ESSAYS ON CORPORATE CAPITAL STRUCTURE AND CASH HOLDINGS

A thesis submitted to the University of Manchester for the Degree of Doctor of Philosophy in the Faculty of Humanities

2012

NGUYEN MANH CUONG

MANCHESTER BUSINESS SCHOOL
UNIVERSITY OF MANCHESTER

Table of Contents

Word count: 41,126

List of Tables

Abstract

The University of Manchester

Nguyen Manh Cuong

The Degree of Doctor of Philosophy in the Faculty of Humanities

Thesis Title: Essays on Corporate Capital Structure and Cash Holdings

July 2012

In this thesis, I examine several important aspects of firms' financing processes in the G-5 countries consisting of France, Germany, Japan, the UK, and the US.

First, I investigate the asymmetry in firms' partial adjustments toward their target leverage, conditional on deviations from target leverage and financing gaps. Using the system Generalized Method of Moments, I show that the asymmetry in firms' leverage adjustments are driven by differences in these factors. Firms adjust toward their target leverage faster when being over-levered and/or facing a financing deficit, a behavior in strong support of the dynamic trade-off theory of corporate leverage.

Second, I examine whether firms' choices of securities enable them to close out deviations from target leverage through asymmetric, logistic models that take into account both total costs of leverage adjustments (as proposed by the trade-off theory) and costs of adverse selection (as proposed by the pecking-order theory). The results suggest that even when firms' choices of securities reflect their target adjustments as they allow them to move closer toward their target leverage, costs of adverse selection may still have some influence on these choices.

Finally, I develop asymmetric, partial adjustment models to examine firms' cash holdings adjustments. Consistent with the optimal cash holdings view, I find that firms have optimal levels of cash holdings and attempt to adjust toward these over time. Further, there is asymmetry in both their speeds and mechanisms of adjustments. Firms with above-target cash holdings adjust toward their targets faster than those with below-target cash holdings as their mechanisms of adjustments may involve relatively lower costs. They adjust mainly via changes in cash flows from financing and cash flows from investing while their counterparts adjust mainly via changes in cash flows from operating. I also document some evidence on the asymmetric impact of the magnitude of deviations from target cash holdings and factors which proxy for the levels of financial constraints on firms' cash holdings adjustments and find that the impact of these proxies tends to be weaker than that of deviations from target cash holdings.

Declaration

No portion of the work referred to this thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institution of learning.

Copyright and the Ownership of Intellectual Property Rights

Acknowledgements

This thesis would not have been possible without the guidance and help of several people.

First and foremost, I would like to thank my supervisors, Dr. Viet Dang and Professor Ian Garrett for their guidance, motivation, and support during the entire research process. Earlier versions of chapters 2, 3, and 4 form the basis of three joint working papers with them.

I would like to thank my committee members, especially Professor Norman Strong, Professor Martin Walker, and Dr. Arif Khurshed for their insightful comments.

I would like to thank the participants at the Financial Management Association (FMA) Asian Meeting 2011, the European Financial Management Association (EFMA) Annual Conference 2011, and the FMA Annual Meeting 2011 for their helpful comments and suggestions on earlier drafts of Chapter 2.

I would like to thank Manchester Business School for the generous financial support through the Doctoral Studentship Scheme.

Finally, I would like to thank my family, friends, and colleagues for their love, encouragement, and support at all times.

Dedication

I dedicate this thesis to my beloved family.

Chapter 1: Introduction

1.1. The Purpose of the Thesis

Since the influential seminal work of Modigliani and Miller (1958), the literature on corporate capital structure has expanded substantially with competing theories trying to shed light on firms' debt-equity mixes. Much of the research on this area focuses on testing the implications of the two dominant views of capital structure - the trade-off and pecking-order theories. The former view suggests firms have optimal levels of leverage that would balance between the costs and benefits of debt financing and adjust toward these over time (e.g., Ozkan (2001); Fama and French (2002); Flannery and Rangan (2006); Lemmon, Roberts and Zender (2008); Huang and Ritter (2009); among others). The latter theory, however, argues that firms do not have any optimal levels of leverage but follow a financing hierarchy that enables them to minimize costs of adverse selection associated with information asymmetries that incur when they visit capital markets (Myers and Majluf (1984)). Borrowing the main arguments of these two theories, the strand of research on corporate cash holdings seeks to explain firms' cash holdings decisions through frameworks that also consider relevant costs related to the partial adjustments in their cash balances. This thesis aims to expand the knowledge on these two important financial processes.

In this thesis I examine several aspects of firms' policies on leverage and cash holdings in the G-5 countries (France, Germany, Japan, the UK, and the US). First, in Chapter 2, I test the predictions of the trade-off theory i.e., whether firms have target leverage and how they adjust toward it over time through asymmetric, partial adjustment models that take into account costs of deviations from target leverage and costs of adjustments with a focus on the asymmetry in their adjustments. Second, in Chapter 3, I investigate how firms' choices between debt and equity securities may be shaped, arguing that even when firms have target leverage and attempt to adjust toward it over time, costs of adverse selection associated with information asymmetries proposed by the pecking-order theory may still have some influence these choices. Finally, in Chapter 4, I borrow the main arguments of the trade-off theory in corporate capital structure to examine firms' cash holdings behaviors. Specifically, I examine whether firms have target cash holdings and attempt to adjust toward these over time, explicitly concentrating on the asymmetry in both their speeds of adjustments and mechanisms of adjustments.

Overall, the results show that firms' leverage and cash holdings behaviors may be best explained by the trade-off view even when relevant factors proposed by the other competing views may matter. My study mainly focuses on testing the implications of the trade-off theory for two reasons. First, recent studies on capital structure on balance tend to lend relatively more support to this view (e.g., Fama and French (2005), Leary and Roberts (2005), Flannery and Rangan (2006), Byoun (2008), Lemmon et al. (2008), Huang and Ritter (2009), among others). Second, dynamic empirical models used to test the dynamic trade-off theory, by considering total costs of adjustments (costs of deviations from target leverage and costs of adjustments), may allow the predictions of other competing theories to be simultaneously considered. For instance, costs of adverse selection proposed by the pecking-order theory in some sense may be viewed as the implicit component of costs of adjustments. Higher costs of adverse selection associated with equity financing may drive firms' preference for debt financing when in need of external financing.

1.2. A Review of Dominant Theories of Capital Structure and Cash Holdings

This section presents a brief overview of the major theories of corporate leverage and cash holdings i.e., the trade-off and pecking-order theories of corporate leverage, the market timing hypothesis and the managerial inertia of corporate leverage, the optimal cash holdings view, the financing hierarchy view of corporate cash holdings, and the major motives of cash holdings.

1.2.1. Theories of Capital Structure

The theories of corporate capital structure can be traced back to the influential seminal work of Modigliani and Miller (1958). The authors' irrelevance theorem suggests that under certain conditions, firms' values are unaffected by how they are financed. Since then, subsequent theories try to relax their strict and unrealistic assumptions to shed light on firms' debt-equity mixes. In what follows I briefly discuss the irrelevance theorem and major subsequent competing theories.

