by altering their capital structure. Nevertheless, to overcome a potential smaller sample (REITs only) caveat, I re-run the regressions with all data point (REIT-quarter) in the sample to obtain "global slopes." I found that current and future (expected) increases in leverage policy add value but past increases do not. However, controlling for investment and profitability eliminates this value gain. I conclude that leverage, by itself, does not explain variation on value in REITs.

Second, I investigate other (non-tax-driven) benefits of leverage. Pecking order theory (Myers and Majluf, 1984) suggests that leverage lowers the adverse selection cost of equity. Agency theory suggests that mandatory debt payouts lowers perquisite spending and empire building behavior (Jensen and Meckling, 1976) and free cash flow (Jensen, 1986). Signaling hypothesis (Ross 1977, Myers and Majluf, 1984, and Miller and Rock, 1985) suggests that debt issuance signals prosperous future and/or financial stability. Fama and French (2002) present a comprehensive model that accounts for different capital structure theories. Following this model, I regress changes on capital structure in REITs on several proxies of profitability and investment opportunities. I find evidence that lends support to pecking order theory in particular. This is consistent with previous findings in broader samples (Long and Malitz (1985), Rajan and Zingales (1995) and Fama and French (2002). I conclude that REITs managers attempt to maximize wealth of exiting shareholders by refraining from issuing equity (unless stocks are overvalued) and rely heavily on debt to finance investments.

Third, I conduct a thought experiment on debt-restricted REITs. I construct a debt-restricted portfolio and a non-restricted portfolio and track their performance over 1990-2010. I collect quarterly data on 163 active REIT's (CIS code 6798) from COMPUSTAT databases over the period 1990Q1-2009Q4 (there are 80 quarters). I create two debt-restricted REIT portfolio based on equal-weighting and value-weighting schemes. The filtering threshold is a maximum of 33% debt ratio. For the purpose of comparison, I form two non-restricted portfolios (one equally-weighted and one value-weighted) composed of all the REITs that do not pass as compliant.

I find that restricted portfolio performs better in value-weighting (but not in equal-weighting) in both average return and volatility. The BHR analysis reveals similar results. Restricted equally-weighted portfolio always underperformed the non-restricted one while restricted value-weighted portfolio always outperformed the non-restricted one. During the recent crisis period, however, restricted portfolio outperformed the non-restricted one in both equally-weighting and value-weighting schemes. Using Jensen's alpha approach, I find that in equally-weighting portfolios non-constrained REITs outperform the constrained ones and there is no difference between restricted and non-restricted REITs in value weighted portfolios. Finally, I use Fama and French (1993 and 1996) three-factor model and Carhart (1997) four-factor market equilibrium model. I find that when other risk factors are controlled for, there is no convincing evidence that restricted portfolio's performance differ from the non-restricted one and that market-wide risk-return characteristics are more important than compliance vs. non-compliance characteristics.

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Chapter 2: Essay on the Persistence of Corporate Diversification Discount after Merger and Acquisition Transactions

I. Introduction

Mergers and acquisitions are business transactions where a parent firm diversifies its assets by merging with or acquiring business unit(s) of another existing firm. Not all M&A events lead to "pure" diversification, though. The new unit(s) could belong to the same, or very similar, industry as the parent (i.e. related or intra-industry diversification) or to a different industry (i.e. unrelated or inter-industry diversification). The literature on corporate diversification is very rich and diverse; it covers many interrelated topics from finance and strategy disciplines. The dominant evidence in finance literature posits that diversification erodes value (Lang and Stulz, 1994 and Berger and Ofek, 1995 and Servaes, 1996) and unrelated diversification is more value-eroding than related diversification (Bettis and Mahajan, 1985 and Wernerfelt and Montgomery, 1988 and Berger and Ofeck, 1995)[28].

It is puzzling that diversification is such a popular business strategy[29] despite overall evidence of value erosion. What motivates managers to diversify their companies despite the documented diversification discount? Some authors suggest that diversification is

[28] The collective evidence, however, is inconclusive (Martin and Sayrak, 2003 and Ravichandran, Liu, Han and Hasan, 2009) and a small, yet important, portion of literature shows evidence of a diversification premium (Hadlock, Ryngaert, and Thomas, 2001 and Villalonga, 2004a, b).

[29] Serveas (1996) shows that in his sample over 1961-1976, number of single-segment firms declined from 54.5% to 28.4% and number of 6-segment firms increased from 0.4% to 4% and the overall trend over the studied period is an increase of average number of segments from 1.74 to 2.70. Montgomery (1994) notes that two thirds of the Fortune 500 companies were diversified in 1992. Mukherjee, Kiymaz, & Baker (2004) reported that the period of 1992-2000 witnessed the largest merger wave in history. Further, the sample studied in this dissertation shows that some diversifiers involved in repeated diversifying behavior in the 1998-2008 period.

motivated by management self-interest pursuit (Jensen (1986) and Jensen and Murphy (1990), Shleifer and Vishny (1990a,b), Hyland and Diltz (2002) and Aggarwal and Samwick (2003)). Others suggest that documented discount is an artifact of inappropriate data (Villalonga, 2004a, b) or a result of diversifiers' tendency to acquire business units that are already selling at a discount (Graham, Lemmon, and Wolf (2002) and Campa and Kedia (2002)). Some authors note that diversification strategy carries some advantages (Rumel (1974) and Bettis and Mahajan (1985) and Berger and Ofek (1995)). No previous work, however, has attempted to investigate the dynamic relationship between diversifiers' value and the evolution of financial and strategic efficiencies of corporate diversification strategy in a cohesive framework. In this dissertation, I hypothesize that diversifiers exchange immediate diversification discount with future value gain attributed to "unanticipated" advantages of diversification. Further, I hypothesize that diversification advantages are more pronounced in related diversification; hence they witness a faster value recovery process compared to unrelated diversifiers.

The literature documents several advantages and disadvantages of diversification strategy. The most celebrated financial advantage is the internal capital market efficiency (see Weston (1970), Stulz (1990), Gertner, Scharfstein and Stein (1994) and Morck and Yeung (1998)) which also has been reported by other authors as a diversification disadvantage (see Stulz (1990), Chen and Steiner (2000), Meyer, Milgrom, and Roberts (1992), Lamont (1997), and Rajan, Servaes and Zingales (2000)). Lewellen (1971) lists several advantages to diversification including improved access to capital market, increased efficiencies through economies of scale and scope, increased market power, sharing of extant assets and greater administrative efficiency. A recent survey study by

Mukherjee, Kiymaz, & Baker (2004) confirms existence of financial and strategic advantages of diversification. They surveyed CFOs about the primary motives behind corporate M&A strategies and found that "synergy" (in the form of operating economies of scope and scale, financial economies, and increased market power) and "diversity" seem to be top motives.

I argue that immediately after the diversifying event, the value of the diversification advantages is uncertain to outsiders; thus the initial discount. Over time, financial and strategic efficiencies materialize and uncertainty diminishes. The market rewards diversifiers in the form of gradual value gain and initial diversification discount declines over time. While the diversifying event occur at one point in time, its advantages are inherently evolving (i.e. they materialize over time) and they do not perfectly qualify as public information. First, diversification advantages listed above are naturally evolving i.e. they materialize slowly over time. It is very unlikely that the newly-acquired business unit(s) come to a complete harmony with existing unit(s) immediately after the diversification. Further, market power and cost efficiencies usually take time to reach full level. Second, and more importantly, financial and strategic advantages are, at least partly, private information [30] at the time of the diversification and, thus, are not immediately priced.

In a sense, investors initially overestimate the disadvantages and underestimate the advantages of diversification and it takes some time before they "correct" their estimation

[30] Potential financial and strategic advantages do not qualify as "publicly-available" information. Rather, they are, at least partially, *insider's* information. Arguably, insiders know better than outsiders about the potentials of the subject diversification. This is consistent with the information asymmetry hypothesis which is a cornerstone in major modern theories of finance such as signaling theory of Ross (1977) and adverse selection of Myers and Majluf (1984) and agency costs of Jensen and Meckling (1976).

through a learning process. Menon and Subramanian (2007) show that risk-averse agents face a trade-off between learning and diversification and what matters is not only the level of risk but also whether or not it can be reduced through learning. In their model, a risk-averse agent chooses between investing in two similar projects (i.e. to focus) and investing in two different projects (i.e. to diversify). They show that initially there is some uncertainty but over time the agent learns and uncertainty is reduced. Diversification allows the agent to diversify away (at least partially) idiosyncratic risk but also entitles slower learning relative to being focused. Analogically, I argue that investors initially discount diversified firms, relative to focused ones, due to uncertainty associated with the materialization of potential efficiencies but eventually the uncertainty vanishes away as the units "learn to work together" (Hund, Monk, and Tice, 2010). The learning process, however, takes longer time with diversified firms relative to focused ones. Thus, it takes some time for the initial discount to gradually fade away.

One testable implication of this hypothesis is that the initial diversification discount documented using static methodologies is attenuated in a dynamic investigation. The second implication is that discount recovery goes hand-in-hand with the materialization of financial and strategic efficiencies over time. The dynamic approach I use in this dissertation is tailored to investigate these two implications. Further, Lewellen (1971) and Rumel (1974) and Bettis and Mahajan (1985), argue that the advantages of diversification are more significant in related diversifications. Consequently, we anticipate observing faster value recovery in related diversifiers relative to unrelated diversifiers.

The major contribution of this dissertation is introducing a dynamic evolution framework to the literature of corporate diversification. The dynamic evolution model I use relates value evolution patterns to several unanticipated financial and strategic advantages of diversification. Specifically, I measure performance (Tobin's Q) and value (excess value approach of Berger and Ofek, 1995) of each parent for several years after the diversification event and observe the trend. Next, I measure several financial and strategic advantages of diversifiers over several years after the diversification event. I relay on extant finance and strategy literature to identify potential advantages including internal capital market, access to capital market, market power and cost efficiencies. Using several OLS models, I test the joint evolution of diversifiers' performance and value with the evolution of diversification advantages. I also condition the test on the structure of the diversification event i.e. related vs. unrelated.

Some empirical work has been done on the persistence of diversification impact on value and performance. However, the small number of empirical studies and the inconclusiveness of results warrant more research in this domain. My hypothesis is consistent with Agrawal, Jaffe, and Mandelker (1992) who show that the market may adjust slowly to news of mergers. Recently, Hund, Monk, and Tice (2010) used Pástor and Veronesi's (2003) rational learning model to examine changes in excess value conditioned on firm organizational form and how these changes vary across the business cycle. They show that diversified firms witness larger initial discount relative to focused firms. However, the diversification discount increases (i.e. worsens) at slower rate in diversified firms relative to focused ones. They attribute the differential in the worsening rate to learning and argue that diversified firms are older and, thus, they allow faster learning as the segments "learn to work together."

In contrast to Hund, Monk, and Tice (2010) findings, I show that the initial discount last for only short post-event period (it actually increases in the first post-event year) before it starts to decrease (i.e. improve) and eventually turn into a premium. In a sample of 316 diversifying events over 1998-2008, I document that initial diversification discount worsens (increases) in the first post-diversification year before it starts to improve (decrease) steadily in subsequent years. In my sample, an average diversifier takes about 3 years to completely neutralize and reverse the initial diversification discount. This finding indicates that documented diversification discount in other studies might be attributed to limiting analysis horizon to short period around the diversifying event or gauging average excess value cross-sectionally without taking into account its dynamic evolution[31]. Expectedly, I find evidence that value recovery process is faster with related diversification which takes about 1 year to reverse the initial diversification discount while an unrelated diversifier needs 5 years to do so. Further, I show that "learning to work together" is more adequately defined (and quantitatively measured) in terms of financial and strategic advantages of corporate diversification.

In particular, I show evidence that annual improvements in performance (higher Tobin's Q) are driven by annual improvements in internal capital market activity, market power, and cost efficiencies. Similarly, annual improvements in value are driven by market power, internal capital market activity, and cost efficiency. I also show that improvements in market power contribute to faster improvement in performance (Tobin's Q) and faster value recovery process (excess value). Access to capital market, cost

[31] The findings of this dissertation does show that, consistent with previous work of Berger and Ofeck (1995) and many others, that diversification initially destroys value. It also shows, however, that the discount improves (decreases) systematically overtime.

efficiencies and share of common assets contribute to faster improvements in Tobin' Q but not necessarily translate into improvement in value. Finally, improvements in market power has stronger impact on speed of recovery (of both Tobin's Q and excess value) in related diversifiers relative to unrelated ones.

The rest of this dissertation unfolds as follows. In the next section, I present my hypothesis and provide a discussion of its implications. In section III, I describe the sample structure. In section IV, I investigate the evolution of diversifiers' performance and value. In section V, I test the joint evolution between value and performance of diversified firms and the diversification efficiencies. In section VI, I discuss the results and conclude.

II. Hypotheses Development

A. Summary of Extant Literature and the Diversification Puzzle[32]

The dominant belief in diversification literature is that related diversification is generally a more advantageous strategy than unrelated diversification (Bettis and Mahajan, 1985 and Wernerfelt and Montgomery, 1988 and Berger and Ofeck, 1995). However, the value consequences of corporate diversification strategy are inconclusive (Martin and Sayrak, 2003 and Ravichandran, Liu, Han and Hasan, 2009). While a sizable portion of literature supports the value-erosion hypothesis of corporate diversification (Lang and Stulz, 1994 and Berger and Ofek 1995 and Servaes, 1996), a smaller, yet important, portion shows evidence of a diversification premium (Hadlock, Ryngaert, and Thomas (2001) and Villalonga, 2004a, b). Nevertheless, the dominant evidence and explanations found in the finance literature support the value-erosion hypothesis of corporate diversification.

The standard methodological approach is to compare the value of multiple-segment firm to the sum of imputed value of its segments (as in Berger and Ofek, 1995) or to compare performance (measured by Tobin's Q) of multiple-segment firms to performance of single-segment firms (as in Lang and Stulz, 1994; Servaes, 1996; and Steiner, 1996). A second methodological approach involves investigation of market reaction by regressing returns on a measure of diversification such as Herfindahl Index (as in Comment and Jarrell, 1995) or by running an abnormal return analysis around divestiture dates (as in Desai and Jain (1999), Burch and Nanda (2003) and Ahn and Denis (2004)). The collective evidence presented in those studies shows that diversification is associated

[32] A detailed literature review is available in appendix A.

with trading at a discount, poorer performance and negative market reaction at announcement date.

Explanations of the value-erosion hypothesis[33] of diversification fall under three major categories: agency, internal market inefficiencies and information asymmetry. Agency-based explanations (as in Denis, Denis and Sarin, 1997, Chen and Steiner, 2000 and Rotemberg and Saloner, 1994) advocate exacerbation of free cash flow problem and the inability to motivate managers. The internal capital market[34] hypothesis attributes value-erosion to inefficient resource allocation (as in Lamont, 1997, Rajan, Servaes and Zingales. 2000 and Shin and Stulz, 1998). Finally, information asymmetry-based explanations posit that diversification discount stems from over-investment problems (as in Stulz, 1990, Matsusaka and Nanda, 2002).

The Corporate Diversification Puzzle

Several studies reported increased business appetite toward diversification despite overwhelming evidence of value-erosion. Serveas (1996) shows that in his sample over 1961-1976, the number of single-segment firms declined from 54.5% to 28.4% and number of 6-segment firms increased from 0.4% to 4% and the overall trend over the studied period is an increase of average number of segments from 1.74 to 2.70. Montgomery (1994) notes that two thirds of the Fortune 500 companies were diversified in 1992. Mukherjee, Kiymaz, & Baker (2004) reported that the period of 1992-2000

[33] There is much less evidence of the value-creation hypothesis of diversification. The fundamental argument is presented by Villalonga (2004a, b) who documents a diversification premium and shows that diversification discount is an artifact of data used. See appendix A for more discussions and evidence.

[34] The impact of internal capital market on diversified firm value is inconclusive. For instance, internal capital market allows easier access to capital (advantage) but also exacerbates agency-related free cash flow problem (disadvantage).

witnessed the largest merger wave in history. In the sample of this dissertation that includes 316 diversifying events during 1998-2008, I also notice a repeated diversifying behavior in the same parent firm. About 7% of the diversifiers studied in this dissertation underwent a second diversifying event and about 2% underwent a third diversifying event over the period 1998-2008. Why diversification is such a popular corporate strategy despite the overwhelming evidence supporting the value-erosion hypothesis of diversification and documents negative market reactions to focus-decreasing moves? In a sense, the ultimate goal of corporate management is to maximize shareholders' wealth through value-creating investments not to involve in value-eroding strategies. This is the diversification puzzle.

Possible Explanations of the Corporate Diversification Puzzle

Some authors explain the popularity of diversification strategy in light of management self-interest pursuits (empire-building behavior and increased benefits and compensations). For instance, Jensen (1986) and Jensen and Murphy (1990) note that managers pursue diversification to increase their compensation, power, and prestige. Shleifer and Vishny (1990a,b) note that diversification strengthens management entrenchment by making investments that require their particular skills. Hyland and Diltz (2002) show evidence that diversifiers enjoy cash availability and lower R&D expenses and conclude that managers of diversifying firms seem to pursue growth through mechanisms other than research and development. Aggarwal and Samwick (2003) also find similar results[35].

In my opinion, management entrenchment concerns cannot be the only motivation behind diversification because what it really implies is that diversification is a strategy that transfers wealth from shareholders to managers. This process cannot continue for long time due to several internal and external control mechanisms. For instance, Board of Directors intervention would not approve a merger proposition if the sole reason was management entrenchment. Further, merger transactions are big events that usually attract a great deal of attention from external investors, analysts, the media, and even the general public. There is very little room for diversification to be such a common strategy if management entrenchment is the only motive. Therefore, the management self-interest pursuit story does not, by itself, resolve the puzzle. I argue that there must be some other plausible justifications for the popularity of diversification.

B. The Potential Advantages and Disadvantages of Diversification

Logically, there must be a positive side of diversification that lures businesses to diversify despite initial discount. In the following, I summarize major financial and strategic advantages of corporate diversification found in literature. I also highlight potential disadvantages. On the financial side, diversification creates efficiency of internal capital market and improves access to external capital. However, it is inconclusive whether internal capital markets create or erode value. On the strategic side, diversification increases market power and creates cost efficiencies attributed to

[35] I would like to highlight that diversification motivations are generally consistent with one explanation of diversification discount that asserts that diversification intensifies agency problems.

economies of scale and scope and share of common assets. Finally, I cite evidence that these advantages are more pronounce in related diversification relative to unrelated diversification.

i. Financial Efficiencies of Diversification

Although the dominant belief in diversification literature is tilted toward the value-erosion hypothesis, few authors reported value-creation evidence (Villalonga 2004a, b) and positive market reaction to diversification announcements (Hadlock, Ryngaert, and Thomas, 2001). The most celebrated explanation for value-creation is efficient internal capital market. Weston (1970) argues that internal capital markets are more efficient in resource allocation than external capital markets. Stulz (1990) shows that diversification allows firms to set up an internal capital market so that they avoid the need to go to external capital and, thus, mitigate the under-investment problem suggested by Myers (1977). Gertner, Scharfstein and Stein (1994) investigate the strengths and weaknesses of internal capital markets. They find that the ownership aspect of internal financing has two significant advantages of better monitoring and better asset deployment. Morck and Yeung (1998) also argue that cross-country diversifications are motivated by efficiency of internal capital markets.

Nevertheless, there is a considerable doubt whether internal capital market in diversified firms is efficient and value-creating or inefficient and value-eroding. I have shown in the literature review section (appendix A) that internal capital market has also been suggested as an explanation of value-erosion because it exacerbates agency-related free cash flow problem (Stulz (1990) and Chen and Steiner (2000)) and allows for inefficient allocation of resources toward underperforming segments (Meyer, Milgrom, and Roberts (1992), Lamont (1997), and Rajan, Servaes and Zingales (2000)). In summary, the exact impact of internal capital market in diversified firms is inconclusive.