The irrelevance theorem. This theorem is proposed based on the assumptions of perfect capital markets; fixed investment policy; and no taxes, transaction costs, bankruptcy costs, agency costs, and asymmetric information. Under these assumptions, firms' values are unaffected by their financing decisions. In other words, firms are indifferent between debt and equity since their choices between these two securities do not have any impact on their values. This theorem then leads to the development of subsequent theories on corporate capital structure which relax some of its assumptions.

The trade-off theory of capital structure. Following the irrelevance theorem, there have been two main trade-off strands of research on corporate leverage including (1) theoretical models based on taxes and costs of bankruptcy and (2) theoretical models based on agency costs. The first strand is developed through the relaxation of the irrelevance theorem's assumption of no taxes and bankruptcy costs. Taking into account corporate taxes but ignoring personal taxes, Modigliani and Miller (1963) show that the market value of a leveraged firm is equal to the market value of an unleveraged firm plus the present value of the tax savings on interest payments, suggesting firms' optimal capital structures should include 100% of debt.

What has been missing in Modigliani and Miller (1963) is that the more levered firms are, the more likely they are to fail to meet their debt obligations and hence be forced into bankruptcy. Kraus and Litzenberger (1973) are the first in the literature to consider potential bankruptcy costs associated with debt financing. The authors determine firms' optimal levels of leverage by balancing between the present values of their tax savings from interest payments and bankruptcy costs. However, similar to Modigliani and Miller (1963), they remain silent on the impact of personal taxes on firms' financing decisions.

The impact of personal taxes on firms' financing decisions is initially discussed by Miller (1977). The author argues that the presence of personal taxes may reduce the tax benefit of debt financing. Firms may be either indifferent between debt and equity financing or prefer one to another depending on their investors' tax considerations. The study, however, does not consider bankruptcy costs of debt financing and unrealistically assumes a same effective corporate tax rate across firms.

Allowing firms' effective tax rates to vary contingent on their tax savings sources including depreciation, investment tax credits, tax allowances on research and development expenses, among others, DeAngelo and Masulis (1980) show that firms' leverage is negatively related to their non-debt tax shields which reduce the tax benefits of debt financing. Further, they find that firms' optimal leverage occurs at the point where the marginal expected benefits of the interest tax shields are equal to the marginal expected costs of bankruptcy.

The agency cost strand relaxes the irrelevance theorem's assumption of no agency costs and focuses on how firms determine their optimal capital structures through minimizing potential costs associated with conflicts of interest among different parties that have claims to their resources i.e., managers, equity holders, and debt holders (Jensen and Meckling (1976)). In particular, through their financing decisions, firms wish to minimize two kinds of costs - agency costs of equity arising from the conflict between firms' managers and shareholders and agency costs of debt arising from the conflict between their shareholders and debt holders.

There are several sources of conflict between firms' managers and shareholders due to the separation between ownership and management. First, as managers do not own 100% of their firms, they may act to maximize their own utility i.e., managerial perquisites rather than shareholders' wealth, thus causing their firms' values to decrease (Jensen and Meckling (1976)). The second source of conflict has been usually referred to as the free cash flow problem (Jensen (1986)). This hypothesis holds that managers of cash-rich firms would rather retain their firms' free cash and invest it in negative net present value (*NPV*) projects than distribute to shareholders. To mitigate this problem, Jensen (1986) suggests these firms should use debt as a device to discipline their managers. Third, according to Harris and Raviv (1991), managers tend to be unwilling to liquidate their firms even if that is the best option for shareholders. To protect themselves, shareholders take advantage of the informational role of debt financing to monitor their managers and force them to make efficient liquidation decisions. Finally, the manager-shareholder conflict may arise from managerial discretion i.e., managers' incentives to either over-invest or under-invest (Stulz (1990)). Stulz shows that debt financing may help mitigate the over-investment problem while equity financing may help alleviate the under-investment problem. Firms' optimal capital structures therefore can be derived by balancing between costs associated with these two problems.

With regard to the sources of conflict between debt holders and equity holders, the general consensus in the literature is that agency costs of debt financing arise as shareholders and bondholders may have different incentives. First, the asset substitution problem suggests that shareholders are likely to undertake projects with excessive risk due to the presence of limited downside losses but unlimited upside gains at the expense of debt holders (Jensen and Meckling (1976)). Second, Myers (1977) shows that high-growth firms may reject positive *NPV* projects since shareholders may have to bear the full costs associated with these while the returns may be grasped mainly by debt holders, implying these firms should be better financed with equity. Finally, conflicts between shareholders and bondholders are likely to arise from dividend payments and claim dilution (Smith and Warner (1979)). In particular, dividend payments may both increase agency costs of debt since they leave bondholders of financially distressed firms with worthless claims and reduce agency costs of equity financing since they may leave managers with less free cash to overinvest. Meanwhile, additional debt issues mean that existing debt holders need to share firms' assets with a larger pool of claimants in case of liquidation, which then may cause a fall in the value of their claims.

Subsequent research has borrowed the main ideas of the above two strands i.e., theoretical models based on taxes and costs of bankruptcy and models based on agency costs to explain firms' financing decisions. Bradley, Jarrell, and Kim (1984) provide a standard presentation of the static trade-off theory - a single-period static trade-off model, showing that firms' optimal capital structures happen at the point where the marginal tax benefits of debt financing are equal to its marginal costs of financial distress. The theory hence predicts a negative relation between firms' leverage and costs of financial distress, non-debt tax shields, bondholders' marginal tax rates, and earnings volatility but a positive relation between leverage and shareholders' marginal tax rates (see Frank and Goyal (2008) and Graham and Leary (2011) for a complete review).

What has remained uncovered by the static trade-off theory is the presence of costs of adjustments which may discourage firms to undertake continuous adjustments to move toward their target leverage (Myers (1984)). Fischer, Heinkel, and Zechner (1989) are the first in the literature to provide a standard presentation of the dynamic trade-off theory. Allowing transaction costs to be considered and firms' leverage to vary over time, the authors show that firms cannot recapitalize on a continuous basis and the presence of sufficient retained earnings, costs of bankruptcy, and negative equity values gives them a convenient time to recapitalize. After Fischer et al. (1989), there have been several other attempts to explain firms' financing decisions from a dynamic point of view (e.g., the dynamic model with callable bonds of Golstein, Ju, and Leland (2001); the dynamic trade-off model with endogenous choice of leverage, earnings distributions, and real investments of Hennessy and Whited (2005); the state-contingent dynamic trade-off model of Strebulaev (2007); among others).