Lewellen (1977) lists several other financial efficiencies associated with diversification including: 1) taking advantage of a temporary undervaluation of the acquired firm; 2) lowering the variability of earnings through diversification of income sources; and 3) utilizing the unused debt capacity of the acquired firm. In the same paper, Lewellen presents an argument based on market efficiency hypothesis of Fama (1965) where investors can detect undervaluation by themselves and act accordingly. Thus, the undervaluation explanation of value gain is weakened. Similarly, Lewellen presents an argument based on well-functioning capital markets envisioned by Sharpe (1964) and Lintner (1965) where investors can diversify on their own and, thus, there should be little value gain from diversification in mergers. In fact, Lewellen's paper is devoted to investigating diversifiers' possible utilization of unused debt capacity. Lewellen shows that this does not *only* include the possibility of utilizing an unused borrowing capacity of the acquired firm. He argues that utilization of unused debt capacity also includes the possible improvement of <u>access to capital market</u> by improved satisfaction of lenders' service criteria even when the acquired firm had already exploited its own borrowing capacity.

ii. Strategic Efficiencies of Diversification

(Mukherjee, Kiymaz, & Baker, 2004) surveyed CFOs about the primary motives behind corporate M&A (and divestiture). Their final sample includes 75 CFOs[36] from the largest M&As reported by *Mergers and Acquisitions* during the period 1990-2001. 28 respondents (37.3%) ranked "synergy" as the top motive behind mergers and acquisitions and 22 respondents (29%) ranked "diversity" as the top motive. Further, when asked about the source of synergy, 62 respondents chose operating economies of scope and scale, 4 chose financial economies, and 3 chose increased market power. Lewellen (1971) argues that diversification strategy creates net increase in market value after mergers. He attributed value gain to: 1) Increased efficiencies through economies of scale; 2) Increased market power through larger market share or the appeal of a more complete product line; 3) Sharing of extant intangible assets such as research and expertise; and 4) Greater administrative efficiency through better fit of scarce managerial skills. Chandler (1977) asserts that diversified firms are inherently more efficient than their divisions would be separately because diversified firms create administrative efficiency in the form of management concerned with coordinating the operations of specialized divisions. Prahalad and Hamel (1990) present evidence that supports the existence of a diversification efficiency attributed to sharing intangible assets. Gertner, Scharfstein and Stein (1994) and Stein (1997) noted presence of cost efficiencies in diversified companies through economies of scale and scope. They posit that unlike tangible assets that deteriorate faster when shared, intangible assets, such as competencies, grow when shared. Siegel and Simons (2010) applied human capital theory to M&A events to assess

[36] Representing 11.8% of the 636 delivered surveys.

their impacts on workers, plants, and firms and found that M&A enhances plant productivity by improving the sorting and matching of plants and workers to more efficient uses.

Kogut and Zander (1992) present an argument where diversification (in the form of acquisition or joint venture) is a form of external learning where an organization uses its "combinative capabilities" to create new market opportunities. Teece, Pisano and Shuen (1997) develop a dynamic capabilities approach to analyze source of wealth-creation in firms. They note that diversification could be seen as a strategy emphasizing the exploitation of market power and conclude that acquisitions may raise rivals' costs or enable firms to attain exclusive arrangements. Tanriverdi and Lee (2008) show that diversification across operating system platforms and diversification across software product-markets complement each other and mutually affect each other's marginal returns. Implementing the two strategies in combination improves sales growth and market share of the entire company.

iii. *Diversification Efficiencies are Stronger in Related Diversification*

The predominant evidence in diversification literature is that related diversifications are more constructive than unrelated ones (Bettis and Mahajan, 1985 and Wernerfelt and Montgomery, 1988 and Berger and Ofeck, 1995) because the former leverages significant business synergies while the latter suffers from agency costs and inefficient resource allocation. Nevertheless, while many authors controlled for relatedness effect and document superiority of related diversification, we still have very little evidence on the cause-effect aspects of this phenomenon.

The literature suggests several arguments for the unequal impact of diversification across related and unrelated diversifiers. I find that these arguments fall under five major explanations. The first explanation is based on savings through share of common resources which is obviously available only to related diversifiers. Rumelt (1974) argues that related diversification is more constructive (compared to unrelated ones) because skills and resources can be used in related markets. Rumelt (1982) and Amit and Livnat (1988) find that related diversifiers exploit synergies across product units by consolidating business activities in manufacturing, marketing, raw material purchases, and R&D. Davis and Thomas (1993) assert that the use of common resources in multiple businesses or multiple product lines within a single business creates value in the form of economies of scope. The second explanation pertains to internal synergy and harmony in operations that is available only to related diversifiers. Barney (1997) shows that related diversifiers benefit from intra-firm product/process technology diffusion. The third explanation is based on increased market power gained from controlling a bigger slice of the market. Amit and Livnat (1988) show that related diversifiers witness enhanced market power. Because an unrelated diversifier operates in different markets by definition, they realize a minimal market power increase. However, related diversifier operates in the same, or at least a very close, market. The fourth explanation is related to the impact of technology advancement. Ravichandran, Liu, Han and Hasan (2009) find that firm’s information technology advancement (proxied by IT spending) has a positive impact on performance of related diversifiers but not unrelated diversifiers.

C. The Hypotheses

Before I formally state my argument, I present an argument that above-cited advantages of diversification are inherently evolving and do not perfectly qualify as publicly-available information; thus, they are not immediately priced. Rather, these advantages materialize gradually and become publicly available over time.

i. *Diversification Advantages are Evolving and Partially Unanticipated Information*

Production-related (economies of scale and scope) and market-related (increased market power) advantages naturally take time to materialize because of production cycles and market conditions. Second, internal efficiency-related advantages (internal market efficiency, share of assets and administrative efficiencies) are part of a unifying process that kicks in after the merger but takes time to become fully effective. To illustrate, I argue that after the acquisition, a "unification process" kicks in and management attempts to bring the newly acquired unit(s) into full harmony and synergy with existing units. However, this is not likely to be a quick process. This claim is consistent with Agrawal, Jaffe, and Mandelker (1992) who show that the market may adjust slowly to news of mergers. Therefore, while the diversification move happens at one point in time, the positive consequences of diversification are inherently evolving i.e. they materialize gradually over time. In effect, the value gain attributed to diversification advantages may materialize over time as well.

I also argue that there is an "unanticipated" part of diversification advantages known to insiders but unknown to the public at the time of diversification, hence the initial discount reported in literature. More specifically, at the time of diversification, the "*full*" potential of the move is known by insiders only. Outsiders are at informational disadvantage compared to managers of the diversifying firm when it comes to estimating the exact potential of the subject move. This claim is consistent with Servaes (1996) who finds evidence that firms with higher insider ownership are more likely to diversify during 1973-1976 when the diversification discount was declining. This indicates that, consistent with my claim, insiders may possess information about the prospectus of the diversification move that outsiders don't. This proposition is also consistent with the information asymmetry hypothesis which is a corner stone of major theories of finance such as signaling theory of Ross (1977) and adverse selection of Myers and Majluf (1984) and agency costs of Jensen and Meckling (1976). The theory posits that managers in general possess information that others don't.

Therefore, potential diversification advantages do not perfectly qualify as "publicly-available" information. According to the well-accepted semi-strong form of market efficiency hypothesis of Fama (1965), only market (historical) information and other publicly available information (such as financial reports and corporate news) are priced. Private information (also called insiders' information) is not priced. In our context, diversification advantages are not immediately and fully priced because they do not perfectly qualify as "publicly-available" information.

ii. *Hypotheses: Value Recovery and Diversification Advantages*

Above discussions imply that diversification strategy carries some potential advantages albeit initial discount. These advantages, however, are uncertain at the time of diversification. Therefore, I hypothesize that diversifiers exchange immediate diversification discount with future value gain attributed to "unanticipated" advantages of diversification. Specifically, I hypothesize that shortly after diversification; its exact advantages are uncertain to outsiders, thus the initial discount. Over time, positive consequences materialize, uncertainty diminishes, and the initial discount fades away. Further, since diversification advantages are more pronounced in related diversifications, I hypothesize that the value and performance of related diversifier's improve faster than unrelated diversifiers. In order to test this hypothesis, I apply a dynamic investigation to gauge diversifiers' performance and value over time. Second, I test the joint evolution of performance and value of diversifiers and diversification advantages. Finally, I condition the test on diversification nature (related vs. unrelated) to capture any differential in the speed of value recovery.

III. Data, Sample, and Descriptive Statistical

A. Data and Sample Structure

The main methodological contribution of this dissertation is tracking diversifiers' value and performance several years (as many as data allows) after the diversification events. I use data collected from SDC (Securities Data Company) to obtain a list of merger/acquisition event[37]. Then, I use CIS (COMPUSTAT Industry Segment) to track the value and performance of these diversifiers over time. Value is measured by the standard excess value approach of Berger and Ofek (1995) and performance is measured by Tobin's Q used by Lang and Stulz (1994), Servaes (1996) and Steiner (1996). I also track the evolution of strategic and financial efficiencies of the parent company and analyze its dynamic impact on value and performance. I track each parent for as many years as data availability allows for.

I follow sample selection criteria that are common in the diversification literature. In particular, I follow the specifications and procedures of Berger and Ofek (1995), Denis Denis and Sarin (1997), Hund, Monk, and Tice (2010), and Subramaniam, Tang, Yue, and Zhou (2010). I start with SDC database to obtain a list of all completed U.S. mergers and acquisitions events in the period 1998-2008[38]. I require that deal value is greater than or equal to $20 million, none of the firms selected have segments in the financial services industry (SIC 6000-6999) or regulated utilities (SIC 4900–4999), and the acquirer is a

[37] The particular argument of this dissertation requires that I use effective date of the merger/acquisition not the announcement date. This is because diversification advantages commence when the two companies actually merge not when they announce to do so.
[38] I choose 1998 as the beginning year of my sample period because of change in business segment reporting post 1997. Before 1997, firms were required to report their segments as major lines of businesses. After 1997, SFAS No 131 requires that segments are defined as the enterprise operating segments. For more discussion on this issue, see Rajan, Serveas, and Zingales (2000).

publicly traded company. The inquiry results in 2,961 merger and acquisition events in the specified time window. Next, I use the CIS database to track these diversifiers[39] and their segments between 1998 and 2008[40]. I was able to match 2,177 events from SDC with segments data from CIS. Each diversifier is tracked for as many years as the data allows for within the specified framework of 1998 – 2008. Thus, I have 6,287 firm-year observations. The year of the M&A transaction is denoted zero for each diversifier. Next year is denoted 1 and so on. Subsequent M&A events of the same parent are treated as separate events and tracked separately (I add a dummy variable EVENT in the analysis to control for this). I require that each diversifier has sufficient data (SIC code and financial statement items) to construct the variables necessary for this research (see next section) in at least two consecutive years (years 0 and 1). Further, if the data is missing for all or some segments in a certain year, I stop tracking that diversifier at that year (because later I will need to calculate year-to-year differences in value and performance). The result is a sample of 4,254 firm-year observations.

Following Berger and Ofek (1995), I eliminate extreme values of EV above +1.386 or below -1.386 (actual value is more than four time imputed value or less than one-fourth of imputed value). Following Subramaniam, Tang, Yue, and Zhou (2010), I eliminate firms with total sales less than 99% or more than 101% of the summation of segments sales. I also eliminate all firms with total assets less than 75% or more than 125% of the

[39] Not all M&A transactions leads to pure diversification. Thus, SDC data is also used to obtain SIC code of parent and acquired unit which will be used later to determine the "relatedness" nature of the transaction (see the description of Rel variable below).

[40] In line with SEC regulation S-K and Statement of Financial Accounted Standards (SFAS) No. 14, firms are required report audited information (starting fiscal years ending after December 15 1977) for segments whose sales, assets, or profits exceeds 10% of consolidated totals (see more discussions in Berger and Ofek 1995, 1996 and Subramaniam, Tang, Yue, and Zhou, 2010).

summation of segments assets. This further reduces sample size to 1,642 firm-year observations.

Not all events represent a "pure diversification" event. An event is considered related if the acquired unit(s) belongs to the same industry and unrelated otherwise. The Rel variable (explained more in the next section) determines whether the event is considered a related or unrelated event. The diversification process is identified as "related" if the acquired and the acquirer belong to the same industry as determined by their SIC code. From SDC database, I obtain SIC code of both acquired and acquirer firms in each transaction. Following Berger and Ofek (1995), a merger is considered "related" if the first two digits of the SIC code of the acquirer match the first two digits of the acquired firm. I use an indicator variable Rel that is 1 for related mergers and 0 otherwise.

Thus, the final sample used in this dissertation includes 1,642 firm-year observations (969 in related events and 673 in unrelated events) from 316 M&A events (185 related events and 131 unrelated events). The data is collected from 295 firms (some firms witnessed multiple events) that witnessed diversifying events over the period 1998-2008.

The following table shows number of mergers, related vs. unrelated, in each year in my sample.

Table 11 – Mergers Completed in 1998 - 2007[41]

The table shows the structure of the raw sample before I take into account the year-from-event. I obtain data on 316 merger and acquisition events over the years 1998-2007. Following Berger and Ofek (1995), a merger is considered "related" if the first two digits of the SIC code of the acquirer match the first two digits of the acquired firm.

Year	Number of Mergers		
	All Mergers	Related Mergers	Unrelated Mergers
1998	2	1	1
1999	10	5	5
2000	48	26	22
2001	50	27	23
2002	36	21	15
2003	34	23	11
2004	40	22	18
2005	33	16	17
2006	34	24	10
2007	29	20	9
All years	**316**	**185**	**131**

With exception of 1998, my sample is reasonably balanced overtime and between related and unrelated mergers. Final sample size is a result of several filtering steps explained above in addition to the special nature of this research study that requires matching of three separate databases: SDC, CIS, and Compustat plus continuity of data availability over several years. Yet, sample size in this dissertation is well compared to those of similar studies such as, for example, Ravichandran, Liu, Han and Hasan (2009) who use as a sample of 403 observations over six years and 134 firms and Freund , Trahan , and Vasudevan (2007) who use 194 US industrial firms that acquire non-US firms over the period 1985-1998 and Hyland (2003) who uses a sample of 118 diversifying US firms over 1981-1992.

[41] I require that each diversifier has at least two years of data (years 0 and 1). Therefore, there are no mergers in 2008 in the final sample.

The following table shows the description of M&A events included in the sample. Panel A shows the descriptive statistics of the parent (acquirer) and target (acquired). Panel B shows the descriptive statistics of the deal,

Table 12 – Descriptive Statistics of Parent and Target Firms and the Merger Deal

The table shows few descriptive statistics of the events in my sample. Panel A shows different aspects of parent (acquirer) and target (acquired) firms in the sample. Panel B shows information about the transaction. Data is obtained from SDC database.

Panel A – Parent vs. Target

		Parent	Target
Market Value ($mil)	Mean	3,651.10	1,701.68
	Median	388.35	220.89
	Std. Dev.	26,340.06	6,793.57
Total Assets ($mil)	Mean	5,440.95	3,465.30
	Median	1,254.22	288.05
	Std. Dev.	9,047.36	29,588.49
Net Sales ($mil)	Mean	-	922.08
	Median	-	103.60
	Std. Dev.	-	3,535.94
EBIT ($mil)	Mean	-	64.36
last 12 months pre-merger	Median	-	8.29
	Std. Dev.	-	1,071.07
Pre-tax Income ($mil)	Mean	-	50.94
last 12 months pre-merger	Median	-	6.30
	Std. Dev.	-	1,145.48
Net Income ($mil)	Mean	-	31.90
	Median	-	4.55
	Std. Dev.	-	905.47

Panel B – Transaction

Value of Transaction ($ mil)	Mean	1,634.90
	Median	220.00
	Std. Dev.	6,384.12
Price Per Share ($)	Mean	29.48
	Median	22.05
	Std. Dev.	42.92
Ratio of Offer Price to EPS	Mean	69.63
	Median	24.10
	Std. Dev.	498.53

B. Measures of Performance and Value of Diversifying Firms

I use Tobin's Q as a measure of performance (as in Lang and Stulz, 1994, Servaes, 1996 and Steiner, 1996), and excess value (first introduced by Berger and Ofek, 1995 then become common in diversification literature). Tobin's Q measures performance as implied by stock market price. Therefore, it reflects investors' perspective and, thus, is a powerful measure of current and expected future performance. Excess value is a measure of performance peculiar to diversified firms. Like Tobin's Q, it incorporates market perception in calculating imputed value (firm's market value had it not been diversified). Therefore, it calculates how much value has been added/subtracted exclusively by being diversified relative to focused firms.

Throughout the rest of this dissertation, I use the following notation:

N	:	Number of diversifiers (parent company) in the sample of this dissertation
$i=1,2,\ldots,N$	:	Subscript that identifies diversifier i in the sample
M	:	Number of segments in the parent (diversifier) company
$j=1,2,\ldots,M$	:	Subscript that identifies segment j in the parent company
K	:	Number of competitors in the same market (firms with the same four digit of SIC code as the parent company)
$k=1,2,\ldots,K$	:	Subscript that identifies competitor k in the market
Q	:	Number of matching pure-plays of a segment (firms with the same last two digits of SIC code as the segment)
$q=1,2,\ldots,Q$	:	Subscript that identifies matching pure play q

i. Tobin's Q:

Tobin's Q (Tobin, 1969) is the ratio of market value of assets to the book value of assets. Tobin's Q is a classical measure of performance used in diversification literature. Lang and Stulz (1994) document lower Q-ratio in diversified firms compared to focused firms and conclude that the market penalizes the value of the firm assets. Similar use of the ratio is also found in Servaes (1996) and Steiner (1996). Tobin's Q measures market perception of firm's value relative to its historical (recorded) value. I calculate Tobin's Q as,

$$TQ_i = \frac{MVE_i + BVL_i}{BVE_i + BVL_i} \tag{E7}$$

MVE_i	:	Market Value of Equity (item MKVALT in Compustat)
BVL_i	:	Book Value of Liabilities (item LT in Compustat)
BVE_i	:	Book Value of Equity (item SEQ in Compustat)

If Tobin's Q is greater than parity (Q > 1), then the market is rewarding shareholders for some unrecorded assets. It is an indication of strong future performance because it implies that the assets are expected to generate sufficient return in the future. Higher Tobin's Q implies stronger perceived performance. If efficiencies increase slowly over time and are impounded in price, I should observe an increase in Tobin's Q over time.

ii. *Excess Value*

I follow Berger and Ofek's (1995) procedure in estimating the imputed value of each segment. First I calculate imputed value of each segment j in a diversifier i as median ratio of total capital to total assets (or sales[42]) of matching pure-play firms multiplied by total assets (or sales) of segment j. Matching pure play firms are in the same SIC code of

[42] Following Berger and Ofeck (1995), I also calculate EBIT multiplier. However, lack of data resulted in much smaller sample size. On top of that, the use of EBIT resulted in some negative multipliers and, thus, negative segment imputed value. Following Berger and Ofeck (1995), I exclude those incidents from subsequent analysis. Specifically, when a segment (or more) has negative imputed value in any year, the parent is removed from the sample. Consequently, the sample size became very small usable observation. As a result, I limit my analysis to excess value calculated based on total assets multipliers and sales multiplier.

segment j, have at least \$20 million in sales, and have sufficient data on Compustat. Mathematically[43],

$$IV_j^i = \left[Median\left(\frac{TC_1}{TA_1}, \frac{TC_2}{TA_2}, \dots, \frac{TC_q}{TA_q}, \dots, \frac{TC_Q}{TA_Q}\right)\right] TA_j^i$$

$$TC_q = MVE_q + BVL_q \tag{E8}$$

IV_j^i	:	Imputed value of segment j in firm i
TA_j^i	:	Total assets of segment j in firm i(Identifiable total assets in Compustat segments database)
TC_q	:	Total capital of a pure-play firm q in the same industry of segment j
MVE_q	:	Market Value of Equity of a pure-play firm q in the same industry of segment j (item MKVALT in Compustat)
BVL_q	:	Book Value of Liabilities of a pure-play firm q in the same industry of segment j (item LT in Compustat)
TA_q	:	Total Asset of a pure-play firm q in the same industry of segment j (item AT in Compustat)

The sum of the imputed values of the M segments in firm i becomes the imputed value of the firm i (its value if all of its M segments were operated as stand-alone businesses):

$$IV_i = \sum_{j=1}^{M} IV_j^i$$

Next, I measure the percentage difference between diversifier i's total value and the sum of imputed values for its M segments as stand-alone entities. If market value (total capital) of firm i is TC_i then I calculate percentage difference (excess value) as:

$$EV_i = \ln\left(\frac{TC_i}{IV_i}\right)$$

$$TC_i = MVE_i + BVL_i$$

[43] I show mathematical notation using total assets (TA) only but I calculate imputed value using sales as well in an analogous manner (see the results section).

TC_i	:	Total capital of a firm i
MVE_i	:	Market Value of Equity of firm i (item MKVALTQ in Compustat)
BVL_i	:	Book Value of Liabilities of a firm i (item LT in Compustat)

Positive (negative) excess value indicates that diversification increases (reduces) the value of segments below that of their stand-alone counterparts and its known in literature as diversification premium (discount). In line with my hypothesis, I anticipate to observer increase in excess value over years after the diversification event.

C. Descriptive Statistics[44]

The table below shows how Tobin's Q and excess value differ between related (Panel B) and unrelated events (Panel C). Descriptive statistics are calculated based on all firm-year observations. A year-by-year analysis is supplied in the next section.

[44] This descriptive statistics is derived from all 1642 firm-year observations in the sample. It is not conditioned on time from merger and, therefore, does not investigate evolution. Time-conditioned analysis is supplied in the next section.

Table 13 – Descriptive Statistics

The table shows mean, standard deviation, minimum, maximum, and median of Tobin' Q and excess value of all diversifiers in the sample. The statistics are calculated from all data-points in the sample without taking into account year-from-event. Panel A shows statistics of all events. Panel B shows statistics of related events. Panel C shows statistics of unrelated events. The statistical significance of the mean Tobin's Q is gauges using t-stat. The statistical significance of the mean of excess value is not shown because the convention is to measure the statistical significance of the median of excess value using Wilcoxon test (see next table).

Panel A - All Events – 1642 firm-year observations

	Mean	Std Dev	Min	Max	Median
Q	1.829**	0.867	0.586	6.047	1.570
EV (based on TA)	-0.0031	0.576	-1.3814	1.3765	-0.0029
EV (based on Sales)	0.0161	0.579	-1.3861	1.3759	0.0000

Panel B - Related Diversifications – 969 firm-year observations

	Mean	Std Dev	Min	Max	Median
Q	1.886**	0.871	0.712	6.047	1.646
EV (based on TA)	0.0189	0.588	-1.3814	1.3739	0.0010
EV (based on Sales)	0.0239	0.588	-1.3861	1.3635	0.0248

Panel C - Unrelated Diversification – 673 firm-year observations

	Mean	Std Dev	Min	Max	Median
Q	1.748**	0.855	0.586	5.827	1.458
EV (based on TA)	-0.0348	0.556	-1.3814	1.3765	-0.0311
EV (based on Sales)	0.0107	0.573	-1.3807	1.3759	-0.0123

(***) = significant at 1%, (**) = significant at 5%, (*) = significant at 10%

An average diversifier has a Tobin's Q of 1.829 (median is 1.570). The mean is significant at 5%. Expectedly, related diversifiers have higher Tobin's Q and unrelated diversifiers have lower Tobin's Q. Numerically, average firm-year Tobin's Q is 1.886 (median is 1.646) for related diversifiers and 1.748 (median is 1.458) for unrelated diversifiers. Both averages are statistically significant at 5%). I conclude that related diversifiers in general perform better than unrelated diversifiers. This finding is consistent with prevailing evidence in literature (see in particular the results of Bettis and Mahajan, 1985 and Wernerfelt and Montgomery, 1988 and Berger and Ofeck, 1995 cited in literature review section in appendix 1).

Excess values measures reveal some interesting results significantly different from those documented in previous studies. The convention in diversification literature is to focus on the median rather than the mean of EV (see Berger and Ofek, 1995). Statistical significant of the median of excess values is tested based on the non-parametric Wilcoxon signed-rank test. The results are shown in the table below:

Table 14 – Wilcoxon Test of EV Median Statistical Significance

The convention is to test the significance of the median of excess values based on the non-parametric Wilcoxon signed-rank test. P-value of the medians are reported.

Panel A - All Events – 1642 firm-year observations

	Median	# of observation[45]	p-value
EV (based on TA)	-0.00289	1596	0.000
EV (based on Sales)	0.000	1607	0.000

Panel B - Related Diversifications – 969 firm-year observations

	Median	# of observation	p-value
EV (based on TA)	0.00100	942	0.000
EV (based on Sales)	0.0248	946	0.000

Panel C - Unrelated Diversifications – 673 firm-year observations

	Median	# of observation	p-value
EV (based on TA)	-0.0311	652	0.000
EV (based on Sales)	-0.0123	661	0.000

Excess value using total asset multiple and sales multiple give somehow consistent results. An average diversifier trades at a discount of about 0.298% using total multiple and no discount using sales multiple. Related diversifiers seem to trade at an average premium of 0.1% using total assets multiple and 2.48% using sales multiple; while unrelated diversifiers trade at a discount of 3.11% using total asset multiple and 1.23%

[45] Number of observation in Wilcoxon test are actually number of “ranks” within the original variable (EV), thus it may be less than the original number of observation.

using sales multiple. All medians are significant at 1% level of confidence. These findings are generally not consistent with existing literature in two ways. First, previous studies have reported a much larger diversification discount (about 13% in the seminal work of Berger and Ofek, 1995). Second, extant literature reports a smaller discount associated with related diversifications relative to unrelated ones but not a premium[46]. Given that these numbers are calculated from firm-year observations over the year of event (0) and several years (1-9) after the diversifying event, it lends support to the general theme of this dissertation i.e. larger initial diversification discount reported in other studies may be an artifact of limiting analysis to the immediate post-diversification period. More investigation of this issue is coming in the next section when I track the year-by-year performance of diversifiers. I will see that large diversification discount is limited to early years after the event. In subsequent years, the discount magnitude fades away and in some cases turns into a premium. Thus, the small (or zero) discount I report in the tables above is in fact an average of initial discount (in early years after event) and subsequent smaller discounts and premiums.

[46] In fact, the reported premium, though very small, is more consistent with the small portion of the literature that supports value-creation hypothesis of diversification (such as Vilalonga's work cited above).

IV. The Evolution of Diversifiers' Performance and Value

As mentioned earlier, the main methodological contribution of this dissertation is the unique sample structure that allows tracking diversifiers' value and performance several years after the diversifying event. The year of event for each diversifier is denoted 0. Subsequent years are numbered 1, 2, 3 … etc. Given the time window of my sample, a diversifier can be tracked for a maximum of 9 years. The following table shows firm-year observation in each year-from-event and the overall structure of my sample. Naturally, there are more observations in early years than in later years. By construction, the minimum number of tracking years is 2 (year 0 and 1).

Table 15 –Sample Structure by Year from Event

This table shows the structure of the sample used in all subsequent analysis. Unlike table 1, this table shows number of observation in each year-from-event (not calendar year). For instance, there are 316 events in the sample. By construction, I have data on these events in the year of event (0) and one subsequent year (1). There are 274 events that also have sufficient data on year 2. There are 223 events that have sufficient data on year 3. The same logic follow for subsequent years. There are only 5 events (out of the original 316) that have data to cover analysis over years 0 through 9. Years 8 and 9 are not considered in subsequent analysis because the number of observations is very small. Finally, the events are also categorized into related and unrelated.

Year From Event	Firm-year Observations		
	All Diversifying Events	Related Diversification	Unrelated Diversification
0	316	185	131
1	316	185	131
2	274	159	115
3	223	127	96
4	181	107	74
5	140	83	57
6	105	63	42
7	76	49	27
8	6	6	0
9	5	5	0
All years	**1642**	**969**	**673**

Due to very small number of observations in years 8 and 9, I will drop them from further analysis. Also, because number of observations in years 6 and 7 are rather limited I will not put too much emphasis on these years in subsequent analysis. This leaves 5 years of post-event data to make reliable inference.

A. Evolution of Tobin's Q

Tobin's Q (James Tobin, 1969) measures market perception of firm's value relative to its historical (recorded) value. It is a classical measure of performance used in diversification literature (as in Lang and Stulz (1994), Servaes (1996) and Steiner

(1996)). Higher Tobin's Q implies stronger perceived performance. In this section I analyze the evolution of Tobin's Q over time. More specifically, I investigate how Tobin's Q of an average diversifier changes from the year of the event, one year after the event, two years after the event, and so on. This analysis allows for detecting possible "trend" in the performance of diversifiers. The results are reported in the table and figure below.

Table 16 – Evolution of Tobin's Q

I track Tobin's Q of each diversifier from the year of diversification up to 9 years from diversification. In each year-from diversification, I take the average of all diversifiers' Tobin's Q and report the mean and median. Statistical significance of the mean is measured using t-stat and is reported as:

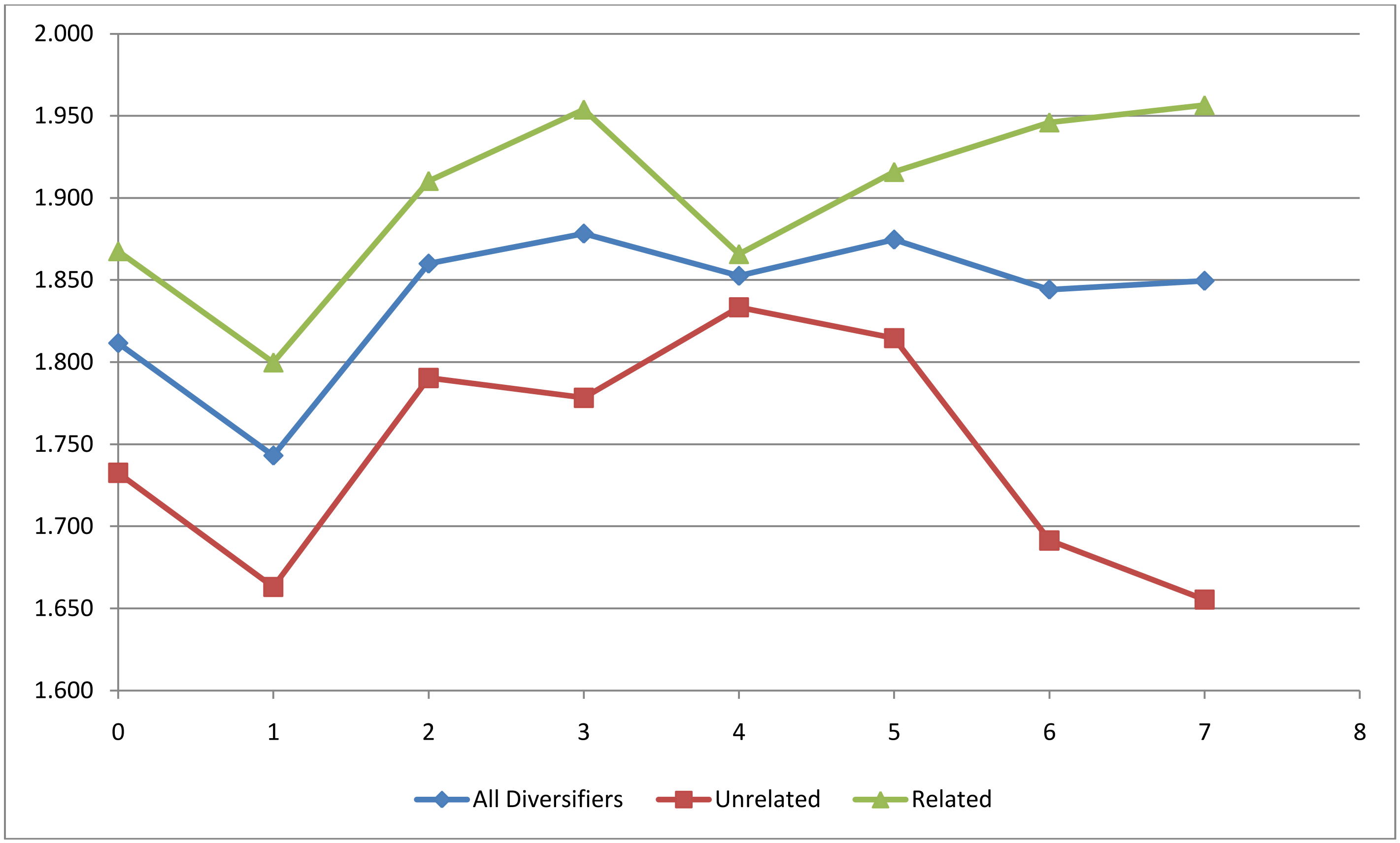
(***) = significant at 1%, (**) = significant at 5%, (*) = significant at 10%, (-) = insignificant

The last column shows the average and median Tobin's Q of all data points in the sample for comparison only. The focus of this dissertation is on the evolution of Tobin's Q over time. Therefore, the focus is on how average Tobin's Q evolves over time from event.

	Year From Div. Event	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**All years**
All Diversifiers	**# of Obs.**	**316**	**316**	**274**	**223**	**181**	**140**	**105**	**76**	**6**	**5**	**1642**
	Average	1.812 (**)	1.743 (**)	1.860 (**)	1.878 (*)	1.853 (**)	1.875 (**)	1.844 (**)	1.850 (**)	1.897	1.669	1.829 (**)
	Median	1.537	1.492	1.626	1.526	1.585	1.654	1.599	1.721	1.916	1.646	1.570
Related	**# of Obs.**	**185**	**185**	**159**	**127**	**107**	**83**	**63**	**49**	**6**	**5**	**969**
	Average	1.868 (**)	1.800 (**)	1.910 (**)	1.954 (**)	1.866 (**)	1.916 (**)	1.946 (**)	1.957 (***)	1.897 (***)	1.669 (***)	1.886 (**)
	Median	1.653	1.495	1.631	1.677	1.591	1.761	1.762	1.804	1.916	1.646	1.646
Unrelated	**# of Obs.**	**131**	**131**	**115**	**96**	**74**	**57**	**42**	**27**	**0**	**0**	**673**
	Average	1.733 (**)	1.663 (**)	1.790 (**)	1.778 (*)	1.833 (*)	1.815 (*)	1.691 (**)	1.655 (**)	---	---	1.748 (**)
	Median	1.418	1.472	1.558	1.450	1.516	1.518	1.321	1.269	---	---	1.458

Figure 8 - Evolution of Tobin's Q

Averages



The table and figure above show that an average diversifier has an average Tobin's Q of 1.812 (median is 1.537) in the year of diversifying event (year 0). Then, Tobin's Q witnesses a remarkable decline in the first year to an average of 1.743 (median is 1.492). Consistent with the prediction of my hypothesis, Tobin's Q witnesses a huge increase in the second year to an average of 1.860 (median is 1.626) and remains at values close to that level in subsequent years (3, 4, and 5) but never comes back to the low value of year 1 or the initial value of year 0. I conclude that an average diversifier witnesses an initial decline in performance followed by a sharp boost and eventually achieves higher levels of performance. Thus, it supports the hypothesis that managers of diversified companies undertake diversification strategies on the basis of not only immediate consequences, which could be adverse, but also future positive evolution in performance.

Looking at related vs. unrelated diversifiers, the results are consistent with existing evidence in literature that related diversifiers are more constructive than unrelated ones. They are also consistent with the time trend explained in the previous paragraph i.e. performance measured by Tobin's Q declines in the first year after the event (year 1) then improves after that to levels higher than initial levels. However I notice that unrelated diversifiers' performance begins to decline significantly in year 6 and 7 while related diversifier's performance continues to increase. I note however that number of observations in these years is limited and generalization of the findings may not be very meaningful. In summary, I note that average diversifiers performance worsens in the first year after the diversifying event before it starts to improve in subsequent years. Up to year 5 after the diversifying event, Tobin's Q of both related and unrelated diversifiers improves. In years 6 and 7, Tobin's Q of related diversifiers continue to improve while Tobin's Q of unrelated diversifiers declines.

B. Evolution of Excess Value

Berger and Ofek (1995) estimated excess value as the percentage difference between diversifier's total value and the sum of imputed values for its segments as stand-alone entities. Positive (negative) excess value indicates that diversification increases (decreases) value and is referred to in literature as diversification premium (discount). In this section, I analyze the evolution of excess value of diversifiers over time. Given the sample structure explained above, I was able to track diversifier up to 7 years from the year of diversification. Results from excess value based on total assets multiple are reported in the tables and figures below:

Table 17 – Evolution of Excess Value (based on Total Assets Multiple)

I track excess value of each diversifier from the year of diversification up to 9 years from diversification. In each year-from diversification, I take the average of all diversifiers' excess value and report the mean and median. Statistical significance of the median is measured using Wilcoxon test and is reported as:
(***) = significant at 1%, (**) = significant at 5%, (*) = significant at 10%, (-) = insignificant
The last column shows the average and median excess value of all data points in the sample for comparison only. The focus of this dissertation is on the evolution of excess over time. Therefore, the focus is on how average excess value evolves over time from event. This table uses excess value calculated based on the total assets multiplier.