Most recent empirical research in favor of the dynamic trade-off strand focuses on firms' partial adjustments toward their target leverage (e.g., Ozkan (2001), Fama and French (2002), Flannery and Rangan (2006), Lemmon et al. (2008), Huang and Ritter (2009), among others). These studies show that in the presence of costs of adjustments, firms undertake partial adjustments to achieve their targets. Byoun (2008) further document that firms are likely to adjust in an asymmetric, partial manner since both costs of deviations from target leverage and costs of adjustments may vary across firms depending on whether they are over-levered relative to their target leverage or under-levered relative to their target leverage.

The pecking-order theory of capital structure. This theory is developed by relaxing the irrelevance theorem's assumption of no asymmetric information. The concept of asymmetric information can be traced back to the work of Akerlof (1970). According to the author, the presence of asymmetric information i.e., customers have little or no idea about the quality of a product may lead to their willingness to pay just an average price for it. Since this price is only attractive to providers of low quality products, the market will be gradually dominated by these providers and providers of high quality products will be eventually driven out of the market.

Borrowing the argument of Akerlof (1970), Myers and Majluf (1984) develop a pecking order of corporate leverage which suggests that (1) equity (debt) issues may have a negative (positive) impact on firms' values; (2) firms' leverage may be inversely related to their profitability; and (3) firms would rather visit the debt market than the equity market when in need of external financing. Myers (1984) then proposes a financing hierarchy in which internal financing i.e., retained earnings is preferred to external financing and debt financing is preferred to equity financing. Different from trade-off models, the pecking-order framework suggests no optimal level of leverage. Firms' leverage is the function of their retained earnings and investment decisions.

The pecking-order theory has been empirically tested by Shyam-Sunder and Myers (1999), Fama and French (2002), Frank and Goyal (2003), Fama and French (2005), among others. Using a limited sample, Shyam-Sunder and Myers (1999) show that firms' net debt issues can be effectively explained by their financing deficit, a finding in strong support of the financing hierarchy view. Fama and French (2002), find that firms' leverage and profitability are inversely related, which is also consistent with the prediction of the theory. The authors, however, realize that small, lowly-levered, and high-growth firms tend to depend heavily on equity financing, a finding in contrast to the argument. Latter, Frank and Goyal (2003) show that the evidence in favor of the pecking-order theory documented by Shyam-Sunder and Myers (1999) may be driven by their sample selection bias i.e., a small sample size that only includes mature and large firms. Using a large sample of US public firms, they find that the pecking-order view fails to explain firms' financing behaviors on a broad scale. Fama and French

(2005) also find evidence inconsistent with the prediction of the theory. More than half of their sample firms issue equity with large amounts during the 1973-2002 period.

The market timing hypothesis of capital structure. Assuming that the market is inefficient, Baker and Wurgler (2002) show that firms' capital structures are the cumulative results of their managers' past attempts to time the equity market. This strand of research therefore suggests that firms' current financing decisions may be best explained by their past market valuations.

Empirical research in support of the market timing hypothesis consists of Taggart (1997) (firms' preference for debt financing in the presence of depressed stock markets); Marsh (1982) (firms' choices between debt and equity contingent on market conditions and historical security prices); Korajczyk, Lucas, and McDonald (1992) and Hovakimian, Optler, and Titman (2001) (firms' seasoned equity offering during times of high market valuations); Baker and Wurgler (2002) (firms' motivation to issue over-valued equity); Korajczyk and Levy (2003) (financially unconstrained firms' choices between debt and equity contingent on suitable macroeconomic conditions); and Hovakimian (2004) (a positive relation between stock returns and the probability of equity issues). Leary and Roberts (2005), Alti (2006), and Hovakimian (2006), however, find that the impact of equity market timing tends to be short-lived. Flannery and Rangan (2006) show that the hypothesis can explain a very small proportion of firms' changes in leverage (about 10%).

The managerial inertia. Contrary to the trade-off and pecking-order theories and the market timing hypothesis, Welch (2004) argues that firms' managers are inactive and their leverage changes in accordance with stock prices. For example, following an increase in stock prices, firms' leverage may drop due to inflated market valuations. This argument arises from the author's empirical observation that firms' leverage in the current accounting period is determined by their historical stock returns.

The empirical support for the managerial inertia so far has been limited. Frank and Goyal (2004) show that firms' managers are not inactive as they respond to equity value shocks by undertaking offsetting actions in the debt market. Strebulaev (2007) reports findings similar to Welch (2004) but argues that these findings can be better explained by a dynamic trade-off model with insignificant costs of adjustments.

Overall, since the irrelevance theorem of Modigliani and Miller (1958), the literature on corporate leverage has expanded substantially with four major research strands. In this thesis, I test the predictions of the trade-off theory in Chapter 2 and the predictions of the trade-off and pecking-order theories in Chapter 3. In Chapter 4, I borrow the argument of the trade-off theory of corporate leverage to explain firms' cash holdings adjustments.

1.2.2. Theories of Cash Holdings

The literature on corporate cash holdings has evolved with frameworks largely similar to those in the area of corporate leverage. Therefore, in this subsection I only present a brief discussion on the main motives of cash holdings and the optimal cash holdings and financing hierarchy views.

The motives of cash holdings. The literature on corporate cash holdings has identified four major motives for firms to hoard cash. These include the transaction motive, the precautionary motive, the tax motive, and the agency motive. The first motive holds that firms' demand for cash is determined by the level of transaction costs that incur when they convert cash substitutes into cash (Baumol (1952), Miller and Orr (1966), and Mulligan (1997)). Large firms therefore may be found hoarding less cash than small firms for they are more likely to experience economies of scale with cash conversion transactions.

According to the precautionary motive, firms hold cash to avoid any impacts from adverse cash flow shocks in the presence of costly access to capital markets, suggesting a positive relation between firms' cash holdings and the levels of their cash flow volatility and growth opportunities (Opler, Pinkowitz, Stulz, and Williamson (1999); Almeida, Campello, and Weisbach (2004); and Han and Qiu (2007)).

The tax motive of cash holdings holds that firms may incur tax consequences when repatriating their foreign earnings (Foley, Hartzell, Titman, and Twite (2007)). Hence, to avoid these tax consequences, firms, especially multinational firms, should hold more cash. Finally, the agency motive of corporate cash holdings suggests that firms' managers would rather retain their free cash and invest it in negative *NPV* projects than distribute it to shareholders, indicating a positive relation between cash holdings and agency problems.

The optimal cash holdings view. Similar to the trade-off theory in corporate leverage, the optimal cash holdings view holds that firms determine their optimal levels of cash holdings by balancing between the costs and benefits of holding cash (Kim, Mauer, and Sherman (1998); Opler et al. (1999); Ozkan and Ozkan (2004); Dittmar and Duchin (2010); Venkiteshwaran (2011); among others). Normal costs of holding cash may be in the forms of (1) opportunity costs arising from holding low-return assets; (2) the increase in marginal tax rates; (3) agency costs associated with managerial discretion i.e., the free cash flow problem; and (4) informational costs i.e., the increase in firms' costs of capital caused by a strong signal of overvaluation associated with a stock issue when investors know that firms do not have to issue stock to invest (Gao, 2011). However, by holding sufficient amounts of cash, firms can save significant transaction costs associated with the conversion of cash substitutes into cash and a variety of costs that incur when they have to visit capital markets during times of a cash shortage. In addition, cash-adequate firms are less likely to forgo positive *NPV* investment projects.