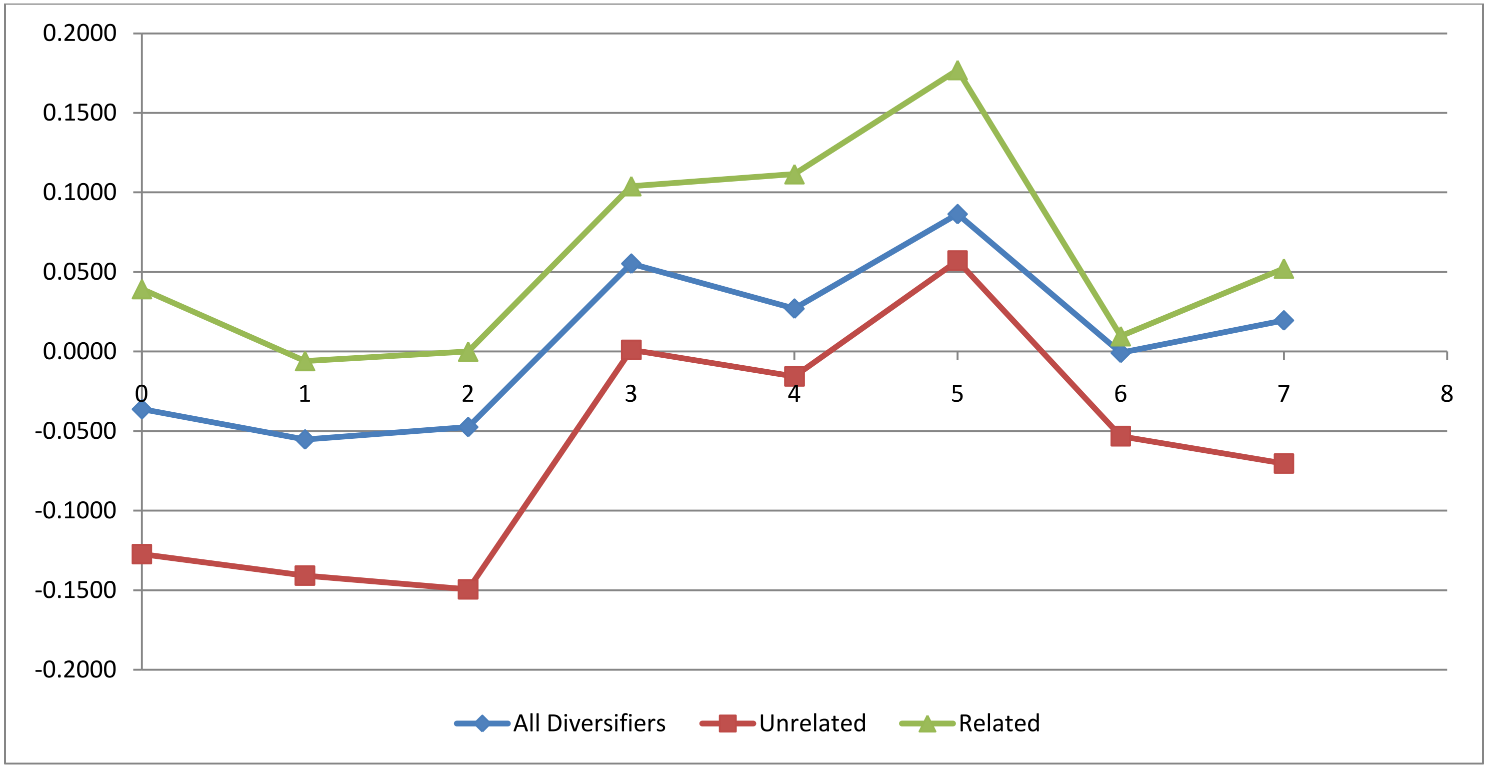
Year From Div. Event		0	1	2	3	4	5	6	7	8	9	All years
All Diversifiers	**# of Obs.**	**316**	**316**	**274**	**223**	**181**	**140**	**105**	**76**	**6**	**5**	**1642**
	Average	-0.0234	-0.0472	-0.0265	0.0589	0.0168	0.0432	0.0188	0.0378	-0.2757	-0.1819	-0.0031
	Median	-0.0362	-0.0552	-0.0474	0.0553	0.0270	0.0864	-0.0008	0.0196	-0.3887	-0.3327	-0.0029
		(***)	(***)	(***)	(***)	(***)	(***)	(-)	(-)	(-)	(-)	(***)
	# of Ranks[47]	310	304	266	217	174	138	102	74	6	5	1596
	P-Value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4510	0.4659	0.1562	0.3125	0.000
Related	**# of Obs.**	**185**	**185**	**159**	**127**	**107**	**83**	**63**	**49**	**6**	**5**	**969**
	Average	0.0688	0.0299	0.0305	0.1637	0.1203	0.1473	0.0738	0.0810	-0.2757	-0.1819	0.0189
	Median	0.0393	-0.0059	0.0000	0.1040	0.1115	0.1770	0.0097	0.0522	-0.3887	-0.3327	0.0010
		(***)	(***)	(***)	(**)	(**)	(**)	(-)	(-)	(-)	(-)	(***)
	# of Ranks	180	178	154	124	104	83	60	47	6	5	942
	P-Value	0.0000	0.0000	0.0000	0.0439	0.0238	0.0454	0.2929	0.2556	0.1562	0.3125	0.000
Unrelated	**# of Obs.**	**131**	**131**	**115**	**96**	**74**	**57**	**42**	**27**	**0**	**0**	**673**
	Average	-0.1535	-0.1559	-0.1053	-0.0203	-0.0548	-0.0283	-0.0635	-0.0407	---	---	-0.0348
	Median	-0.1274	-0.1408	-0.1494	0.0010	-0.0157	0.0571	-0.0532	-0.0703	---	---	
		(***)	(***)	(**)	(***)	(**)	(***)	(-)	(-)			-0.0311
	# of Ranks	130	126	112	93	70	55	42	27	0	0	652
	P-Value	0.0000	0.0000	0.0154	0.0019	0.0304	0.0087	0.2802	0.2277	---	---	0.000

[47] Significance of median is calculated by Wilcoxon Singed-rank Test. The test is based on ranking original observations. Thus, number of ranks will always be less than or equal original number of observations.

(***) = significant at 1%, (**) = significant at 5%, (*) = significant at 10%, (-) = insignificant

Figure 9 - Evolution of Excess Value (based on Total Assets Multiple)

Medians



The table and figure above support the general implication of the hypothesis tested in this dissertation. An average diversifier trades at a discount initially (the year of diversification and two subsequent years) but at a premium later (years 3, 4, and 5). In specific, an average diversifier trades at a discount of 3.62% in the year of diversification. The discount increases (i.e. worsens) to 5.52% in the next year before it improves slightly to 4.74% in the second year. In the third year, the discount turns into a premium of 5.53% and remains as a premium in the fourth and fifth years. All figures are statistically significant. In the sixth and seventh year, the premium is almost lost but figures are statistically significant. This is second evidence that supports the tested hypothesis. Diversification discount persists for only a short period surrounding the diversification event (year of event and two subsequent years). In farther years, the value loss is restored and the discount turns into a premium. This explains why diversification is still a very popular business strategy as evidenced in the hypothesis development section above. Managers of diversifying firms seem to be inclined to accept initial discount knowing that eventually it will turn into a premium. How can they be sure about this turnover? The second part of the hypothesis (tested in the next section) states that they are at better situation than the market to evaluate the true financial and strategic advantages of the transaction.

Excess value of related and unrelated diversifiers move in unison and also show a trend of improvement in later years. Nevertheless, diversification discount persists longer in unrelated diversification. Related diversifiers trade at a premium of 3.93% in the year of event. They lose value and trade at a small discount of 0.59% in the next year. Excess value becomes nil in year 2, then dramatically jumps to a huge premium of 10.4% in year

3. The trend continues and the premium increases to 11.15% in year 4 and a remarkable level of 17.7% in year 5. The figures are statistically significant throughout years 0, 1, 2, 3, 4, 5 but statistically insignificant in years 6 and 7 (where we see a sharp decline to trivial premium of 0.97% in year 6 and 5.22% in year 7). Unrelated diversifiers show the same overall trend but at a different level. They trade at a huge discount of 12.74% in the year of the event; the discount worsens to 14.08% in the year 1, and worsens even further to 14.94% in year 2. However, a huge jump in value occurs in year 3 when the huge discount disappears and turns into a very small premium of 0.1%. In years 4, a small setback brings discount back to 1.57% before it surges again to a premium of 5.71%. In years 6 and 7 the value gain is lost again but figures are statistically insignificant.

I conclude that the overall theme of the hypothesis tested in this dissertation is valid with related and unrelated diversification. An average diversifier trades at an initial discount but achieves reasonable value recovery in subsequent years. However, I find that the value recovery process does not kick off immediately and the discount persists for few years before it turns into a premium. I also note a differential in speed of recovery between related and unrelated diversifiers. For an average diversifier, it takes three years for the discount to become a premium. For an unrelated diversifier, it takes almost 4 years before the diversification discount turns into a premium. Related diversifiers never trade at a huge discount and they witness sustains increase in value starting year 1.

I repeat the analysis above with excess value calculated based on sales multiple. The following table and figure show the results.

Table 18 – Evolution of Excess Value (based on Sales Multiple)

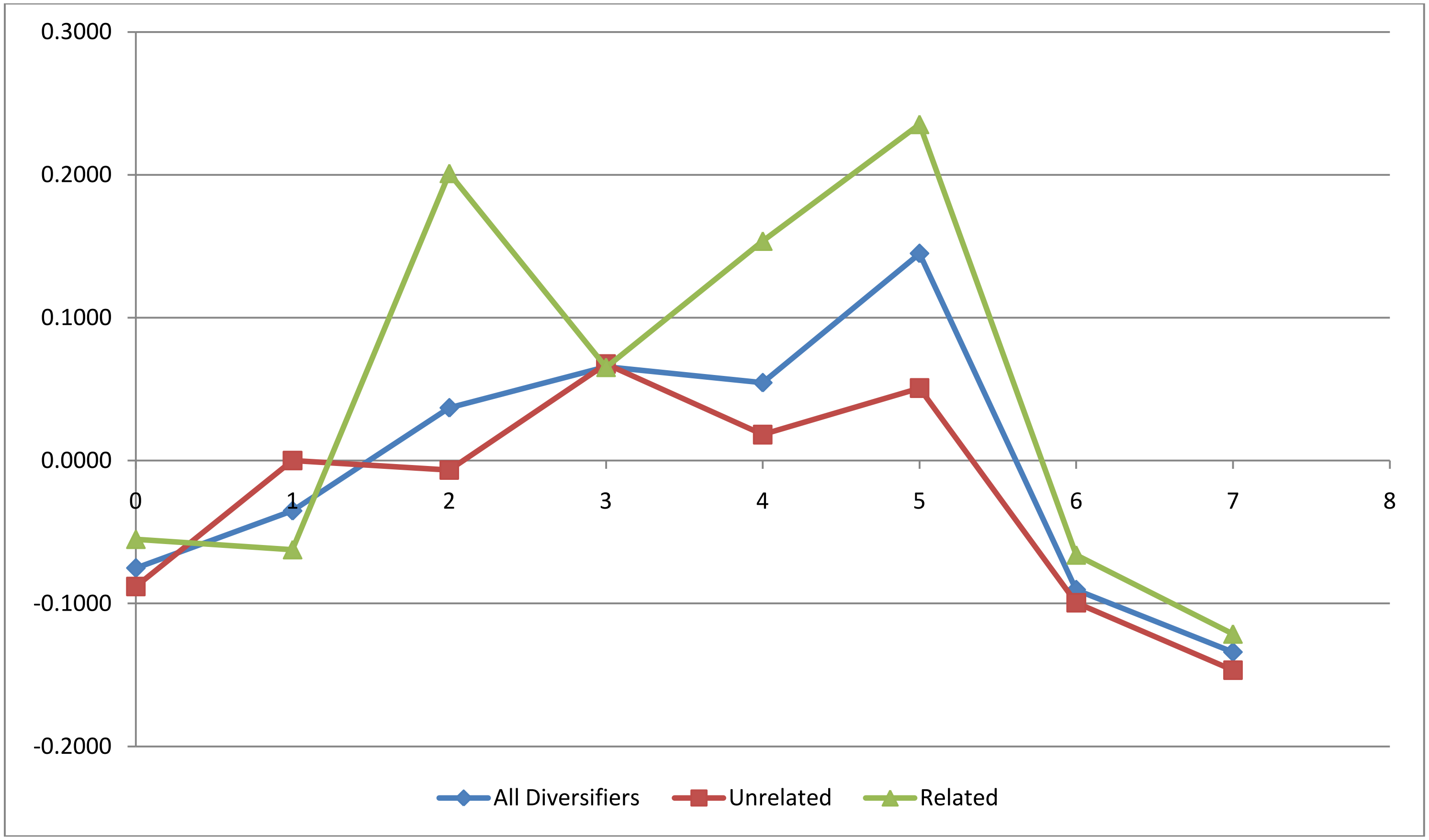
I track excess value of each diversifier from the year of diversification up to 9 years from diversification. In each year-from diversification, I take the average of all diversifiers' excess value and report the mean and median. Statistical significance of the median is measured using Wilcoxon test and is reported as:
(***) = significant at 1%, (**) = significant at 5%, (*) = significant at 10%, (-) = insignificant
The last column shows the average and median excess value of all data points in the sample for comparison only. The focus of this dissertation is on the evolution of excess over time. Therefore, the focus is on how average excess value evolves over time from event. This table uses excess value calculated based on the sales multiplier.

Year From Div. Event		0	1	2	3	4	5	6	7	8	9	All years
All Diversifiers	**# of Obs.**	**316**	**316**	**274**	**223**	**181**	**140**	**105**	**76**	**6**	**5**	**1642**
	Average	-0.0412	-0.0386	0.0610	0.0977	0.0906	0.1383	-0.1112	-0.1025	-0.3094	-0.2454	0.0161
	Median	-0.0752	-0.0352	0.0369	0.0656	0.0544	0.1449	-0.0904	-0.1340	-0.4763	-0.4779	0.0000
		(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(-)	(-)	(***)
	# of Ranks[48]	306	312	272	216	175	135	103	76	6	5	1607
	P-Value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0199	0.0465	0.1094	0.2188	0.0000
Related	**# of Obs.**	**185**	**185**	**159**	**127**	**107**	**83**	**63**	**49**	**6**	**5**	**969**
	Average	-0.0301	-0.0887	0.0812	0.1081	0.1163	0.1756	-0.0792	-0.1234	-0.3094	-0.2454	0.0239
	Median	-0.0550	-0.0623	0.2011	0.0653	0.1537	0.2354	-0.0660	-0.1213	-0.4763	-0.4779	0.0248
		(***)	(***)	(***)	(**)	(*)	(**)	(**)	(-)	(-)	(-)	(***)
	# of Ranks	178	181	157	123	103	81	62	49	6	5	946
	P-Value	0.0000	0.0000	0.0000	0.0446	0.0915	0.0367	0.0423	0.1155	0.1094	0.2188	0.0000
Unrelated	**# of Obs.**	**131**	**131**	**115**	**96**	**74**	**57**	**42**	**27**	**0**	**0**	**673**
	Average	-0.0490	-0.0032	0.0465	0.0898	0.0729	0.1126	-0.1326	-0.0909	---	---	0.0107
	Median	-0.0882	0.0000	-0.0066	0.0676	0.0182	0.0508	-0.0994	-0.1467			-0.0123
		(***)	(***)	(*)	(**)	(**)	(***)	(-)	(-)	---	---	(***)
	# of Ranks	128	131	115	93	72	54	41	27	0	0	661
	P-Value	0.0000	0.0000	0.0703	0.0352	0.0360	0.0059	0.1206	0.1242	---	---	0.0000

[48] Significance of median is calculated by Wilcoxon Singed-rank Test. The test is based on ranking original observations. Thus, number of ranks will always be less than or equal original number of observations.

Figure 10 - Evolution of Excess Value (based on Sales Multiple)

Medians



The results from excess value based on sales multiple are similar in general to those from excess value based on total assets. However, I notice that the recovery process is faster and there is much more fluctuation in value over time despite the overall improvement trend up to year 5. An average diversifier trades at a discount of 7.52% in the year of event. The discount improves steadily in subsequent years. It improves to a smaller discount of 3.52% in year 1 before it turns into a premium of 3.69% in year 2, 6.56% in year 3, 5.44% in year 4, and a remarkable 14.49% in year 5. However, this momentum is lost in years 6 and 7 where the premium turns into a discount again. In fact it goes back to a huge discount of 13.40% in year 7. All figures are statistically significant over the 7 years. Again, in contrast with existing evidence found in literature and consistent with the value recovery hypothesis presented here, we may conclude that the celebrated diversification discount is a result of limited time horizon, or lack of subjects time synchronizations, in analysis in previous studies. There is a potential value gain of diversification strategy and this gain materializes over time.

Related and related diversifiers show somehow similar trend but with much more fluctuation. A related diversifier trades at a discount of 5.5% in the year of event. The discount worsens a little to 6.23% in the next year before it jumps dramatically to a huge premium of 20.11% in year 2. After that, a huge fluctuation in value occurs when premium drops to 6.53% in year 3 and rise again to 15.37% in year 4 and a reaches a remarkable level of 23.54% in year 5. In year 6, the value gain is lost and the premium drops down to a discount of 6.6% (excess value of year 7 is statistically insignificant). Unrelated diversifiers trade at a discount of 8.82% during the event year. The discount disappears in the next year, comes back to trivial discount of 0.66% in year 2 and jumps to a premium of 6.67% in year 3. After that, it fluctuates as well before it turns back to become a discount in years 6 and 7 but without statistical significance.

In summary, I find that, consistent with the value recovery hypothesis presented in this dissertation, diversification discount is limited to short periods around the diversification event. In subsequent years, the discount decreases (i.e. improves) gradually over time and at some point in time it turns into a premium. In my sample, the discount is likely to persist for about 2 years post-event in an average diversifier. There is also a strong evidence of differential in speed of value recovery between related and unrelated diversifiers. Unrelated diversifiers trade a discount for longer periods than related ones. Collectively, these evidences pave the road for the second half of the hypothesis which states that diversification has potential financial and strategic advantages that materialize over time. I also hypothesize that these advantages are stronger in related diversifier relative to unrelated ones. Both of these claims are investigated thoroughly in the next section.

V. Value Recovery and Diversification Advantages

I argue that value recovery documented in previous section is attributed to "unanticipated" financial and strategic advantages of diversification that are known only to insiders at time of diversification (thus, not priced immediately) and materialize slowly over time. When managers make the diversification decision, they attempt to exploit future potential boost in efficiency. When the merger is complete, the advantages of the diversification move are still "potential" and are not fully disclosed to the public, hence the initial discount. Over time, the advantages materialize and become publicly available; thus the market responds with increased value.

A. Financial Efficiencies of Diversification

i. Efficient Internal Capital Market

I have shown above that the most documented source of value creation in corporate diversification strategies is efficient internal capital market. In fact, several authors have shown that internal capital market efficiency is a major motivation for diversification (see Berger and Ofek (1995), Lamont (1997), Shin and Stulz (1998), and Khanna and Tice (2001)). Several measures are found in literature of internal capital market size and efficiency. Billet and Mauer (2003) argue that a subsidy is efficient (inefficient) if the segment receiving the subsidy has a larger (smaller) ROA than the asset-weighted average of the firm's other segments, and a transfer is efficient (inefficient) if the segment making the transfer has a smaller (larger) ROA than the asset-weighted average of the firm's other segments. Accordingly, they constructed a measure of internal capital market efficiency ($ICME$). Subramaniam, Tang, Yue, and Zhou (2010) developed a measure of internal capital market activity that includes cash holdings. They take the difference between the summation of segments excess cash flow and the firm-level excess cash flow and argue that this difference is a good measure of internally-exchanged cash flow. Both measures are used in this dissertation with slight modifications (one at a time).