Further, in line with the research strand on firms' partial adjustments in corporate leverage, these above studies show that due to the presence of costs of adjustments, firms do not adjust continuously toward their target cash holdings. Recent developments in the area also document the asymmetry in firms' cash holdings partial adjustments i.e., their speeds of adjustments may vary conditional on whether they have above- or below-target cash holdings (Dittmar and Duchin (2010), and Venkiteshwaran (2011)).

The financing hierarchy view of cash holdings. Contrary to the optimal cash holdings view, this view suggests no optimal level of cash holdings and information asymmetries may make external financing become expensive i.e., firms are unresponsive to changes in their cash balances (Myers and Majluf (1984)). Firms' cash balances are therefore determined solely by their cash availability and investment decisions, implying a positive relation between their cash holdings and cash flows but a negative relation between these and capital expenditures and research and development expenses.

Most empirical research on corporate cash holdings tends to be in support of the optimal cash holdings view (Kim et al. (1998), Opler et al. (1999), Ozkan and Ozkan (2004), Dittmar and Duchin (2010), Venkiteshwaran (2011), among others). These studies show that firms have target cash holdings and adjust toward these over time although the presence of costs of adjustments may prevent them from undertaking continuous adjustments.

1.3. Research Questions and Contributions

Prior empirical studies on corporate leverage and cash holdings have suggested several gaps in the literature on these two areas which motivate my research. First, most prior studies tend to assume firms adjust toward their target leverage at a homogenous rate (e.g., Fama and French (2002), Flannery and Rangan (2006), Antoniou, Guney, and Paudyal (2008), Lemmon et al. (2008), and Huang and Ritter (2009)), which is a strong assumption as firms are likely to face different levels of costs of deviations from target leverage and costs of adjustments depending on whether they are over-levered or under-levered (Byoun (2008)). I hence develop asymmetric, partial adjustment models that allow firms' speeds of adjustments to vary in relation with costs of deviations from targets and costs of adjustments. My models also allow the impact of firms' financing imbalances on their leverage adjustments to be considered. Faulkender, Flannery, Hankins, and Smith (2012) suggest firms' leverage adjustments may be affected by their financing imbalances, which provide them with a chance to adjust at low incremental costs as costs of adjustments can now be "shared" with transaction costs that incur when firms visit capital markets to offset their large financing imbalances.

Second, recent international studies show that the financial orientation of the economy in which firms operate may determine the sources of financing available to them and hence their capital structures (e.g., Antoniou et al. (2008); Mahajan and Tartaroglu (2008); and de Jong, Kabir, and Nguyen (2008)). Although previous studies (e.g., Antoniou et al. (2008), and Öztekin and Flannery (2012)) have examined how firms' leverage adjustments may be shaped by the institutional, legal and financial environment in which they operate, they largely focus on how speeds of adjustments may vary across countries but not among firms within a same country, which is the focus of this study.

In brief, in Chapter 2, I address these above gaps and examine how firms' leverage adjustments may vary with their deviations from target leverage and financing gaps using international data.

In Chapter 3, I examine firms' choices of securities using asymmetric, logistic models that can not only test the predictions of the trade-off theory but also those of its "close mate" - the pecking-order theory on these choices. Myers (2001) and Byoun (2008) have shown the necessity to consider both costs of adverse selection associated with information asymmetries proposed by the pecking-order view and total costs of leverage adjustments (costs of deviations from target leverage and costs of leverage adjustments) suggested by the trade-off argument in examining firms' financing decisions. However, our knowledge on how firms adjust toward their target leverage through their choices of securities so far has been still limited.

Prior research on firms' choices of securities tends to test the predictions of either the trade-off or pecking-order theories. In support of the trade-off view, Hovakimian et al. (2001) show that firms' choices between debt and equity securities reflect their target adjustments for when they are visiting capital markets, these choices allow them to close out deviations from target leverage. Similarly, Hovakimian (2004) finds that firms' debt retirements may enable them to reduce deviations from targets. However, in favor of the pecking-order view, allowing their debt capacities to vary, Leary and Roberts (2010) show that costs of adverse selection associated with information asymmetries can explain about 80% of firms' observed debt and equity issue decisions. Recently, de Jong, Verbeek, and Verwijmeren (2011), through examining which theory of the pecking-order and trade-off theories can explain firms' financing decisions better (the percentage of firm-years in which their actual financing decisions follow it), find that these theories may have different predictions on firms' choices of securities in certain situations when their debt capacities are considered.

In sum, in Chapter 3, motivated by Myers (2001) and Byoun (2008) and other studies, I argue that firms' choices of securities may be effectively examined by a unified framework that simultaneously considers both total costs of leverage adjustments and costs of adverse selection associated with information asymmetries. As far as I am aware, I am among the first in the literature to examine how firms' choices of securities may reflect their target adjustments i.e., allow firms to close out deviations from target leverage by considering relevant factors suggested by the two most dominant theories of corporate capital structure through asymmetric, logistic models.

After examining firms' target adjustments and their choices of securities, I explore some important aspects of their cash holdings policies in Chapter 4. Although there has been some research on firms' asymmetric cash holdings adjustments driven by differences in the levels of costs of deviations from target cash holdings, costs of adjustments, and financial constraints (e.g., Dittmar and Duchin (2010), and Venkiteshwaran (2011)), little is known about the mechanisms they may undertake to adjust toward their targets. To my knowledge, my study is the first attempt in the literature to look at the asymmetry in these mechanisms. I shed light on why firms' speeds of adjustments may vary contingent on the position relative to their target cash holdings by examining the possible mechanisms they may undertake to adjust toward these which include adjustments in cash flows from financing (*CFF*), cash flows from operating (*CFO*), and cash flows from investing (*CFI*). Conditional on having either below- or above-target cash holdings, firms may undertake different adjustments in these three groups of cash flows which may involve different levels of costs. My previous two chapters as well as other studies tend to treat changes in *CFO* and *CFI* as exogenous to firms' cash and leverage management policies. I now explicitly account for these.

Overall, to expand the knowledge on firms' leverage and cash management, in this thesis, I am going to address the following research questions:

1. How do firms adjust toward their target leverage conditional on deviations from target leverage and financing gaps (in Chapter 2)?
2. Do firms' choices of securities allow them to close out deviations from target leverage? Does the presence of costs of adverse selection and debt capacities proposed by the pecking-order theory matter when firms have target leverage and attempt to adjust toward it over time (in Chapter 3)?
3. How do firms adjust toward their target cash holdings contingent on deviations from target cash holdings with an explicit focus on the asymmetry in their speeds of adjustments and mechanisms of adjustments (in Chapter 4)?

1.4. Structure of the Thesis

This thesis has five chapters and is organized as follows. Chapter 1 briefly (1) discusses the purpose of the thesis, its research questions, and contributions; and (2) reviews the major theories of corporate capital structure and cash holdings. Chapter 2, 3, and 4 which are self-contained address the thesis' research questions. Specifically:

In Chapter 2, I provide new international evidence on firms' asymmetric, partial leverage adjustments conditional on deviations from target leverage and financing gaps.

In Chapter 3, I examine firms' choices of securities through asymmetric, logistic models that consider the major themes of both the pecking-order and trade-off theories.

In Chapter 4, I examine firms' cash holdings adjustments with an explicit focus on the asymmetry in both their speeds and mechanisms of adjustments.

Finally, in Chapter 5, I provide some concluding remarks and a brief summary of the study's main results and limitations and suggest opportunities for future research.

Chapter 2: Asymmetric Partial Adjustments toward Target Leverage - International Evidence

2.1. Introduction

Recent studies on corporate leverage have focused on two major issues namely whether firms have target leverage and how fast they adjust toward it (e.g., Ozkan (2001); Fama and French (2002); Flannery and Rangan (2006); Antoniou, Guney, and Paudyal (2008); Lemmon, Roberts, and Zender (2008); and Huang and Ritter (2009)). Consistent with the trade-off theory i.e., firms determine their optimal leverage through balancing between the costs (e.g., financial distress) and benefits (e.g., debt tax shields) of debt financing, their consensus is that target leverage is a function of firms' fundamentals. However, they fail to reach an agreement on how fast firms may adjust toward their target leverage.[1] Employing partial adjustment models of leverage that account for costs of adjustments, some of these empirically show that firms may experience fast speeds of adjustments (Flannery and Rangan (2006), and Antoniou et al. (2008)), while others report slow or moderate speeds (Fama and French (2002), Lemmon et al. (2008), and Huang and Ritter (2009)). Estimating firms' speeds of

[1] The consensus in the current literature of corporate leverage has been that the estimated magnitude of speeds of adjustments have important implications for the trade-off theory (e.g., Fama and French (2002), Flannery and Rangan (2006), Kayhan and Titman (2007), Antoniou et al. (2008), Lemmon et al. (2008), Huang and Ritter (2009), among others). In particular, if on average it takes firms five years to close out 35-40% of deviations from the target leverage (Kayhan and Titman (2007)), then achieving target leverage can be reasonably considered as a factor secondary to the financing hierarchy in corporate financing decisions. If, however, speeds of adjustments stand at about 35% per year (Flannery and Rangan (2006)), then achieving target leverage is of critical importance to firms.

leverage adjustments hence has been a contentious topic in corporate leverage research. In this chapter, I develop asymmetric, partial adjustment models to provide new international evidence on firms' leverage adjustments.

There are two main motivations for this study. First, most previous studies tend to assume that firms adjust toward their target leverage at a homogenous rate (e.g., Fama and French (2002), Flannery and Rangan (2006), Antoniou et al. (2008), Lemmon et al. (2008), and Huang and Ritter (2009)). That assumption, however, has been questioned by Byoun (2008) as the author argues that costs of deviations from targets may be higher and costs of adjustments may be lower when firms are over-levered relative to their target leverage than when they are under-levered relative to their target leverage, suggesting over-levered firms may adjust toward their targets faster.

In addition, firms' leverage adjustments may be affected by their financing imbalances which provide them with a chance to adjust at low incremental costs (Faulkender, Flannery, Hankins, and Smith (2012)). Costs of leverage adjustments can be "shared" with transaction costs that incur when firms offset their large financing imbalances, suggesting those with large cash flow realizations may adjust faster. The impact of firms' financing imbalances, however, is ambiguous. One the one hand, firms with a financing deficit may be under pressures to visit capital markets to offset it, which then may allow them to adjust their leverage appropriately. On the other hand, firms with a financing surplus may find it easy to adjust, especially when costs of debt retirements and equity repurchases tend to be lower than costs of issuing these securities (Byoun (2008)).

The impact of financing imbalances is even more complex when these are interacted with firms' deviations from target leverage. In line with the trade-off theory, over-levered (under-levered) firms with a financing surplus (deficit) may adjust quickly by using their surplus cash to retire excess debt (visiting the debt market) (Byoun

(2008)).[2] Over-levered firms with a financing deficit, however, may adjust either slowly (as the deficit may reduce their ability to retire excess debt) or quickly (as while visiting capital markets to offset the deficit, they can jointly adjust their leverage at low incremental costs (e.g., issuing equity)). A further examination of the joint impact of these two factors on firms' leverage adjustments therefore is warranted.

Second, recent international studies show that the financial orientation of the economy in which firms operate may determine the sources of financing available to them and hence their capital structures (e.g., Antoniou et al. (2008); Mahajan and Tartaroglu (2008); and de Jong, Kabir, and Nguyen (2008)). In line with Antoniou et al. (2008) that creditor-friendly bankruptcy laws, high levels of ownership concentration, and close borrower-lender relationships in bank-oriented economies may lead to firms' preference for debt financing, Öztekin and Flannery (2012) show that firms' leverage adjustments may be shaped by the institutional, legal and financial environments in which they are operating. However, these studies mainly examine how speeds of adjustments may vary across countries but not across firms within the same country conditional on differences in their firm-specific factors (e.g., deviations from target leverage and financing gaps), which is the focus of this study.

In this chapter, I address these above gaps in the current literature and examine how firms' leverage adjustments may vary with their deviations from target leverage and financing gaps. Specifically, I study a sample of firms in the G-5 countries, namely France, Germany, and Japan (bank-oriented economies) and the UK and the US (market-oriented economies) using asymmetric, partial adjustment models of leverage that take into account differences in these factors. Using Blundell and Bond's (1998)

---

[2] The pecking-order theory predicts that due to information asymmetries and resulting costs of adverse selection, firms with a financing surplus may prefer retiring debt to repurchasing equity to save their debt capacities and avoid high costs of re-issuing equity (Shyam-Sunder and Myers (1999)).

system Generalized Method of Moments (SYS-GMM) to estimate firms' speeds of adjustments, I find that firms in the sample countries adjust toward their target leverage reasonably fast, with speeds ranging from 0.399 (Japanese firms) to 0.495 (French firms).[3] Importantly, there is clear and consistent asymmetry with over-levered firms adjusting between 9 and 17% faster than under-levered firms. In support of the argument that firms with a financing deficit may be under pressures to visit capital markets, thus having more room to adjust their mixes of securities, I find new evidence that these firms adjust toward their target leverage faster than those with a financing surplus. Inconsistent with Byoun's (2008) US evidence that over-levered firms with a financing surplus adjust toward their target leverage relatively faster than other groups of firms, the results, however, suggest that speeds of adjustments tend to be fastest among over-levered firms with a financing deficit.