I construct a proxy of internal capital market efficiency in manner very similar to Billet and Mauer's (2003). I first construct two variables to distinguish subsidies from transfers,

$$
\begin{aligned}
&Subsidy_j = \max\left(CAPEX_j - NCF_j \quad , \quad 0\right) && \text{(a)}\\
&PTransfer_j = \max\left(NCF_j - CAPEX_j - w_j DIV_i \quad , \quad 0\right) && \text{(b)}\\
&Transfer_j = \min\left(PTransfer_j\,, PTransfer_j \frac{\sum Subsidy_j}{\sum PTransfer_j}\right) && \text{(c)}\\
&NCF_j = SNI_j + D_j && \text{(d)}\\
&w_j = TA_j \,/\, TA_i && \text{(e)}
\end{aligned}
\qquad \text{(E9)}
$$

$Subsidy_j$	:	Subsidy segment j
$PTransfer_j$	:	Potential transfer of segment j
$Transfer_j$	:	Transfer of segment j
$CAPEX_j$	:	Capital expenditure of segment j (form Compustat segment database)
NCF_j	:	Net cash flow of segment j
SNI_j	:	Net Income of segment j (form Compustat segment database)
D_j	:	Depreciation of segment j (form Compustat segment database)
w_j	:	Asset weight of segment j
TA_j	:	Total assets of segment j (Identifiable total assets in Compustat segments database)
TA_i	:	Total Assets of the parent company (item AT in Compustat)
DIV_i	:	Total dividend parent company (item DVT in Compustat)

When capital expenditure of a segment j is greater than its own net cash inflow, then this segment must be receiving cash from other segments to cover its excess expenses and, thus, is a subsidy. When net cash inflow of segment j is greater than its own capital expenditure (plus its asset-weighted contribution to dividends of the parent company), then this segment must be subsidizing other segments (or at least not being subsidized by any other segment) and, thus, is a transfer. To assess efficiency of the ICM, we need also to know if the subsidizing activities within the firm are efficient. To do that, I compare each segment's ROA to the asset-weighted average ROA of all other segments in the firm. For each segment, I calculate the following indicator,

$$\begin{aligned} Positive_j &= \begin{cases} 1 \ldots if\ ROA_j > \overline{ROA} \\ 0 \ldots if\ ROA_j < \overline{ROA} \end{cases} \\ ROA_j &= SNI_j / TA_j \\ \overline{ROA} &= \sum_{\neq j} ROA_j \end{aligned} \tag{E10}$$

ROA_j	:	Return on asset of segment j
TA_j	:	Total assets of segment j (Identifiable total assets in Compustat segments database)
SNI_j	:	Net Income of segment j (form Compustat segment database)
$\overline{ROA}$	:	Asset-weighted average ROA of the firm's remaining segments

A cash flow between two segments is considered efficient if it flows from a segment with relatively low ROA to a segment with relatively high ROA. Accordingly, a subsidy is efficient if it has a relatively high ROA ($Positive_j = 1$) and inefficient otherwise. Similarly, a transfer is efficient if it has a relatively low ROA ($Positive_j = 0$) and in efficient otherwise. Now I can construct a measure of internal capital market efficiency as summation of the values of all efficient subsidies and transfers minus the summation of the values of all inefficient subsidies and transfers. Mathematically,

$$
\begin{aligned}
ICME &= ES - IS + ET - IT \\
ES &= \sum_{j=1}^{M} \frac{(ROA_j - \overline{ROA})\big(Subsidy_j\big)(Positive_j)}{TA_i} \\
IS &= \sum_{j=1}^{M} \frac{(ROA_j - \overline{ROA})\big(Subsidy_j\big)(Positive_j - 1)}{TA_i} \\
ET &= \sum_{j=1}^{M} \frac{(\overline{ROA} - ROA_j)\big(Transfer_j\big)(1 - Positive_j)}{TA_i} \\
IT &= \sum_{j=1}^{M} \frac{(\overline{ROA} - ROA_j)\big(Transfer_j\big)\big(Positive_j\big)(-1)}{TA_i}
\end{aligned}
\qquad \text{(E11)}
$$

$ICME$	:	Proxy of internal Capital market efficiency
ES	:	Value of all efficient subsidies
IS	:	Value of all inefficient subsidies
ET	:	Value of all efficient transfers
IT	:	Value of all inefficient transfers
TA_i	:	Total Assets of the parent company (item AT in Compustat)

ii. *Internal Capital Market Activity*

I construct a proxy of internal capital market activity following the methodology of Subramaniam, Tang, Yue, and Zhou (2010). I calculate the excess capital expenditure of each segment as the positive difference between capital expenditure and net cash flow:

$$
\begin{aligned}
ExcessCap_j &= \max\left(CAPEX_j - NCF_j \;\;,\;\; 0\right) && \text{(a)} \\
NCF_j &= SNI_j + D_j && \text{(b)}
\end{aligned}
\qquad \text{(E12)}
$$

$Excess\ Cap_j$	:	Excess capital expenditure of segment *j*
$CAPEX_j$	:	Capital expenditure of segment *j* (form Compustat segment database)
NCF_j	:	Net cash flow of segment *j*
SNI_j	:	Net Income of segment *j* (form Compustat segment database)
D_j	:	Depreciation of segment *j* (form Compustat segment database)

$ExcessCap_j$ represents the amount of cash that segment j needs (on top of its own) to finance its capital expenditure. Segments are not always financed through internal capital market activity. External financing as well as previous year cash flow contributes to the financing of segments as well. To control for this, Subramaniam, Tang, Yue, and Zhou (2010) take the difference between summation of all segments excess capital expenditure and the firm-level excess capital expenditure $ExcessCap_i$ (which is calculated in the same way I calculate segment-level excess capital expenditure $ExcessCap_j$). This difference represents the total size of cash flow exchanged internally[49],

$$TRAN_i = \max\left(\sum_{j=1}^{M} ExcessCap_j - ExcessCap_i \quad , \quad 0\right) \qquad \text{(E13)}$$

iii. *Access to capital markets*

Lewellen (1971) pointed out that diversification strategy could be motivated by the desire of enhancing access to capital market. He shows that this includes the possibility of utilizing an unused borrowing capacity of the acquired firm as well as the possible improvement of the borrowing capacity derived from improved satisfaction of lenders' service criteria even when the acquired firm had already exploited its own borrowing capacity. In effect, our performance measure might be upward biased because it reflects improvement in borrowing capacity. In the diversification literature, Lang and Stulz (1994) include a dummy variable to capture access to capital markets. In a sense, a firm that has limited access to funds forgoes some positive NPV projects and therefore has a

[49] Subramaniam, Tang, Yue, and Zhou (2010) then calculate the mean of Transfer variable, MINTER, as a measure of average internal cash flow across divisions in diversified firms. For the purpose, of this dissertation, I keep the analysis at the firm level and I track Transfer variable over time.

higher Q because only highest NPV projects are taken. To control for this, they use a dichotomous variable that takes value one if the firm pays dividend. The idea is that a firm that pays dividend is not likely to be capital-constrained. This approach was originally used by Fazzari, Hubbard, and Peterson (1988) and also adopted by Serveas (1996). I use a dichotomous explanatory variable (i.e. a dummy) indicating whether the firm have access to funds (1) or not (0).

$$\begin{aligned} ATC &= 1 \text{ when } DVT > 0 \\ ATC &= 0 \text{ when } DVT = 0 \end{aligned} \tag{E14}$$

DVT : dividend paid (item DVT in Compustat)

B. Strategic Efficiencies of Diversification

i. <u>*Cost efficiencies*</u>

Several authors (see Lewellen (1971), Gertner, Scharfstein and Stein (1994), Stein (1997), Mukherjee, Kiymaz, & Baker (2004) and Tanriverdi and Lee (2008)) noted that diversifiers benefit from <u>economies of scale and scope</u>. In microeconomics, economies of scale are defined as the cost advantages of expansion. More specifically, they are factors that cause a producer's average cost per unit to fall as a result of spreading fixed costs over larger units of output. Economies of scope are conceptually similar to economies of scale. Whereas economies of scale primarily refer to efficiencies associated with a single segment/product type, economies of scope refer to efficiencies associated with different segments/product types. Formally, economies of scale and scope translate in lower relative costs, hence I anticipate that firms with higher economies of scale and scope have higher ratio of total asset and revenues to expenses. Thus, I calculate ratio of total assets to total expenses as a proxy of economies of scale and scope.

$$ESP1_i = \frac{TA_i}{TE} \tag{E15}$$

$ESP1_i$	:	Proxy for economies of scale and scope
TA_i	:	Total assets (item AT in Compustat)
TE	:	Total expenses (item XOPR in Compustat[50])

$$ESP2_i = \frac{Rev_i}{TE} \tag{E16}$$

$ESP2_i$	:	Proxy for economies of scale and scope
Rev_i	:	Total Revenues (item REVT in Compustat)
TE	:	Total expenses (item XOPR in Compustat[51])

Lewellen (1971), Prahalad and Hamel (1990), Kogut and Zander (1992), and Teece, Pisano and Shuen (1997) show that diversifiers realize strategic advantages by sharing common resources. More specifically, different units may be able to share the same resource (like R&D, HR, licenses, … etc) and reduce overall costs for the parent company. Intuitively, the more similar the units are, the more they are likely to share common resources. Rajan, Servaes, and Zingales (2000) show that when divisions are homogenous (heterogeneous), funds flow toward divisions with more (less) investment opportunities manifested in high (low) Tobin's Q. Thus, less dispersion in weighted opportunity (diversity, as they call it) leads to a more (less) valuable firm.

In order to account of this type of strategic efficiency, I take the % of assets in common SIC code to total asset of parent firm:

---

[50] This item is titled "Total Operating Expenses" in Compustat. I tried the obtain "Total Expenses" figure (item XT in Compustat) but the inquire did not return usable data (I obtained missing data points only)
[51] This item is titled "Total Operating Expenses" in Compustat. I tried the obtain "Total Expenses" figure (item XT in Compustat) but the inquire did not return usable data (I obtained missing data points only)

$$SHCA_i = \frac{\sum_{j=1}^{M'} TAC_j}{TA} \tag{E17}$$

$SHCA_i$	:	Proxy of the efficiency of sharing common assets of parent i
M'	:	Number of segments with the same SIC code in the parent company i
$\sum_{j=1}^{M'} TAC_j$	:	Total assets of all segments that shares the same SIC code
TA	:	Total Assets of parent company (item AT in Compustat)

ii. *Market Power*

Lewellen (1971), Kogut and Zander (1992), and Teece, Pisano and Shuen (1997), show that diversification may create market opportunities in the form of enhanced brand recognition and consumer loyalty. Mukherjee, Kiymaz, & Baker (2004) documented that mergers and acquisitions may be motivated by management's desire to gain increased market power. I follow Shenoy's (2008) approach who calculates market power as the ratio of sales of the diversifier to the sales of all firms on Compustat with the same four-digit primary SIC code during the same year. Hence,

$$MP_i = \frac{Rev_i}{\sum_{k=1}^{K} Rev_k} \tag{E18}$$

MP_i	:	Proxy for market power
Rev_i	:	Total revenues (sales) of the diversifier (item REVT in Compustat)
K	:	Number of competitors in the same market
Rev_k	:	Total revenues (sales) of the competitor k in the market

I eliminate all cases where market power variable is greater than 0.99 and consider that a data error. Higher (lower) values of MP indicate that the firm is enjoying larger (smaller) market share and implies stronger (weaker) performance.

C. Some Control Variables

i. *Size*

Lang and Stulz (1994) find evidence that size is a significant determinant of valuation differences (differences in Tobin's Q between diversified and pure-play firms). Specifically, they find that valuation differences are reduced (but not explained away) when taking into account differences in size. I control for log of total assets:

$$Size = log\ (TA) \tag{E19}$$

TA	:	Total Assets (item AT in Compustat)

ii. *Relatedness*

I use two measure of relatedness, dichotomous measure and a continuous measure. Following Berger and Ofek (1995), a merger is considered "related" if the first two digits of the SIC code of the acquirer match the first two digits of the acquired firm. I use an indicator variable Rel that is 1 for related mergers and 0 otherwise.

The second measure of relatedness is based on Palepu's (1985) entropy measure of diversification. Within each diversifier i, segments (denoted $j = 1,2, \dots, M$) are placed in Y SIC industry groups (denoted $y = 1,2, \dots, Y$) at the two-digit level ($Y \leq M$). Let's assume that there are Z segments (denoted $z = 1,2, \dots, Z$) in a certain industry group y. Palepu (1985) showed that we can compute related diversification of industry group y as:

$$DR_y = \sum_{z=1}^{Z} \frac{TA_z}{TA_y} log \frac{TA_y}{TA_z}$$

DR_y : Entropy measure of related diversification of industry group y.

TA_z : Total assets of the segment z in industry group y.

$TA_y = \sum_{z=1}^{Z} TA_z$: Total assets[52] of the industry group y.

Accordingly, related diversification of diversifier i is calculated as weighted average of its industry groups related diversification:

$$DR_i = \sum\nolimits_{y=1}^{Y} DR_y \frac{TA_y}{TA_i}$$

DR_i : Entropy measure of related diversification of diversifier i.

$TA_i = \sum_{y=1}^{Y} TA_y$: Total assets of the diversifier i.

I measure ΔDR_i for each diversifier i as the difference in DR_i in the year of completion of merger from the year before (for the acquirer):

$$\Delta DR_i = DR_{i,\ after\ event} - DR_{i,\ before\ event}$$

ΔDR_i : Change in entropy measure of related diversification of diversifier i.

If ΔDR_i is positive, then the new unit has increased the "relatedness" of the parent and the merger is related. If ΔDR_i is negative, then the new unit decreased the "relatedness" of the parent and the merger is unrelated. In both cases, we have an efficient continuous measure that incorporates the magnitude of relatedness.

iii. *Profitability and investment*

[52] The original entropy measure of Palepu (1985) uses sales; I use assets. In this dissertation, I focus on the relative importance of each segment in terms of assets rather than sales. Assets are generally more stable than sales and less susceptible to the possibility that the acquired and/or the acquirer witness a sudden surge/decline in sales shortly before the merger.

Profitability (EBIT over sales) and investment (capital expenditures over sales) are common control variables in diversification literature (see for example Campa and Kedia (2002) and Mansi and Reeb (2002) and Hund, Monk, and Tice (2007)). Firms with higher profitability and/or investment may have higher performance measures regardless of diversification. To neutralize the effect of profitability and investment on firm performance, I include in my model two proxies,

$$Proft = \frac{EBIT}{Rev} \tag{E20}$$

$EBIT$	:	Income after interest and taxes of parent company (item EBIT in Compustat)
Rev	:	Total Revenues (item REVT in Compustat)

$$Invest = \frac{CEX}{Rev} \tag{E21}$$

CEX	:	Capital Expenditure of parent company (item IVNCF in Compustat)
Rev	:	Total Revenues (item REVT in Compustat)

D. Descriptive Statistics of Financial and Strategic Efficiencies of Diversification

The table below shows the descriptive statistics of variables used in this dissertation and how they differ between related (Panel B) and unrelated events (Panel C). Descriptive statistics are calculated based on all firm-year observations. A year-by-year analysis is supplied in the methodology and results sections below.

Table 19 – Descriptive Statistics – Measures of Diversification Advantages

Panel A - All Events – 1642 firm-year observations

	Mean	Std Dev	Min	Max	Median
$\boldsymbol{ICME}$	0.118	0.341	2.987	0.000	0.00370
$\boldsymbol{TRAN}$	1692.590	4467.485	51516.000	0.000	292.469
$\boldsymbol{ESP1}$	2.168	2.288	19.524	0.103	1.444
$\boldsymbol{ESP2}$	1.237	0.508	5.603	0.0537	1.150
$\boldsymbol{MP}$	0.200	0.245	0.986	6.181D-06	0.0903
$\boldsymbol{SHCA}$	0.190	0.0617	0.884	0.112	0.180
$\boldsymbol{SIZE}$	3.348	0.836	5.440	0.356	3.350
$\boldsymbol{ATC}$	0.465	0.499	1.000	0.000	0.000
$\boldsymbol{PROFT}$	-0.136	1.495	0.574	-19.712	0.0877
$\boldsymbol{INVST}$	-0.146	1.142	21.888	-20.881	-0.0600
$\boldsymbol{DR_{Before\ event}}$	0.401	0.142	0.650	0.150	0.406
$\boldsymbol{DR_{after\ event}}$	0.422	0.169	0.870	0.111	0.414
$\boldsymbol{\Delta DR}$	0.0211	0.0726	0.221	-0.186	0.0186

Panel B - Related Diversifications – 969 firm-year observations

	Mean	Std Dev	Min	Max	Median
$\boldsymbol{CME}$	0.156	0.419	0.000	2.987	0.0207
$\boldsymbol{TRAN}$	2101.760	4862.963	0.000	51516.000	355.190
$\boldsymbol{ESP1}$	1.956	2.005	0.191	19.524	1.333
$\boldsymbol{ESP2}$	1.225	0.436	0.0676	4.804	1.151
$\boldsymbol{MP}$	0.265	0.276	0.000	0.986	0.133
$\boldsymbol{SHCA}$	0.195	0.0727	0.112	0.884	0.182
$\boldsymbol{SIZE}$	3.461	0.850	0.830	5.440	3.404
$\boldsymbol{ATC}$	0.520	0.500	0.000	1.000	1.000
$\boldsymbol{PROFT}$	-0.0698	1.207	-15.877	0.547	0.0878
$\boldsymbol{INVST}$	-0.132	0.887	-20.881	9.170	-0.0548
$\boldsymbol{DR_{Before\ event}}$	0.406	0.142	0.151	0.650	0.411
$\boldsymbol{DR_{after\ event}}$	0.468	0.172	0.145	0.870	0.467
$\boldsymbol{\Delta DR}$	0.0620	0.0549	-0.0306	0.221	0.0537

Panel C - Unrelated Diversification – 673 firm-year observations

	Mean	Std Dev	Min	Max	Median
$\boldsymbol{CME}$	0.0630	0.164	0.000	1.308	0.000
$\boldsymbol{TRAN}$	1103.458	3752.836	0.000	46174.000	225.066
$\boldsymbol{ESP1}$	2.472	2.613	0.103	18.051	1.631
$\boldsymbol{ESP2}$	1.255	0.596	0.0537	5.603	1.150
$\boldsymbol{MP}$	0.106	0.150	0.000	0.795	0.0455
$\boldsymbol{SHCA}$	0.183	0.0398	0.112	0.402	0.178
$\boldsymbol{SIZE}$	3.185	0.786	0.356	5.207	3.230
$\boldsymbol{ATC}$	0.385	0.487	0.000	1.000	0.000
$\boldsymbol{PROFT}$	-0.232	1.828	-19.712	0.574	0.0873
$\boldsymbol{INVST}$	-0.165	1.433	-15.571	21.888	-0.0700
$\boldsymbol{DR_{Before\ event}}$	0.394	0.143	0.150	0.650	0.394
$\boldsymbol{DR_{after\ event}}$	0.356	0.141	0.111	0.680	0.349
$\boldsymbol{\Delta DR}$	-0.0378	0.0512	-0.186	0.0618	-0.0338

(***) = significant at 1%, (**) = significant at 5%, (*) = significant at 10%

Related diversifiers witness better sharing of common assets compared to unrelated ones. Understandably, segments that belong to similar industries are more likely to have common assets to share. I also note that related diversifiers tend to be larger than unrelated ones. This might be loosely explained as follows: when acquiring an unrelated business unit from a different industry, managers prefer to acquire smaller ones. It might also be explained as larger firms are more inclined to expand within their industries. The answer of this question goes beyond the goal of this research and may be undertaken in separate analysis.

Related diversifying results in lower economies of scale and scope efficiency compared to unrelated ones. This is true when we look at the second proxy $ESP2$ which is statistically significant. However, very little inference can be made using the first proxy $ESP1$ which is statistically insignificant in both related and unrelated diversifiers. $ESP2$ compares revenues to total expenses while $ESP2$ compares total assets to total expenses. It seems that unrelated diversifiers are able to derive more revenues from dollars spent on expenses. This does generally does not support my hypothesis. Further analysis is supplied below when I make a year-by-year analysis.

Table 9 below analyzes the correlation between used variables. Most of variables used in this dissertation are not highly correlated with few exceptions. The two proxies of economies of scale and scope ($ESP1$ and $ESP2$) are understandably highly correlated (+0.75) and are used in further analysis as alternatives (on at a time). Size is moderately correlated (+0.51) with market power (MP) and moderately correlated (+0.51) with activity of internal capital market ($TRAN$) and moderately correlated (+0.44) with access to capital market (ATC). This is not surprising because it indicates that larger firms capture larger share of their product market and allow for larger internal capital market and have better access to capital markets.

Table 20 – Correlation Analysis

	Q	*EV(based on TA)*	*EV(based on Sales)*	*ICME*	*TRAN*	*ESP1*	*ESP2*	*MP*	*SHCA*	*Log(TA)*	*ATC*	*Rel*	*Proft*	*Invst*
Q	1.00													
EV(based on TA)	0.18	1.00												
EV(based on Sales)	-0.18	0.17	1.00											
ICME	-0.07	0.06	0.06	1.00										
TRAN	0.08	0.09	-0.03	0.15	1.00									
ESP1	-0.05	-0.03	-0.05	-0.20	0.08	1.00								
ESP2	-0.01	-0.02	0.05	-0.09	0.13	0.75	1.00							
MP	0.06	0.10	-0.01	0.23	0.20	-0.21	-0.03	1.00						
SHCA	-0.01	0.02	0.04	0.39	0.12	-0.04	0.01	0.15	1.00					
Log(TA)	-0.07	0.10	-0.04	0.26	0.51	0.09	0.25	0.51	0.17	1.00				
ATC	-0.05	0.03	0.00	0.22	0.21	-0.09	0.06	0.25	0.09	0.44	1.00			
Rel	0.08	0.05	-0.01	0.13	0.11	-0.11	-0.03	0.32	0.10	0.16	0.13	1.00		
Proft	-0.17	-0.01	0.11	0.05	0.08	0.05	0.38	0.13	0.03	0.28	0.07	0.05	1.00	
Invst	0.01	-0.02	-0.06	0.03	-0.04	-0.21	-0.11	0.03	0.02	-0.02	0.04	0.01	-0.05	1.00

E. Value Recovery and the Dynamic Evolution of Diversification Advantages

The second half of my hypothesis states that value gain and performance boost comes as a result of financial and strategic advantages of diversification. In this dissertation I focus on: 1) Internal capital market efficiency ($ICME$) and activity ($TRAN$). 2) Access to capital market (ATC). 3) Economies of scope and scale calculated as the spread of total assets over expenditure ($ESP1$) and spread of revenues over expenditure ($ESP2$). 4) Market power measured as firms revenues divided by revenues of all other firms in the same industry (MP). 5) Share of common assets ($SHCA$). I use three different forms of OLS regression analyses to test the prediction of joint evolution of these efficiencies with value and performance. First, I run OLS regressions on level values of both dependent (performance and value) and dependent (diversification advantage) variables. Second, I run OLS regressions on annual changes. I regress simple annual changes in dependent variables on annual percentage changes in independent variables. In the third OLS model I regress annual changes in dependent variables on the annual percentage changes in dependent variables interacted with Rel variable and ΔDR variable.

i. Level OLS regression

The level models are,

$$\begin{aligned} Q_{i,t} &= a + \beta_1 ICME_{i,t} + \beta_2 TRAN + \beta_3 ATC_{i,t} \\ &\quad + \beta_4 ESP_{i,t} + \beta_5 MP_{i,t} + \beta_6 SHCA_{i,t} + \beta_7 Size_{i,t} + \\ &\quad \beta_8 Proft_{i,t} + \beta_9 INVST_{i,t} + \beta_{10} EVENT_{i,t} + \beta_{11} Rel_i + \\ &\quad \beta_{12} \Delta DR_i \qquad \text{(A)} \end{aligned}$$

(E22)

$$\begin{aligned} EVTA_{i,t} &= a + \beta_1 ICME_{i,t} + \beta_2 TRAN + \beta_3 ATC_{i,t} \\ &\quad + \beta_4 ESP_{i,t} + \beta_5 MP_{i,t} + \beta_6 SHCA_{i,t} + \beta_7 Size_{i,t} + \qquad \text{(B)} \\ &\quad \beta_8 Proft_{i,t} + \beta_9 INVST_{i,t} + \beta_{10} EVENT_{i,t} + \beta_{11} Rel_i + \end{aligned}$$

$$\beta_{12}\Delta DR_i$$

$$EVSl_{i,t} = a + \beta_1 ICME_{i,t} + \beta_2 TRAN + \beta_3 ATC_{i,t} + \beta_4 ESP_{i,t} + \beta_5 MP_{i,t} + \beta_6 SHCA_{i,t} + \beta_7 Size_{i,t} + \beta_8 Proft_{i,t} + \beta_9 INVST_{i,t} + \beta_{10} EVENT_{i,t} + \beta_{11} Rel_i + \beta_{12}\Delta DR_i \quad \text{(C)}$$

$Q_{i,t}$	:	Tobin's Q of firm i at time t
$EVTA_{i,t}$	:	Excess value (based on assets multiple) of firm i at time t
$EVSl_{i,t}$	:	Excess value (based on sales multiple) of firm i at time t
$ICME_{i,t}$	:	Internal capital market efficiency of firm i at time t
$TRAN_{i,t}$	:	Internal capital market activity of firm i at time t
$ESP_{i,t}$	:	Economies of scale and scope of firm i at time t[53]
$MP_{i,t}$	:	Market power of firm i at time t
$SHCA_{i,t}$	:	Sharing of common assets advantage of firm i at time t
$Size_{i,t}$	:	Size (log of total assets) of firm i at time t
$ATC_{i,t}$	:	Dummy for access to capital of firm i at time t
$Proft_{i,t}$	:	Profitability of firm i at time t
$INVST_{i,t}$	:	Investment of firm i at time t
$EVENT_{i,t}$	:	Dummy for another event of firm i at time t[54]
Rel_i	:	Dummy for another relatedness of the diversifying event
ΔDR_i	:	Change in entropy measure of related diversification of diversifier i.

The models above test the null hypothesis that year-to-year variation in performance (Tobin's Q) and value (Excess Value) of diversified firms are explained by variation in financial and strategic advantages ($ICME, TRAN, ATC, ESP, MP, SCHA$). Specifically, the first model tests whether diversifiers with better performance or higher value in certain post-event year also benefit from higher financial and strategic advantages in that year. I run the model with $EVENT$ variable as well as Rel variable or ΔDR variable. Further, I control for size, profitability and investment.

[53] I have two proxies of economies of scale and scope. See variable construction section
[54] EVENT is a dummy variable that equals 1 if the parent witnessed another event in that year, and 0 otherwise

In the context of our model, β_1, β_2, β_3, β_4, β_5 and β_6 capture the association between diversifiers' performance (Tobin's Q) and value (EV) in certain post-event year and the level of financial and strategic advantages that the diversifier has achieved in the same year. An economically meaningful and statistically significant coefficient implies that the corresponding advantage co-varies with performance or value. It also implies that annual changes in value and performance are explained by annual changes in the corresponding diversification advantage. Insignificant coefficient implies that changes in value and performance are not attributed to changes in the corresponding advantage. $EVENT$ indicates whether the parent witnessed a previous diversifying event in the time frame of my sample. Thus, β_{10} captures the incremental gain (loss) that a diversifier gets from being diversified before. Rel is dummy that indicates whether acquired unit is related to parent and ΔDR is an entropy measure of relatedness. Therefore, β_{11} and β_{12} capture incremental gain/loss from related diversifications. β_7, β_8, and β_9 are slopes on control variables.

I run the models in their full format as well as some variations. For instance, I run the models once without $ICME$ and once without $TRAN$ variable. I also run the models once with $ESP1$ and once with $ESP2$ only. The results are reported in the table below.

Table 21 – OLS Model on Level Values – Tobin's Q

The table shows the results of the following regression:

$$Q_{i,t} = a + \beta_1 ICME_{i,t} + \beta_2 TRAN + \beta_3 ATC_{i,t} + \beta_4 ESP_{i,t} + \beta_5 MP_{i,t} + \beta_6 SHCA_{i,t} + \beta_7 Size_{i,t} + \beta_8 Proft_{i,t} + \beta_9 INVST_{i,t} + \beta_{10} EVENT_{i,t} + \beta_{11} Rel_i + \beta_{12} \Delta DR_i$$

The models above test the null hypothesis that year-to-year variation in Tobin's Q of diversified firms are explained by variation in ICME, TRAN, ATC, ESP, MP, SCHA. I run the model with EVENT variable as well as Rel variable or ΔDR variable and I control for size, profitability and investment. β_1, β_2, β_3, β_4, β_5 and β_6 capture the association between diversifiers' performance and the level of financial and strategic advantages. β_{10} captures the incremental gain (loss) that a diversifier gets from being diversified before. β_{11} and β_{12} capture incremental gain/loss from related diversifications. I run the models in their full format as well as some variations. (***) = significant at 1%, (**) = significant at 5%, (*) = significant at 10%

	Diversification Advantages							Control Variables						
a	$ICME$	$Tran$[55]	ATC	$ESP1$	$ESP2$	MP	$SHCA$	$Size$	$Proft$	$Invst$	$EVENT$	Rel	ΔDR[56]	R^2
1.766 (***)	-.2386 (***)	.2893 (***)	-.0986 (**)	-.0976 (***)	.5060 (***)	.3822 (***)	.2091	-.1597 (***)	-.1466 (***)	-.0170	.4682 (***)	.1057 (**)		.1021
1.812 (***)	-.2297 (***)	.2883 (***)	-.0959 (**)	-.0988 (***)	.5080 (***)	.4029 (***)	.2248	-.1609 (***)	-.1460 (***)	-.0176	.4761 (***)		.6333 (**)	0.1015
1.899 (***)	-.2256 (***)		-.0641	-.0113		.3748 (***)	.2718	-.0628 (*)	-.0970 (***)	-.0069	.5158 (***)	.1226 (***)		.0588
1.784 (***)	-.1781 (***)		-.0556		.1583 (***)	.4644 (***)	.2127	-.1001 (***)	-.1147 (***)	.0026	.5094 (***)	.1272 (***)		.0647
2.260 (***)		.2924 (***)	-.0742	-.0059		.4200 (***)	-.2279	-.1656 (***)	-.0899 (***)	-.0032	.4299 (**)	.1041 (**)		.0692
2.112 (***)		.2881 (***)	-.0659		.1701 (***)	.5032 (***)	-.1984	-.1971 (***)	-.1091 (***)	.0050	.4324 (**)	.1094 (**)		.0768

[55] Transfer variable is scaled down by 10,000 to make it more comparable in magnitude with internal capital market efficiency (ICME).

[56] I found that replacing Rel with ΔDR does not change the sign or the statistical significance of any coefficient. It does, however, change the magnitude of coefficients but the change is very minimal. Therefore, I report the results of including ΔDR in the full regression only. I also ran the model with both Rel and ΔDR and find that both of them lose significance when put together in any model (results are not reported)

The table shows that performance (Tobin's Q) of diversifiers is positively related to market power (MP) and revenues-based cost efficiencies (when calculated as revenues divided by expenses - $ESP2$) and internal capital market activity ($TRAN$). The coefficients on these variables, β_2, β_5, and β_6 are positive and economically and statistically significant which implies that year-to-year variation in Tobin's Q, i.e. performance, of diversifiers is explained by year-to-year variation in these variables. More specifically, annual increases in Tobin's Q (reported in the previous section) are driven by annual increases in market share, annual decreases in expenditure relative to revenues, and annual increases in the activity of internal capital market. Also consistent with evolution trend of Tobin's Q over time depicted in previous section, I find that related diversifiers enjoy higher Tobin's Q. This is evidence by positive and statistically significant β_{11} and β_{12}.

Surprisingly, however, diversifiers performance is negatively related to internal capital market efficiency ($ICME$) and asset-based cost efficiencies (calculated as total assets divided by expenses - $ESP1$) and access to capital market (ACT). The coefficients on these variables β_1, β_3, β_4 are negative and statistically significant. Nevertheless, β_3 and β_4 magnitudes are small. β_1 magnitude is economically meaningful. It implies that depicted annual increase in Tobin's Q, it associated with decreasing internal capital market efficiency.

On the other hand, it seems that diversifiers' performance is not related to share of common assets and investment. Subsequent diversifying events have strong positive impact on diversifiers' performance. This might explain why some firms involve in repeated diversifying strategy. These findings are robust to several variation of the model as shown in the table. I run the model once without $ICME$ and once without $TRAN$ because these two variables represent the efficiency and activity of internal capital market, respectively. This variation in the model does not change the sign of the coefficients and it causes very minimal changes in the magnitude. I also run the model without $ESP1$ and $ESP2$. This variation also does not change sign of coefficients and causes very minimal change in magnitude. However, I note that when $ESP2$ is excluded from the model, $ESP1$ loses significance.

To sum up the findings of Tobin's Q level OLS regression, and keeping in mind that it is a market-driven measure of future performance, the result of regression indicates market tendency to reward internal capital market activity, market power, and cost efficiencies. This finding is in line with the general implication of my hypothesis that future improvements in diversifiers' performance are derived from future materialization of financial and strategic advantages. Further, related diversifiers have higher Tobin's Q and previous diversifying events contribute to even higher Tobin's Q.

Table 22 – OLS Model on Level Values – Excess Value

Panel A – Excess Value based on Assets Multiplier

The table shows the results of the following regression:

$$EVTA_{i,t} = a + \beta_1 ICME_{i,t} + \beta_2 TRAN + \beta_3 ATC_{i,t} + \beta_4 ESP_{i,t} + \beta_5 MP_{i,t} + \beta_6 SHCA_{i,t} + \beta_7 Size_{i,t} + \beta_8 Proft_{i,t} + \beta_9 INVST_{i,t} + \beta_{10} EVENT_{i,t} + \beta_{11} Rel_i + \beta_{12} \Delta DR_i$$

The models above test the null hypothesis that year-to-year variation in excess value of diversified firms are explained by variation in ICME, TRAN, ATC, ESP, MP, SCHA. I run the model with EVENT variable as well as Rel variable or ΔDR variable and I control for size, profitability and investment. β_1, β_2, β_3, β_4, β_5 and β_6 capture the association between diversifiers' value and the level of financial and strategic advantages. β_{10} captures the incremental gain (loss) that a diversifier gets from being diversified before. β_{11} and β_{12} capture incremental gain/loss from related diversifications. I run the models in their full format as well as some variations.
(***) = significant at 1%, (**) = significant at 5%, (*) = significant at 10%

	Diversification Advantages							Control Variables						
a	$ICME$	$Tran$	ATC	$ESP1$	$ESP2$	MP	$SHCA$	$Size$	$Proft$	$Invst$	$EVENT$	Rel	ΔDR	R^2
-.1559 (*)	.0448	.0633 (*)	-.0379	-.0075	-.0040	.1202 (*)	-.1637	.0505 (**)	-.0136	-.0146	.0468	.0152		.0201
-.1528 (*)	.0474	.0599 (*)	-.0388	-.0077	-.0036	.1059 (*)	-.1709	.0516 (**)	-.0135	-.0148	.0451		.3463 (*)	.0218
-.2153 (***)	.0458		-.0394	-.0080		.1082 (*)	-.1501	.0697 (***)	-.0155	-.0153	.0562	.0180		.0184
-.1916 (**)	.0501		-.0355		-.0300	.1190 (*)	-.1546	.0676 (***)	-.0122	-.0135	.0561	.0187		.0181
-.1781 (**)		.0638 (*)	-.0352	-.0094		.1216 (*)	-.0791	.0529 (**)	-.0142	-.0149	.0549	.0161		.0196
-.1521 (*)		.0639 (*)	-.0303		-.0356	.1345 (*)	-.0747	.0506 (**)	-.0102	-.0128	.0557	.0170		.0190

Panel B - Excess Value based on Sales Multiplier

The table shows the results of the following regression:

$$EVSl_{i,t} = a + \beta_1 ICME_{i,t} + \beta_2 TRAN + \beta_3 ATC_{i,t} \quad + \beta_4 ESP_{i,t} + \beta_5 MP_{i,t} + \beta_6 SHCA_{i,t} + \beta_7 Size_{i,t} + \beta_8 Proft_{i,t} + \beta_9 INVST_{i,t} + \beta_{10} EVENT_{i,t} + \beta_{11} Rel_i + \beta_{12} \Delta DR_i$$

The models above test the null hypothesis that year-to-year variation in excess value of diversified firms are explained by variation in ICME, TRAN, ATC, ESP, MP, SCHA. I run the model with EVENT variable as well as Rel variable or ΔDR variable and I control for size, profitability and investment. β_1, β_2, β_3, β_4, β_5 and β_6 capture the association between diversifiers' value and the level of financial and strategic advantages. β_{10} captures the incremental gain (loss) that a diversifier gets from being diversified before. β_{11} and β_{12} capture incremental gain/loss from related diversifications. I run the models in their full format as well as some variations. (***) = significant at 1%, (**) = significant at 5%, (*) = significant at 10%

	Diversification Advantages							Control Variables						
a	***ICME***	***Tran***	***ATC***	***ESP1***	***ESP2***	***MP***	***SHCA***	***Size***	***Proft***	***Invst***	***EVENT***	***Rel***	**ΔDR**	**R^2**
.0371	.0999 (**)	-.0122	-.0006	-.0487 (***)	.2153 (***)	-.0335	.2375	-.0653 (**)	.0284 (**)	-.0392 (***)	.0390	-.0235		.0410
.0243	.0989 (**)	-.0144	-.0009	-.0484 (***)	.2149 (***)	-.0509	.2303	-.0641 (**)	.0283 (**)	-.0391 (***)	.0351		.0481 (*)	0.0407
.2140 (***)	.1030 (**)		.0177	-.0123 (*)		-.0119	.2352	-.0654 (***)	.0525 (***)	-.0336 (***)	.0390	.0225		.0301
.1872 (**)	.1273 (***)		.0245		.0393 (*)	.0362	.2058	-.0832 (***)	.0481 (***)	-.0279 (**)	.0362	-.0200		.0291
.1611 (*)		-.0088	.0244	-.0150 (**)		-.0097	.4257 (*)	-.0566 (**)	.0521 (***)	-.0342 (***)	.0593	-.0198		.0274
.1305		-.0104	.0347		.0278 (**)	.0442	.4513 (*)	-.0736 (***)	.0488 (***)	-.0278 (**)	.0615	-.0163		.0248

OLS regressions with excess value based on total assets and sales multiple reveal somehow consistent, but generally weaker, results as the Tobin's Q regression. Annual improvements in excess value based on total assets (Table 12) is positively related to annual improvements in market power (MP) and internal capital market activity ($TRAN$). The coefficients on these variables β_2 and β_6 are positive and statistically significant (at 10%). Annual improvements in excess value based on sales (Table 13) are positively related to annual improvements in internal capital market efficiency ($ICME$) and revenues-based cost efficiencies ($ESP2$). The coefficients on these variables β_1 and β_5 are positive and statistically significant (at 10%). In both regressions, I obtain positive and significant coefficient on relatedness measure ΔDR (but not Rel) which implies that relatedness of diversification adds value.

Access to capital market (ATC) and share of common assets do not add value. Neither does previous diversifying event ($EVENT$). Similar to Tobin's Q regression, β_4 is negative and statistically significant in the third regression. Thus, assets-based cost efficiencies ($ESP1$) has negative impact on performance and value. Unlike excess value based on assets, excess value based on sales is positively related to profitability and negatively related to investment.

To put things in perspective, I summarize the findings above in the table below. The table summarizes the results of level regressions and some concluding remarks follow,

Table 23 – The Association between Diversification Advantages and Performance and Value

The table shows the sign of the relevant coefficients from the three regressions above. The table, therefore, summarized the findings from the level regression analysis. A positive sign indicates that the variable has a constructive impact on Tobin's Q or excess value.

	Diversification Advantages							Relatedness	
	$ICME$	$Tran$	ATC	$ESP1$	$ESP2$	MP	$SHCA$	Rel	ΔDR
Tobin's Q	-	+	-	-	+	+	0	+	+
Excess Value based on Total Assets	0	+	0	0	0	+	0	0	+
Excess Value based on Sales	+	0	0	-	+	0	0	0	+

The table shows that, generally speaking, future improvements in performance and value are attributed to annual improvements in internal capital market activity ($Tran$), revenues-based cost efficiencies ($ESP2$), and market power (MP). Assets-based cost efficiencies ($ESP1$) have negative impact on performance and value Internal capital market efficiency ($ICME$) has negative impact on performance and positive impact on value. Share of common assets ($SHCA$) do not contribute to performance or value. Related diversifiers are better in terms of performance and value.

ii. *Annual Differences OLS Regression*

The models in the previous section test the cross-sectional year-to-year variation between performance and value and other financial and strategic advantages. In this section, I move to a more specific question. Does the documented improvements in performance and value stems from synchronous evolution of diversification advantages? To answer this question, I run an annual differences model. For each dependent variable (Tobin's Q and excess value), I calculate annual changes at time t as the level difference between time t and time $t-1$

$$\Delta V_{i,t} = V_{i,t} - V_{i,t-1} \tag{E23}$$

For each independent variable (diversification advantages and control variables[57]), I calculate annual percentage at time t as the level difference between time t and time $t-1$ divided by level value at time $t-1$[58]

$$\Delta V_{i,t} = \frac{V_{i,t} - V_{i,t-1}}{V_{i,t-1}} \times 100 \tag{E24}$$

Given this change in variables, the structure of the sample changes as well. The changes are shown in the table below,

Table 24 – Description of Sample Structure After Taking Annual Differences

I lost one year of data by taking the annual differences. This table shows how total number of observations is affected by this. Expectedly, the numbers of observations in each year are identical to those in table 5 with a shift of one year.