Finally, I find that the magnitude of firms' deviations from target leverage and financing gaps and the size mismatch between these two factors together with its magnitude may have an asymmetric impact on their target adjustments. Firms with large deviations from target leverage, large financing gaps, excess financing gaps (financing gaps larger than deviations from target leverage), and large excess financing gaps (financing gaps exceed deviations from target leverage by large amounts) adjust toward their target leverage relatively faster than other groups of firms. These findings suggest that the magnitude of costs of deviations from target leverage and costs of adjustments also asymmetrically influence firms' leverage adjustments.

[3] My estimation strategy involves estimating firms' target leverage in the first-stage regression and their speeds of adjustments in the second-stage regression. Previous research estimates partial adjustment models in the second-stage regression using the OLS or fixed (mixed) effects estimators (e.g., Byoun (2008)), which are likely to produce biased coefficients in short dynamic panels with firm fixed effects. Hence, I am among the first in the literature to adopt an appropriate estimator to estimate firms' speeds of adjustments in the second stage.

The chapter proceeds as follows. Section 2.2 (1) develops the empirical models and research hypotheses and (2) discusses the econometric methods. Section 2.3 describes the data, sample selection, and descriptive statistics. Section 2.4 discusses the empirical findings. Section 2.5 reports several robustness checks. Section 2.6 concludes.

2.2. Empirical Models and Methods

2.2.1. A Symmetric Partial Adjustment Model of Leverage

When firms adjust toward their target leverage, they may wish to minimize the sum of costs of deviations from target leverage (also known as the benefits of being close to targets) and costs of adjustments. Assuming these two costs are both quadratic and additive, the total costs related to leverage adjustments can be written as:

(2.1) $$C_{it} = a(D^{*}_{it} - D_{it})^2 + b(D_{it} - D_{it-1})^2,$$

where C_{it} is total costs of leverage adjustments; D^{*}_{it} is firms' unobserved target leverage; and D_{it} and D_{it-1} are their leverage at time *t* and *t*-1.[4] I define D_{it} as the ratio of the book value of total debt to the sum of total debt and the market value of equity. *a* and *b* are the respective weights on costs of deviations and costs of adjustments. To minimize C_{it} with respect to D_{it}, I derive the first-order condition, as follows:

(2.2) $$\frac{\partial C_{it}}{\partial D_{it}} = -2a(D^{*}_{it} - D_{it}) + 2b(D_{it} - D_{it-1}) = 0,$$

or $$D_{it} - D_{it-1} = \frac{a}{(a+b)}(D^{*}_{it} - D_{it-1}),$$

which can be written as:

[4] In Chapter 2 and Chapter 3, market leverage is the major measure of leverage. In my robustness checks I also consider the book leverage measure and obtain qualitatively similar results.

(2.3) $$D_{it} - D_{it-1} = \lambda_1 (D_{it}^* - D_{it-1}),$$

where $\lambda_1 = a/(a+b)$ represents the proportion of firms' actual leverage changes, $(D_{it} - D_{it-1})$, to desired changes to adjust fully toward their targets, $(D_{it}^* - D_{it-1})$. Adding a constant and an error component, u_{it} to Equation (2.3), I obtain a standard partial adjustment model of leverage:

(2.4) $$D_{it} - D_{it-1} = \lambda_0 + \lambda_1 (D_{it}^* - D_{it-1}) + u_{it},$$

or, more compactly:

(2.5) $$\Delta D_{it} = \lambda_0 + \lambda_1 Dev_{it} + u_{it},$$

where $\Delta D_{it} = D_{it} - D_{it-1}$ and $Dev_{it} = D_{it}^* - D_{it-1}$. In Equation (2.5), firms seek to partially close out their deviations from target leverage over time at a homogeneous speed of adjustment, λ_1. By definition, λ_1 is between 0 and 1 with a higher value indicating a faster speed of adjustment. D_{it}^* can be specified as a function of firms' characteristics, as follows:[5]

(2.6) $$D_{it}^* = \hat{\beta}' \mathbf{x}_{it},$$

where $\hat{\beta}'$ is a vector of the parameters estimated from a fixed-effects regression of leverage on a vector of its determinants, i.e., firms' characteristics, $\mathbf{x}_{it}$:

(2.7) $$D_{it} = \beta' \mathbf{x}_{it} + \varepsilon_{it}.$$

ε_{it} is an error component that includes firm-fixed effects that control for time-invariant unobservable, unique firm and/or industry characteristics that cannot be captured by $\mathbf{x}_{it}$ and an *i.i.d.* error term. Following the literature (e.g., Antoniou et al.

[5] A major concern with the estimation of target leverage is that its complete set of determinants is unknown. The fixed effects method removes concerns about omitted determinants of target leverage (e.g., managerial skills, reputation, capital intensity, etc.) which vary across firms but are constant in time (Hovakimian and Li (2011)).

(2008), and Byoun (2008)), I include in the vector $\mathbf{x}_{it}$ profitability, growth opportunities, asset tangibility, effective tax rates, firm size, dividend payout, non-debt tax shields, share price performance, and earnings volatility.[6] These variables' expected relations with firms' target leverage are as follows:

Profitability (PROF). The pecking-order view predicts a negative relation between profitability and leverage as profitable firms may have more retained earnings, thus probably having less need to visit the debt market (Myers and Majluf (1984), and Myers (1984)). In contrast, the trade-off and agency theories suggest that these firms should be highly levered to exploit potential debt-interest tax shields (Modigliani and Miller (1963))[7] and mitigate the free cash flow problem (Jensen (1986)).

Growth opportunities (GO). High-growth firms may need to eschew debt to mitigate the debt overhang and underinvestment problems (Myers (1977)). In contrast, cash-rich firms with limited growth opportunities may use debt as a discipline device to alleviate the free cash flow problem (Jensen (1986)). These arguments suggest growth opportunities and leverage may be inversely related. Antoniou et al. (2008) further argue that the impact of growth opportunities on firms' target leverage may be weaker in bank-based economies (France, Germany and Japan in particular) due to closer borrower-lender relationships and limited managerial discretion as a result of the presence of large shareholders.

Asset tangibility (AT). The agency theory predicts that asset tangibility may have a positive effect on target leverage as collaterals in the form of tangible assets may help mitigate the risk-shifting and asset substitution problems better, thus reducing the agency costs of debt financing and enabling firms to borrow more (Jensen and Meckling

---

[6] Refer to Table 2.1 for the definitions of these variables.

[7] Recent trade-off models show that profitable firms may maintain low leverage to preserve their retained earnings and debt capacities for future investment opportunities (e.g., Strebulaev (2007)).

(1976)). In addition, high asset tangibility may also imply low costs of financial distress due to firms' better access to capital markets. The impact of asset tangibility on leverage may be more prominent among firms in bank-based economies where collaterals traditionally play an important role (Antoniou et al. (2008)).

Effective tax rates (ETR). The trade-off theory suggests effective tax rates may positively affect leverage as firms facing high tax rates should lever up to exploit the tax benefits of debt financing (Modigliani and Miller (1963)). However, their impact may vary across countries with different tax systems i.e., the classical or imputation systems, which favor either earnings retentions or dividend payments (Antoniou et al. (2008)).