$t-1$	t	Firm-year Observations		
		All Diversifying Events	**Related Diversification**	**Unrelated Diversification**
0	1	316	185	131
1	2	274	159	115
2	3	223	127	96
3	4	181	107	74
4	5	140	83	57
5	6	105	63	42
6	7	76	49	27
7	8	6	6	0
8	9	5	5	0
All years		**1326**	**784**	**542**

[57] Except $Size$, $EVENT$, ATC, Rel and ΔDR. These are indicators and their annual difference is meaningless.
[58] Tobin's Q is already a ratio and EV is already a discount relative to imputed value, hence no need for further normalizing. Diversification advantages and profitability and investment variables, however, are not normalized, hence I take the difference divided by previous period value.

The annual differences models are,

$$\begin{aligned}\Delta Q_{i,t} \quad &= a + \beta_1 \Delta ICME_{i,t} + \beta_2 \Delta TRAN + \beta_3 ATC_{i,t} \\ &+\beta_4 \Delta ESP_{i,t} + \beta_5 \Delta MP_{i,t} + \beta_6 \Delta SHCA_{i,t} + \beta_7 Size_{i,t} + \\ &\beta_8 \Delta Proft_{i,t} + \beta_9 \Delta INVST_{i,t} + \beta_{10} EVENT_{i,t} + \\ &\beta_{11} Rel_i + \beta_{12} \Delta DR_i \end{aligned} \qquad \text{(A)}$$

$$\begin{aligned}\Delta EVTA_{i,t} &= a + \beta_1 \Delta ICME_{i,t} + \beta_2 \Delta TRAN + \beta_3 ATC_{i,t} \\ &+\beta_4 \Delta ESP_{i,t} + \beta_5 \Delta MP_{i,t} + \beta_6 \Delta SHCA_{i,t} + \beta_7 Size_{i,t} + \\ &\beta_8 \Delta Proft_{i,t} + \beta_9 \Delta INVST_{i,t} + \beta_{10} EVENT_{i,t} + \\ &\beta_{11} Rel_i + \beta_{12} \Delta DR_i \end{aligned} \qquad \text{(B)} \qquad \text{(E25)}$$

$$\begin{aligned}\Delta EVSl_{i,t} &= a + \beta_1 \Delta ICME_{i,t} + \beta_2 \Delta TRAN + \beta_3 ATC_{i,t} \\ &+\beta_4 \Delta ESP_{i,t} + \beta_5 \Delta MP_{i,t} + \beta_6 \Delta SHCA_{i,t} + \beta_7 Size_{i,t} + \\ &\beta_8 \Delta Proft_{i,t} + \beta_9 \Delta INVST_{i,t} + \beta_{10} EVENT_{i,t} + \\ &\beta_{11} Rel_i + \beta_{12} \Delta DR_i \end{aligned} \qquad \text{(C)}$$

The independent variable represents annual change in performance (Tobin's Q) and value in every time point. The right-hand variables represent unanticipated annual improvement (deterioration) in financial and strategic efficiencies. This regression captures synchronous evolution between performance and value and the materialization of diversification advantages. This model tests the null hypothesis that there is a synchronous improvement (deterioration) between performance and value and diversification advantages. I run the regressions for all firm-year data and observe the β's which indicate whether a certain movement in diversification advantages derives synchronous movements in performance and value. In other words, unlike the level regression model that focuses on changes, this model focuses on speed of changes. Statistically significant and positively signed slope implies that performance and value evolution is expedited by synchronous evolution of the corresponding diversification efficiency. The slope on Rel and DR in this regression tests if relatedness makes improvement in performance and value any faster. The slope on $EVENT$ tests if repeated diversifying events make improvements in performance and value any faster.

I run the models in their full versions as well as some variations similar to those adopted in the previous section. The results are reported in the table below,

Table 25 – OLS Model on Annual Percentage Differences – Tobin's Q

I run the following model:

$$\Delta Q_{i,t} = a + \beta_1 \Delta ICME_{i,t} + \beta_2 \Delta TRAN + \beta_3 ATC_{i,t} + \beta_4 \Delta ESP_{i,t} + \beta_5 \Delta MP_{i,t} + \beta_6 \Delta SHCA_{i,t} + \beta_7 Size_{i,t} + \beta_8 \Delta Proft_{i,t} + \beta_9 \Delta INVST_{i,t} + \beta_{10} EVENT_{i,t} + \beta_{11} Rel_i + \beta_{12} \Delta DR_i$$

I take annual percentage changes of the independent variables and annual changes in the dependent variable. Not all independence variables are differenced. Size captures the firm size effect and its annual changes are not relevant in this context. Same argument applies to EVENT and relatedness variables.

	Diversification Advantages							Control Variables						
a	$\Delta ICME$	$\Delta Tran$	ATC	$\Delta ESP1$	$\Delta ESP2$	ΔMP	$\Delta SHCA$	$Size$	$\Delta Proft$	$\Delta Invst$	$EVENT$	Rel	ΔDR[59]	R^2
-.0461	.0000	-.0000	.0644 (*)	-.0033 (***)	.0010 (**)	.0068 (*)	.0220 (***)	-.0569 (***)	-.0000	-.0000	.0216	-.0028		.0484
-.0452	.0000	-.0000	.0631 (*)	-.0033 (***)	.0010 (**)	.0069 (*)	.0219 (***)	-.0585 (***)	-.0000	-.0000	.0179		.1703 (*)	.0489
-.0399	.0000		.0646 (**)	-.0028 (***)		.0068 (*)	.0228 (***)	-.0600 (***)	-.0000	-.0000	.0254	-.0031		.0461
-.0310	.0000		.0668 (*)		.0012 (**)	.0065 (*)	.0241 (***)	-.0655 (***)	-.0000	-.0000	.0363	-.0038		.0184
-.0357		-.0000	.0642 (*)	-.0028 (***)		.0068 (*)	.0229 (***)	-.0611 (***)	-.0000	-.0000	.0253	-.0020		.0466
-.0249		-.0000	.0643 (*)		.0012 (**)	.0065 (*)	.0242 (***)	-.0672 (***)	-.0000	-.0000	.0361	-.0028		.0193

(***) = significant at 1%, (**) = significant at 5%, (*) = significant at 10%

[59] I run all models with Rel only then with ΔDR only. Replacing Rel with DR did not change the sign or statistical significance of any of the coefficients. Some minimal changes in coefficients magnitude is observed but the change is negligible. I show the results on including ΔDR in the full regression only for clarity and conciseness of presentation.

The table shows that the developments of performance (Tobin's Q) of diversifiers is driven by synchronous improvements in access to capital market (ATC), market power (MP), revenues-based cost efficiencies (when calculated as revenues divided by expenses - $ESP2$) and share of common assets ($SHCA$). The coefficients on these variables β_3, β_5, $\beta_6$and β_7 are positive and economically and statistically significant. I conclude that the speed of recovery process is driven by speed of materialization of these efficiencies. More specifically, a diversifier that witness faster improvements in access to capital market, market power, cost efficiencies, and share of common assets is likely to witness faster improvements in Tobin's Q. Further, I find that related diversifiers enjoy higher Tobin's Q. This is evidence by positive and statistically significant β_{11} and β_{12}.

Diversifiers performance evolution speed is not related to internal capital market efficiency ($ICME$) or previous diversifying events ($EVENT$). Finally, coefficient on annual improvements in asset-based cost efficiencies (calculated as total assets divided by expenses - $ESP1$) is negative and statistically significant. It implies that speed of improvement in Tobin's Q is reduced with this cost efficiency. Several variations in the model do not change the sign of the coefficients and it causes very minimal changes in the magnitude.

Table 26 – OLS Model on Annual Percentage Differences – Excess Value

Panel A – Excess Value based on Assets Multiplier

I run the following model:

$$\Delta EVTA_{i,t} = a + \beta_1 \Delta ICME_{i,t} + \beta_2 \Delta TRAN + \beta_3 ATC_{i,t} + \beta_4 \Delta ESP_{i,t} + \beta_5 \Delta MP_{i,t} + \beta_6 \Delta SHCA_{i,t} + \beta_7 Size_{i,t} + \beta_8 \Delta Proft_{i,t} + \beta_9 \Delta INVST_{i,t} + \beta_{10} EVENT_{i,t} + \beta_{11} Rel_i + \beta_{12} \Delta DR_i$$

I take annual percentage changes of the independent variables and annual changes in the dependent variable. Not all independence variables are differenced. Size captures the firm size effect and its annual changes are not relevant in this context. Same argument applies to EVENT and relatedness variables.

	Diversification Advantages							Control Variables						
a	$\Delta ICME$	$\Delta Tran$	ATC	$\Delta ESP1$	$\Delta ESP2$	ΔMP	$\Delta SHCA$	$Size$	$\Delta Proft$	$\Delta Invst$	$EVENT$	Rel	ΔDR	R^2
.1424	-.0000	.0000 (*)	-.0177	.0003	-.0014 (**)	.0021 (**)	.0011	-.0309	-.0000	-.0000	.1254	-.0550		.0137
.1236	-.0000	.0001 (*)	-.0225	.0004	-.0015 (**)	.0019 (**)	.0015	-.0356	-.0000	-.0000	.1115		.0858 (*)	.0119
.1379	-.0000		-.0181	-.0003		.0021 (**)	-.0016	-.0277	-.0000	-.0000	.1200	-.0534		.0074
.1506	-.0000		-.0183		-.0012 (**)	.0022 (**)	.0009	-.0326	-.0000	-.0000	.1329	-.0537		.0106
.1274		.0000 (*)	-.0177	-.0003		.0021 (**)	-.0002	-.0248	-.0000	-.0000	.1198	-.0559		.0102
.1402		.0000 (*)	-.0178		-.0012 (**)	.0022 (**)	.0008	-.0298	-.0000	-.0000	.1239	-.0559		.0133

(***) = significant at 1%, (**) = significant at 5%, (*) = significant at 10%

Panel B – Excess Value based on Sales Multiplier

I run the following model:

$$\Delta EVSl_{i,t} = a + \beta_1 \Delta ICME_{i,t} + \beta_2 \Delta TRAN + \beta_3 ATC_{i,t} + \beta_4 \Delta ESP_{i,t} + \beta_5 \Delta MP_{i,t} + \beta_6 \Delta SHCA_{i,t} + \beta_7 Size_{i,t} + \beta_8 \Delta Proft_{i,t} + \beta_9 \Delta INVST_{i,t} + \beta_{10} EVENT_{i,t} + \beta_{11} Rel_i + \beta_{12} \Delta DR_i$$

I take annual percentage changes of the independent variables and annual changes in the dependent variable. Not all independence variables are differenced. Size captures the firm size effect and its annual changes are not relevant in this context. Same argument applies to EVENT and relatedness variables.

	Diversification Advantages							Control Variables						
a	**$\Delta ICME$**	**$\Delta Tran$**	**ATC**	**$\Delta ESP1$**	**$\Delta ESP2$**	**ΔMP**	**$\Delta SHCA$**	**$Size$**	**$\Delta Proft$**	**$\Delta Invst$**	**$EVENT$**	**Rel**	**ΔDR**	**R^2**
-.1241	.0000	-.0000	.0079	-.0010	-.0001	.0060 (*)	.0175	.0038	.0000	-.0000	.0396	.0093		.076
-.1199	.0000	-.0000	.0081	-.0010	-.0001	.0059 (*)	.0174	.0038	.0000	-.0000	.0401		.0854	.0137
-.1286	.0000		.0181	-.0010		.0060 (**)	.0175	.0049	.0000	-.0000	.0395	.0083		.0074
-.1228	.0000		.0087		-.0007	.0061 (*)	.0182	.0020	.0000	-.0000	.0440	.0106		.0059
-.1247		-.0000	.0061	-.0010		.0060 (**)	.0178	.0039	.0000	-.0000	.0376	.0105		.0054
-.1181		-.0000	.0068		-.0007	.0061 (*)	.0185	.0007	.0000	-.0000	.0421	.0129		.0044

(***) = significant at 1%, (**) = significant at 5%, (*) = significant at 10%

OLS annual difference regressions with excess value do not comply much with the results of OLS annual difference regression with Tobin's Q. Only market power seems to have similar impact on speed of value recovery as it has on Tobin's Q i.e. faster improvements in market value contributes to faster improvement in value. Internal capital market activity does have positive impact on the speed of value recovery but its impact is very minimal (β_2 is very small) and limited to excess value based on assets multiplier. Similar to earlier finding with Tobin's Q regression, repeated diversifying events do not make the value recovery process any faster. Relatedness speeds up the value recovery process but the impact is limited to excess value based on assets multiplier and to the ΔDR variable (but not Rel). Internal capital market efficiency, access to capital market, cost efficiencies, and share of common assets do not contribute to the speed of value recovery.

iii. Annual Percentage Differences OLS Regression with interaction variables:

Inclusion of Rel and ΔDR variables in the models above allows for intercept differences only i.e. β_{11} and β_{12} capture the full impact of relatedness on the evolution process (in level regression) and speed of the recovery process (in the annual change regressions). In this section I am interested in different inquiry. I look at the relatedness "incremental" impact on performance and value through financial and strategic advantages[60]. Econometrically, this is done by interacting each advantage variable with the Rel and ΔDR variable and test the significance of interaction variable.

[60] This is equivalent to testing if diversification advantages have differential impact in performance and value between related and unrelated diversifiers.

The null hypothesis here is that the dependent variable (performance or value evolution) follows the same model for related and unrelated diversifiers conditioned on the studied variable V and is tested by the significance of the corresponding coefficient. Positive and statistically significant coefficient implies that the studied variable V have larger impact on related diversifiers' performance and value. In the context of our model, since the independent variables are annual percentage differences and dependent variables are annual changes, larger impact is safely interpreted as faster improvement. The model also tests if all diversification advantages contribute jointly to faster (slower) improvement in related diversifiers performance and value. This is done by testing the joint significance (Wald test) of all coefficients including the coefficient on Rel and ΔDR

The results are reported in the table below,

Table 27 – OLS Model on Annual Differences with Interaction Variables[61]

Panel A - Interaction with Rel

	α	$\Delta ICME$	$Rel.\Delta ICME$	$\Delta TRAN$	$Rel.\Delta TRAN$	ATC	Rel.ATC	$\Delta ESP1$	$Rel.\Delta ESP1$	$\Delta ESP2$	$Rel.\Delta ESP2$	ΔMP	$Rel.\Delta MP$	$\Delta SHCA$	$Rel.\Delta SHCA$	Rel
Tobin's Q	-.1047	.0000	-.0000	-.0000 (*)	.0000 (*)	.0554	.0116	-.0021 (***)	-.0027 (**)	.0001	.0018	.0069 (*)	.0085 (*)	.0311 (**)	-.0137	.0759
Excess Value based on Assets	.0415	.0000	-.0000	-.0000	.0000	.0068	-.0202	.0005	.0001	-.0028 (**)	.0018	.0021	.0014 (*)	.0165	-.0246	.1151
Excess Value based on Total Sales	-.1599	-.0000	.0000	.0000	.0001 (**)	.0230	-.0171	-.0028	-.0023	-.0013	.0026	.0061	.0067	.0211	-.0045	.0408

Panel B - Interaction with ΔDR

	α	$\Delta ICME$	$\Delta DR.\Delta ICME$	$\Delta TRAN$	$\Delta DR.\Delta TRAN$	ATC	$\Delta DR.ATC$	$\Delta ESP1$	$\Delta DR.\Delta ESP1$	$\Delta ESP2$	$\Delta DR.\Delta ESP2$	ΔMP	$\Delta DR.\Delta MP$	$\Delta SHCA$	$\Delta DR.\Delta SHCA$	ΔDR
Tobin's Q	-.0636	.0001	-.0004	-.0000	.0000	.0554	.1217	-.0033 (***)	-.0057 (**)	.0020 (**)	.0042	.0006 (***)	.0132 (***)	.0311 (**)	-.0137	.4840
Excess Value based on Assets	.0863	.0000	-.0000	.0001 (*)		-.0258	-.0927	.0002	.0027	-.0014	.0012	.0008 (***)	.0169 (***)	.0075	.2793 (*)	1.891 (**)
Excess Value based on Total Sales	-.1324	-.0000	.0003	-.0000	.0003	-.0163	.8409	-.0008	-.0143	-.0005	.0135	.0005 (*)	.0121 (*)	.0200	-.0698	.0026

[61] Only diversification and interaction variables coefficients are shown. Control variables are suppressed for clarity of presentation.

The table shows that market power have a positive differential impact on related diversifiers. When market power is interacted with Rel variable, we see that market power has stronger impact on related diversifiers Tobin's Q and excess value (based on assets multiplier). When market power is interacted with ΔDR variable, we notice that market power has stronger impact on related diversifiers Tobin's Q and excess value (based on both assets and sales multipliers). This is not surprising. Market power variable reflects mainly market share. It is quite expected that diversifier who seek merger or acquisitions of units in related industry are more capable to capitalize on increased market share than diversifier who acquire business units from completely different industry. We also note that share of common assets has stronger impact on related diversifiers value (but not Tobin's Q) when it is interacted with ΔDR variable (but not Rel).

VI. Conclusion

The main contribution of this dissertation is tracking diversified companies' performance over several post-event years. The dominant belief in diversification literature is that diversification destroys value (Lang and Stulz, 1994 and Berger and Ofek 1995 and Servaes, 1996) and related diversification is more value constructive than unrelated diversification (Bettis and Mahajan, 1985 and Wernerfelt and Montgomery, 1988 and Berger and Ofeck, 1995). Yet, a small portion of the literature shows evidence of a diversification premium (Hadlock, Ryngaert, and Thomas (2001) and Villalonga, 2004a, b) and the literature, as it currently stands, is not completely conclusive about the impact of diversification strategy on value (Martin and Sayrak, 2003 and Ravichandran, Liu, Han and Hasan, 2009). Anecdotally, diversification has been a popular business strategy over the last 4 decades (Serveas, (1996), Montgomery (1994), and Mukherjee, Kiymaz, & Baker (2004)). Why diversification is such a popular corporate strategy despite the overwhelming evidence supporting the value-erosion hypothesis of diversification and documents negative market reactions to focus-decreasing moves? Possible explanations of the found in literature focus on management self-interest pursuits (Jensen (1986) and Jensen and Murphy (1990), Shleifer and Vishny (1990a,b), Hyland and Diltz (2002) and Aggarwal and Samwick (2003)). Alternatively, I argue that documented discount associated with diversification strategy is an artifact of limited subject-specific time horizon of previous studies. Specifically, I argue that the discount is limited to short period around the diversification event. The literature presents several evidences that diversification strategy carries some financial advantages (internal capital market and access to capital market) and strategic advantages (market power and cost efficiencies).

These advantages are, at least partially, private information at the time of the diversifying event and thus they are not fully priced. Further, these advantages are inherently evolving and are uncertain at the time of diversification, thus the initial discount. Over time, positive consequences materialize, uncertainty diminishes, and the initial discount fades away. Formally, I present and test a hypothesis that diversifiers exchange immediate diversification discount with future value gain attributed to unanticipated financial and strategic advantages of diversification. Two implications of this hypothesis are tested. First, the initial diversification discount found in static methodologies should be attenuated in a dynamic analysis. Second, diversifier's value evolves jointly with the materialization of certain financial and strategic efficiencies.

I construct a unique sample composed of a list of merger/acquisition event collected from SDC (Securities Data Company) in 1998-2008. Then, I use CIS (COMPUSTAT Industry Segment) to track the value and performance of these diversifiers over time. Value is measured by the standard excess value approach of Berger and Ofek (1995) and performance is measured by Tobin's Q used by Lang and Stulz (1994), Servaes (1996) and Steiner (1996). I also track the evolution of strategic and financial efficiencies of the parent company and analyze its dynamic impact on value and performance. Thus, the final sample used in this dissertation includes 1,642 firm-year observations (969 in related events and 673 in unrelated events) from 316 M&A events (185 related events and 131 unrelated events).

I track each diversifier for up to 9 years after diversification. Years 8 and 9 are ignored due to very small number of observations. Depicted trends show that the value recovery momentum continues for up to 5 years form diversifying event. Tobin's Q of unrelated diversifiers declines sharply in years 6 and 7. Excess value based on total assets multiplier and sales multiplier in years 6 and 7 are not significantly different form zero. Nevertheless, due to smaller number of observations in years 6 and 7, I refrain from making a solid generalization of this observation[62].