Firm size (FS). Under the trade-off framework, large firms may face lower costs of financial distress and agency costs of debt financing than small firms. Further, they may have more access to the debt market due to lower information costs. These arguments together suggest a positive relation between firm size and leverage.

Dividend payout (DPO). Agency theories argue that dividends and leverage may be considered as close substitutes in alleviating the free cash flow problem (Fama and French (2002)). Antoniou et al. (2008) further note that this negative relation may vary across countries, in line with their specific institutional factors such as ownership structures and tax systems.

Non-debt tax shields (NDS). These can be seen as a substitute for the tax benefit of debt financing, thus being inversely related to leverage (DeAngelo and Masulis (1980)).

Share price performance (SPP). According to the market timing hypothesis, managers may time the market by issuing over-valued equity (Baker and Wurgler (2002)). Further, the managerial inertia view suggests that firms' market leverage may mechanically drop after an increase in share prices that inflates their total market values (Welch (2004)). These imply share price performance may negatively affect leverage.

Earnings volatility (EV). Trade-off models argue that firms with high earnings volatility are likely to face significant costs of debt financing (e.g., financial distress) (Bradley, Jarrell, and Kim (1984)), thus suggesting earnings volatility may reduce leverage.

2.2.2. Asymmetric Partial Adjustment Models Conditional on Deviations from Target Leverage

The symmetric, partial adjustment model (2.5) is derived basing on the assumption that costs related to leverage adjustments are quadratic and hence remain the same whether firms have above- or below-target leverage, implying over- and under-levered firms may adjust toward their target leverage at a homogenous rate. Byoun (2008), however, argues that the former firms may face higher costs of deviations as they are more likely to breach debt covenants and hence be subject to higher costs of financial distress. Further, compared with under-levered firms, they are likely to face lower costs of adjustments for their adjustments may be in the form of debt retirements, which tend to be less costly than debt issues. These arguments lead to the following hypothesis:

Hypothesis 2.1: Over-levered firms are likely to adjust toward their target leverage faster than under-levered firms due to higher costs of deviations and lower costs of adjustments.

To account for the differences in costs of deviations and costs of adjustments for firms having above- and below-target leverage, C_{it} can be rewritten as:

$$C_{it} = a_1(D^*_{it} - D_{it})^2 \cdot 1_{(D_{it}-D^*_{it} \geq 0)} + a_2(D^*_{it} - D_{it})^2 \cdot 1_{(D_{it}-D^*_{it} < 0)} + b_1(D_{it} - D_{it-1})^2 \cdot 1_{(D_{it}-D^*_{it} \geq 0)} + b_2(D_{it} - D_{it-1})^2 \cdot 1_{(D_{it}-D^*_{it} < 0)}, \tag{2.8}$$

where $1_{(\cdot)}$ is an indicator function that takes the value of 1 if the underlying condition is true and 0 otherwise. To minimize C_{it}, I derive the following first-order condition:

$$\frac{\partial C_{it}}{\partial D_{it}} = -2a_1(D_{it}^* - D_{it}) \cdot 1_{(D_{it}-D_{it}^* \geq 0)} - 2a_2(D_{it}^* - D_{it}) \cdot 1_{(D_{it}-D_{it}^* < 0)}$$

(2.9)

$$+2b_1(D_{it} - D_{it-1}) \cdot 1_{(D_{it}-D_{it}^* \geq 0)} + 2b_2(D_{it} - D_{it-1}) \cdot 1_{(D_{it}-D_{it}^* < 0)} = 0,$$

which, after some arrangements, can be written as:

$$D_{it} - D_{it-1} = \frac{a_1}{(a_1+b_1)}(D_{it}^* - D_{it-1}) \cdot 1_{(D_{it}-D_{it}^* \geq 0)} + \frac{a_2}{(a_2+b_2)}(D_{it}^* - D_{it-1}) \cdot 1_{(D_{it}-D_{it}^* < 0)}. \quad (2.10)$$

Adding a constant and an error component, v_{it} to the above equation, I obtain an asymmetric, partial adjustment model of leverage, as follows:

$$D_{it} - D_{it-1} = \alpha_0 + \alpha_1(D_{it}^* - D_{it-1})D_{it}^a + \alpha_2(D_{it}^* - D_{it-1})D_{it}^b + v_{it}, \quad (2.11)$$

or, more compactly,

$$\Delta D_{it} = \alpha_0 + \alpha_1 Dev_{it} D_{it}^a + \alpha_2 Dev_{it} D_{it}^b + v_{it}, \quad (2.12)$$

where $\alpha_1 = a_1/(a_1+b_1)$ $((\alpha_2 = a_2/(a_2+b_2))$ is the proportion of over-levered (under-levered) firms' actual leverage changes to their desired changes. $D_{it}^a = 1_{(D_{it}-D_{it}^* \geq 0)}$ $(D_{it}^b = 1_{(D_{it}-D_{it}^* < 0)})$ is a dummy variable equal to 1 if firms are over-levered (under-levered) relative to their targets and 0 otherwise. These two speeds of adjustments, α_1 and α_2, should be between 0 and 1. Over-levered firms may adjust faster than under-levered ones $(\alpha_1 > \alpha_2)$ due to higher costs of deviations and lower costs of adjustments.

2.2.3. Asymmetric Partial Adjustment Models Conditional on Deviations from Target Leverage and Financing Gaps

Firms' leverage adjustments may be affected by their financing and cash flow imbalances, which have implications about both costs of adjustments and the timing of these adjustments (Byoun (2008)). Those having to offset large financing imbalances through substantial changes in their capital structures may find it less costly to adjust toward their targets when a large proportion of costs of adjustments now can be "shared" with transaction costs that incur when they offset these imbalances (Faulkender et al. (2012)). The story, however, becomes complex when the signs of these imbalances are considered. On the one hand, firms with a financing deficit may be under pressures to offset it by issuing debt, equity or both, thus having a chance to adjust quickly through an appropriate mix of securities. On the other hand, firms with a financing surplus may find it easier to adjust as costs of debt retirements/equity repurchases tend to be lower than those of debt/equity issues. Following Shyam-Sunder and Myers (1999) and Frank and Goyal (2003), I define financing gaps (FG_{it}) as:

(2.13) $$FG_{it} = DIV_{it} + I_{it} + \Delta W_{it} - OCF_{it} \equiv ND_{it} + NE_{it},$$

where OCF_{it} stands for operating cash flows after interest and taxes; I_{it} is net investments; ΔW_{it} is the change in net working capital; and DIV_{it} represents dividend payments. ND_{it} and NE_{it} are net debt and equity issues, respectively. Equation (2.13) can be rewritten as:

(2.14) $$FG_{it} = NCF_{it} + CDIV_{it} - OSUF_{it} \equiv ND_{it} + NE_{it},$$

where NCF_{it} is net cash flow from financing (net cash receipts and disbursements resulting from debt and equity issues or reductions/repurchases, dividends paid and other financing activities); $CDIV_{it}$ is cash dividends; and $OSUF_{it}$ is other sources/uses of financing.[8] Using a similar derivation in Equations (2.8)-(2.10), I develop the following asymmetric, partial adjustment model of leverage, conditional on firms having either a financing surplus $(FG_{it} < 0)$ or a deficit $(FG_{it} \geq 0)$:

[8] This definition is more suitable for the *Worldscope* database due to its data availability and account structure. Any missing values for $CDIV_{it}$ and $OSUF_{it}$ are set to zero.