Consistent with my hypothesis, I find evidence of value recovery (reduction in excess value) in subsequent years after the diversification event and it is accompanied with parallel improvement in performance (increase in Tobin's Q). Diversification discount declines constantly over the first 3 years from event before it turns into a premium in year 4 and continues to improve thereafter. When the test is conditioned on relatedness, I find a noticeable differential in recovery speed between related and unrelated diversifiers. The diversification discount persists for at least one year in related diversifiers and may persist for up to 4 years in unrelated diversifiers. In both cases, however, the initial discount does improve (i.e. decline) steadily over time and eventually it turns into a premium.

Surprisingly, and somehow inconsistent with my hypothesis, value recovery process does not start immediately after the diversifying event. There seem to be an initial decline in value and performance of diversifiers in the year that follows the year of diversification before the recovery process kicks off in year 2. Specifically, Tobin's Q worsens in the in year 1 i.e. one year after the diversification event before it, consistent with my

[62] It is particularly surprising that all three measures of performance and value start to decline at exactly the same time distance from event (i.e. at 6 years). In fact, the curves depicted suggest that diversification impact on value and performance follow a curve that increases initially up to a maximum before it starts to decline again. This suggests that some negative consequences of diversification consummate at some distant point in time and rises sharply thereafter. This possibility is beyond the scope of this dissertation but further investigation might be a fertile research field For researchers interested in investigating this point, it might be fruitful to think of market-related explanations such as product cycle or legal explanations such as taxes

hypothesis, improves gradually starting in year 2. Similarly, there seem to be a "dip" in excess value in first year after the diversifying event. This might be explained as a result of "disturbance" that the diversifying event creates but further research is needed to address this particular observation[63].

I run three different forms of OLS regressions to test the prediction of joint evolution of diversification efficiencies with value and performance: 1) regression with level values 2) regression with annual changes and 3) regression with annual changes interacted with Rel variable and ΔDR variable.

The result of the level OLS regression with Tobin's Q indicates that annual improvements in performance (higher Tobin's Q) are driven by annual improvements in internal capital market activity, market power, and cost efficiencies. When dependent variable in the level OLS regression is excess value, I document positive impact of future improvements in market power and internal capital market activity on excess value based on asset multiplier and positive impact of annual improvements in cost efficiency and internal capital market activity on excess value based on sales multiplier. These findings lend support to the general implication of my hypothesis that future improvements in diversifiers' performance and value are derived by future materialization of financial and strategic advantages.

[63] For interested researchers, a plausible explanation of this trend could be that diversifier's performance declines initially for some administrative and operational reasons. First, management time is spent on closing the deal and attempting to bring the new unit(s) into full harmony with existing ones. Second, the new unit(s) and existing units may be using existing common resources inefficiently before they "learn to work together" as described by Hund, Monk, and Tice (2010). Finally, the diversifying event is a huge transaction that could by itself create disturbance and distraction in operations. Subsequent boost of performance comes after the legal and administrative procedures of the deal are completed and the new unit(s) has come into complete harmony with existing ones and become an inherent part of the new organizational structure.

The results of the annual changes OLS regression reveals that improvements in market power contribute to faster improvement in performance measure (Tobin's Q) and faster value recovery process (excess value). I also find that access to capital market, cost efficiencies and share of common assets contribute to faster improvements in Tobin' Q (but not value). Finally, the regression with annual changes interacted with Rel variable and ΔDR variable indicates that improvements in market power has stronger impact on speed of recovery (of both Tobin's Q and excess value) in related diversifiers relative to unrelated ones.

Several other findings about diversification are reported. 1) Regression analysis confirms earlier findings in this dissertation and in literature that related diversifiers outperforms unrelated ones in and trade at higher value. However, I find that related diversifiers also enjoy faster value recovery process relative to unrelated ones. 2) The structure of my sample allows for controlling for repeated diversifying behavior. I find that subsequent diversifying events contribute to higher Tobin's Q (but not higher value) of diversifier. Further, repeated diversifying behavior does not make the recovery process any faster. 3) I find mixed results on internal capital market efficiency impact. It has negative impact on Tobin's Q an positive impact on value. This is not surprising given mixed evidence in the literature on the impact of internal capital market efficiency. I do find, however, that internal capital market efficiency do not contribute to the speed of value recovery.

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VIII. Appendix A: Literature Review

In the following, I focus on major findings under major topics of corporate diversification. Four distinct topics are presented separately for the purpose of clarity: the value-erosion hypothesis, the value-creation hypothesis, the impact of related vs. unrelated diversification and persistence.

A. Value-erosion Hypothesis of Corporate Diversification

Advocates of the value-erosion hypothesis posit that diversifiers sell at a discount compared to matching pure-plays. The standard methodological approach is to compare the value of multiple-segment firm to the sum of imputed value of its segments (as in Berger and Ofek, 1995) or to compare performance (measured by Tobin's Q) of multiple-segment firms to performance of single-segment firms (as in Lang and Stulz, 1994; Servaes, 1996; and Steiner, 1996). A second methodological approach involves investigation of market reaction by regressing returns on a measure of diversification such as Herfindahl Index (as in Comment and Jarrell, 1995) or by running an abnormal return analysis around divestiture dates (as in Desai and Jain, 1999). The collective evidence presented in those studies shows that diversification is associated with trading at a discount, poorer performance and negative market reaction at announcement date.

Explanations of the value-erosion fall under three major categories: agency, internal market inefficiencies and information asymmetry. Agency-based explanations (as in Denis, Denis and Sarin, 1997, Chen and Steiner, 2000 and Rotemberg and Saloner 1994) advocate exacerbation of free cash flow problem and the inability to motivate managers. The internal capital market hypothesis attributes value-erosion to inefficient resource allocation (as in Lamont, 1997, Rajan, Servaes and Zingales. 2000 and Shin and Stulz, 1998). Finally, information asymmetry-based explanations posit that diversification discount stems from over-investment problems (as in Stulz, 1990, Matsusaka and Nanda, 2002).[64]

In the following two subsections, I explain in detail the above cited evidence and explanations of the value-erosion hypothesis of corporate diversification strategy.

iv. The Evidence of Value-erosion Hypothesis of Corporate Diversification

Lang and Stulz (1994) find a strong evidence of diversification discount and poor performance of diversifying firms. They show that diversified firms have a lower Tobin's Q than comparable portfolios of pure-play firms. They also show that diversification level is negatively related to performance measured by Tobin's Q throughout the 1980s. They conclude that diversified firms are consistently valued less than specialized firms. They note, however, that poor performance of diversifiers may not be attributed mainly to being diversified because diversifiers are likely to perform poorly even before they diversify. They suggest that diversification might be a strategy of seeking external growth after all opportunities of internal growth have been exploited i.e. diversification move is a symptom of overinvestment problem[65]. A seminal paper in the domain of diversification discount is that of Berger and Ofek (1995). They estimate diversification's effect on

[64] Nevertheless, some authors argue that diversification discount arises endogenously because acquired firms are usually discounted before they are purchased (Graham, Lemmon, and Wolf (2002) and Campa and Kedia (2002)). The literature also presents management's self-interest motivations of diversifications grounded in the agency theory such as managements' love for power, entrenchment, prestige and perks (Shleifer and Vishny (1990a,b), Hyland and Diltz (2002) and Aggarwal and Samwick (2003)). These are explained in more details below.

[65] The reasoning supplied here is that mangers diversify because they have excess cash and little investment opportunity inside there firms.

firm’s value by imputing stand-alone values for segments of a diversified firm. Comparing the firm’s imputed value (sum of stand-alone values of its segments) to the firm's actual value implies a 13% to 15% average value loss from diversification during 1986-1991. They also show that profitability of pure-play firms is higher than profitability of comparable segment of a diversified firm. They also find evidence that supports Lang and Stulz’s (1994) suggestion of overinvestment problem. Specifically, they document higher propensity to overinvest in segments of a diversified firm compared to a pure-plays. Servaes (1996) examines samples of firms in three year intervals over the 1961-1976 period when the diversification merger wave started. He compares Tobin’s Q of multiple-segment firms with that of single-segment firms to measure capital markets reaction to diversification. He documents a large diversification discount during the 1960s (during the diversification wave) that declined to zero during the 1970s. Specifically, he finds that the difference between Tobin’s Q of multi-segment firms and Tobin’s Q of single-segment firms is negative and statistically significant in every year of the studied period and declines from -0.4 in 1961 to -0.04 in 1976. He also finds results that contradict with Lang and Stulz’s (1994) suggestion of underperformance before diversifying. Specifically, he finds that firms have low valuation because they are diversified not because poorly performing firms decide to diversify. Steiner (1996) incorporates ownership structure and diversification into the same model of Tobin’s Q. Using data from 1992, he finds that Tobin’s Q is negatively related to the level of diversification which is consistent with the value-erosion hypothesis of diversification[66].

[66] It has been shown also that diversification discount is not a US-specific phenomenon but might be a

Market reaction analysis studies also support value-erosion hypothesis of diversification because the market seems to react favorably to increases in corporate focus. Comment and Jarrell (1995) find that shareholder returns increase with focus. Using the revenue-based Herfindahl Index, they find that an increase in focus of 0.1 is associated with an additional stock return of 4.3%. Similarly, using the asset-based Herfindahl Index, they find that an increase in focus of 0.1 is associated with an additional stock return of 3.5%. Desai and Jain (1999) use a sample of 155 spinoffs between the years 1975 and 1991 and find that the announcement period as well the long-run abnormal returns for the focus-increasing spinoffs are significantly larger than the corresponding abnormal returns for the non-focus-increasing spinoffs.

v. *Possible Explanations of Value-erosion Hypothesis of Corporate Diversification*

Probably the simplest and most intuitive explanation of the diversification discount is that corporate diversification runs against one of the most-celebrated concepts in economics that specialization is more productive (Matsusaka, 2001). Three other possible explanations for the cross-sectional diversification discount are found in literature. The first explanation is grounded in the agency problems arguments set forth by Jensen and Meckling (1976) and Jensen (1986). Stulz (1990) shows that diversification allows firms to set up an internal capital market where cash flows are pooled and re-allocated among divisions. This, however, might trigger a free cash flow problem (i.e. over-investment problem suggested by Jensen, 1986) or exacerbate an existing one. Rotemberg and

developed-markets-specific phenomenon. Lin and Servaes (1999) examine a large sample of firms in Germany, Japan, and the United Kingdom. They find significant diversification discount of 10% in Japan and 15% in UK but no significant diversification discount in Germany. Lin and Servaes (2002) use a sample of over 1,000 firms form seven emerging markets in 1995 and find that diversified firms trade at a 7% discount. Fauver, Houston and Naranjo (2004) examine across 35 countries and find that diversification discount is more likely to occur in high income and common law economies.

Saloner (1994) show that diversified firms are less powerful in combating agency-related symptoms because diversification precludes offering incentives to motivate managers. Denis, Denis and Sarin (1997) also provide evidence consistent with agency cost explanation of corporate diversification discount. They find that focus-increasing strategies are triggered by external corporate control threats, financial distress, and management turnover and conclude that agency problems are responsible for firms maintaining value-reducing diversification strategies. Chen and Steiner (2000) advocate that diversification exacerbates agency problems such as excess discretionary cash flow. They find that the level of excess discretionary funds in the firm is a significant and positive determinant of the level of diversification.

The second explanation of the diversification discount advocates <u>inefficient allocation of resources</u> by the internal capital market. Meyer, Milgrom, and Roberts (1992) asserts that internally-generated funds are likely to be used in the cross-subsidization of failing business segments. They argue that a stand-alone unit can reach a minimum value of zero while a cross-subsidized unit can have a negative value because it is negative value is absorbed by other units in the conglomerate. Lamont (1997) focuses on the oil companies' non-oil segments during the 1986 oil shock (oil prices fell by 50%). He finds correlation between oil cash flow and non-oil investments and suggested that this is because large diversified companies overinvest in and subsidize underperforming segments. Rajan, Servaes and Zingales (2000) also find evidence of inefficient allocation of resources. They model the internal power struggles for resources in diversified firms (in a sense, this is also an agency-based problem). The model predicts that increased diversification causes resources to flow toward the most inefficient division. They test the model with US data from 1980 to 1993 and find evidence consistent with model predictions of inefficient allocation of resources in diversified firms. Similarly, Scharfstien and Stein (2000) show how rent-seeking behavior of divisions managers could lessen the efficiency of internal capital market. Shin and Stulz (1998) use segment information from Compustat and find evidence consistent with the inefficient internal capital market hypothesis. They find no evidence that the internal capital market protects the investment budgets of good segments in cases of adverse cash flow shocks. At the same time, however, a segment's investment is affected by the cash flow shortfall of the firm regardless of the value of its investment opportunities. They conclude that investment by a segment is more sensitive to its own cash flow than it is to firm cash flow. In effect, resources eventually flow toward inefficient divisions[67].

The third explanation of diversification discount is based on internal and external information asymmetry. Myerson (1982) and Harris, Kriebel, and Raviv (1982) suggest that conglomerates are more likely to incur costs of information asymmetry between central management and divisional management. CEOs of major companies such as Robert Allen of AT&T and Dennis Pickard of Raytheon expressed their belief that the market better understand strategies of stand-alone units and, thus, gives them higher valuation (see quotations in Krishnaswami and Subramanian, 1999). Stulz (1990) shows that in presence of information asymmetry internal capital market exacerbates free cash flow problem and this reduces the value of diversifiers. Matsusaka and Nanda (2002) show that increased information asymmetry between managers and owners results in over-investment and misallocation of resources. Information asymmetry problem is also

[67] Siddiqi and Warganegara (2003) also report evidence that spin-offs reduce capital mis-allocations.

acute in the related literature of corporate spin-offs, carve-outs, and targeted stock offerings. Nanda and Narayanan (1999) find that transparency improves following a breakup of a conglomerate into several focused units. Krishnaswami and Subramanian (1999) demonstrate that spin-offs enhance value because they mitigates information asymmetry in diversified firms.

Some authors find evidence that diversification discount arises endogenously i.e. diversification discount exists not because diversification is a bad strategy per se, rather, because acquirers tend to purchase already discounted business units. For instance, Graham, Lemmon, and Wolf (2002) find evidence that acquired firms sell at a discount before they are purchased. Campa and Kedia (2002) also find evidence in support of the endogenous diversification discount effect. This explanation fits well with the hypothesis addressed in this dissertation. Managers may acquire undervalued business units, and accept the initial negative market reaction, hoping that harmony and synergy between the new unit(s) and the existing one(s) would reverse the discount in the future.

B. Value-creation Hypothesis of Corporate Diversification

There is much less evidence of the value-creation hypothesis of diversification. The fundamental argument presented is by Villalonga (2004a, b) who documents a diversification premium and shows that diversification discount is an artifact of data used. Similarly, evidence of positive market reaction to diversification announcements (as in Hadlock, Ryngaert, and Thomas, 2001) is limited compared to evidence of negative reaction. The most prominent explanation for value-creation is efficient internal capital market.[68] The following section list major evidences of the value-creation hypothesis of corporate diversification.

The evidence on diversification premium is very limited compared to that on diversification discount. The most prominent work in this domain is that of Villalonga (2004a, b). She shows that that diversification discount is an artifact of data used. She uses unit-level rather than segment-level data and documents a diversification premium. Villalonga (2004a) uses causal inference techniques to examine diversification impact on value. First, she uses the matching estimators of Dehejia and Wahba (1999, 2001) and Abadie and Imbens (2002) to match diversifiers and pure-play firms on their diversification propensity score (the predicted values from a probit model of the propensity to diversify). Second, she uses Heckman's (1979) two-stage estimator to compare value across diversifiers to pure-plays. Both methodologies render insignificant OLS effect i.e. no difference in value between diversifiers and pure-plays. She concludes that corporate diversification does not destroy value. Villalonga (2004b), goes on to show that the diversification discount found in earlier work might be an artifact of the data used. She uses a sample from Business Information Tracking Series (BITS) which is a census database that covers the whole U.S. economy at the establishment level. She argues that this data allows for better comparison across firms because business units are more consistently and objectively defined than segments. Using this data on a sample that

[68] Note that some advantages and disadvantages of diversification share the same theoretical ground. For instance, internal capital market allows easier access to capital (advantage) but also exacerbates agency-related free cash flow problem (disadvantage).

yields a diversification discount according to segment data, she finds evidence of large and statistically significant diversification premium.[69]

C. Related vs. Unrelated Diversifications

Not all acquisitions lead to diversification. Acquisitions lead to extreme diversification when occurring across different industries. Acquisitions lead to minimal diversification when firms acquire a close competitor from the same industry. Broadly speaking, related diversification refers to the case where acquired unit belong to the same, or very similar, industry as the acquirer (i.e. related or intra-industry diversification) or to a completely different industry (i.e. unrelated or inter-industry diversification). The predominant belief is that related diversifications are more constructive than unrelated ones (Bettis and Mahajan, 1985 and Wernerfelt and Montgomery, 1988 and Berger and Ofeck, 1995) because the former leverages significant business synergies while the latter suffers from agency costs and inefficient resource allocation. Nevertheless, while many authors controlled for relatedness effect and document superiority of related diversification, we still have very little evidence on the cause-effect aspects of this phenomenon.

Lewellen (1971) noted that strategic advantages of a merger are more likely to materialize in intra-industry mergers (i.e. related diversifications). Rumelt's (1974) work is considered to be pioneering in this area. It is the first research effort that empirically distinguished between related and unrelated diversification. He establishes nine categories of diversification based on the level of relatedness and finds that related

[69] Hadlock, Ryngaert, and Thomas (2001) examine the effect of corporate diversification on the equity issue process. Using a sample of 641equity issues in the 1983-94 period, they show that the market views equity issues by diversified firms less negatively than equity issues by focused firms.

diversifiers generally tend to outperform unrelated diversifiers. Further, he shows that narrowly focused (related-constrained) diversification are more profitable than the broadly focused (related-linked) diversification. Bettis and Mahajan (1985) investigate the risk-return tradeoff in profits for 80 related and unrelated diversifiers and find that related diversifiers outperform unrelated diversifiers on average. Wernerfelt and Montgomery (1988) use Tobin's Q as a measure of performance and find that narrowly diversified firms do better than widely diversified ones. Berger and Ofeck (1995) compare the sum of imputed stand-alone values to the firm's actual value and find that value loss is smaller when the segments of the diversified firm are in the same two-digit SIC code.

D. Evolution of the Impact of Diversification

Evolution of the impact of diversification is an important sub-topic of corporate diversification that has received very little attention. Therefore, the results presented on this topic are very limited and inconclusive. Hyland (2003) finds evidence of a drop in Tobin's Q in the first year after diversification compared to three years prior to diversification. Agrawal, Jaffe, and Mandelker (1992) use a large sample of mergers between NYSE acquirers and NYSE/AMEX targets. They find a statistically significant two-year post-merger CAAR of -0.0494 and five-year post-merger CAAR of -0.1026 that persists even after controlling for size, book-to-market ratio, and beta. They conclude that shareholders of acquiring firms suffer a value loss of about 5% during the two-year post-merger period and 10% during the five-year post-merger period. More importantly, they suggest that the market may adjust slowly to news of mergers. This finding supports my hypothesis that "strategic" advantages of diversification are not immediately priced but rather materialize gradually over time. Recently, Hund, Monk, and Tice (2010) use Pástor and Veronesi's (2003) rational learning model to show that the initial adverse effect of diversification is mitigated over time as the conglomerate segments "learn" to work together.

IX. VITA

Yasser Alhenawi was born in Damascus, Syria in 1977. He received his B.Sc. in Electrical Engineering from Damascus University (Damascus – Syria) in 1999. He received a Master of Business Administration in 2004 from Emporia State University (Emporia KS – USA) and a Master of Science in Financial Economics in 2009 from the University of New Orleans (New Orleans LA - USA). He received his PhD in Financial Economics in 2010 from the University of New Orleans (New Orleans LA - USA).