(2.15) $$\Delta D_{it} = \varphi_0 + \varphi_1 Dev_{it} D_{it}^s + \varphi_2 Dev_{it} D_{it}^d + \eta_{it},$$

where D_{it}^s (D_{it}^d) is a dummy variable equal to 1 when firms have a financing surplus (deficit) and 0 otherwise. The earlier discussion suggests that the impact of firms' financing gaps on their speeds of adjustments, φ_1 and φ_2, may be ambiguous and hence must be resolved empirically.

Models (2.12) and (2.15) capture firms' leverage adjustments conditional on their deviations from targets and financing gaps. Byoun (2008) suggests a model that takes into account both of these factors to examine their joint impact on firms' leverage adjustments. Thus, I extend Equations (2.12) and (2.15) by including the interaction terms between firms' deviations from target leverage and financing gaps, as follows:[9]

(2.16) $$\Delta D_{it} = \phi_0 + (\phi_1 D_{it}^s + \phi_2 D_{it}^d) Dev_{it} D_{it}^a + (\phi_3 D_{it}^s + \phi_4 D_{it}^d) Dev_{it} D_{it}^b + \omega_{it}.$$

Whether facing a financing surplus or deficit, it is expected that over-levered firms may adjust toward their target leverage faster than under-levered firms to avoid potentially high costs of financial distress ($\phi_1 > \phi_3$ and $\phi_2 > \phi_4$). Further, the trade-off theory would suggest that over-levered firms with a financing surplus may adjust toward their target leverage quickly by using their surplus cash to retire excess debt (Byoun (2008)).

Compared with over-levered firms with a financing surplus, over-levered firms with a financing deficit may have less ability to reduce their excess debt because of the deficit they are facing, implying that they may adjust at slower rates ($\phi_1 > \phi_2$). However, due to pressures from both potentially high costs of financial distress and the financing deficit, they may be forced to visit capital markets i.e., to issue equity, thus

[9] In a robustness check (Table A2 in Appendix 1), I include not only slope dummy variables but also intercept variables as suggested by Byoun (2008). The results for this alternative specification are qualitatively similar.

allowing costs of adjustments to be "shared" with transaction costs, implying they may adjust faster $(\phi_1 < \phi_2)$. Finally, conditional on being under-levered, firms with a financing deficit are likely to adjust toward their target leverage faster than those facing a financing surplus $(\phi_3 < \phi_4)$ as they may lever up to both move closer to their target leverage and offset the deficit.

2.2.4. Econometric Methods

The estimated magnitude of speeds of adjustments is important as it helps test the dynamic trade-off theory. Currently there exist several different views on how these speeds can be best estimated. Dang, Kim, and Shin (2010) and Elsas and Florysiak (2011), for example, show that both traditional estimators (e.g., the pooled OLS and fixed (mixed) effects estimators) and existing advanced techniques (e.g., instrumental variables (IV), GMM estimators, and long-differencing (LD)) can be severely biased and propose alternative methods to estimate firms' speeds of adjustments (e.g., the bootstrap based bias-corrected and DPF estimators). Hovakimian and Li (2011) identify several sources of bias associated with the existing estimators and approaches to minimize it i.e., (1) estimating firms' target leverage using the fixed effects method, (2) entering firms' target leverage and lagged actual leverage separately into the second-stage partial adjustment model, and (3) excluding firm years with leverage ratios greater than 0.8.[10] Finally, Flannery and Hankins (2011) document that studies' choices of estimators should be guided by their data's properties and SYS-GMM estimators tend to

[10] I have already addressed the first suggestion of Hovakimian and Li (2011) as in Chapter 2 and Chapter 3, I estimate firms' target leverage using the fixed effects method. In an unreported robustness check, I re-estimate the partial adjustment models by (1) entering firms' target leverage and lagged actual leverage separately into the second-stage partial adjustment models and (2) excluding firm years with leverage ratios greater than 0.8 and obtain qualitatively similar results.

perform better than other existing advanced methods in the presence of missing observations, unbalanced panel lengths, and dependent variable censoring - problems that my data are also subject to.

In this chapter, I employ a two-stage estimation approach by first adopting the fixed-effects estimator to estimate firms' target leverage as specified by Equation (2.7) and then their speeds of adjustments in the partial adjustment models as specified by equations (2.5), (2.12), (2.15), and (2.16). In estimating these partial adjustment models, two econometric issues come to my attention. First, as these are dynamic panel models, using the OLS or fixed (mixed) effects estimators may produce biased estimates of speeds of adjustments due to the correlation between Dev_{it} (and the associated interaction terms) and the error component, particularly in short panels with unobserved individual fixed effects (e.g., Nickell (1981)). Second, that target leverage estimated from the first stage is used to create Dev_{it} - the independent variable in the second stage may give rise to the generated regressor problem (e.g., Pagan (1984)).[11] The GMM (also known as the difference GMM) estimator, using the Generalized Method of Moments (Hansen (1982)), addresses these two issues by (1) transforming all the regressors through first-differencing and using the instruments for Dev_{it} based on some moment conditions (e.g., Arellano and Bond or Blundell and Bond style conditions), thus providing unbiased estimates of speeds of adjustments and (2) producing robust standard errors that account for the generated regressor problem.[12]

---

[11] In the presence of the generated regressor problem, estimates of speeds of adjustments are consistent if the error component in the second-stage regression is uncorrelated with the generated regressor. However the generated regressor problem is essentially one in which standards errors are inconsistent and test statistics therefore may be invalid.

[12] In the time series context, Newey (1984), Hall (2005), and Green (2008) show that two-step GMM may account for the problem as they have already embedded an automatic standard error

I choose to estimate the partial adjustment models by using the SYS-GMM estimator as it incorporates the above strengths of the Arellano and Bond GMM estimator (Arellano and Bond (1991)) and moreover improves its efficiency, especially in short panels with persistent data (Blundell and Bond (1998)). The SYS-GMM estimator involves first differencing the aforementioned dynamic models to remove the individual fixed effects. Next, it exploits the linear restrictions in both the level and first-differenced equations under the assumption of no serial correlation. For example, for model (2.5), lagged values of the independent variable $(Dev_{it-1}, Dev_{it-2}, .., Dev_{i1})$ can be used as instruments for ΔDev_{it} in the equation in first differences for period t (Arellano and Bond (1991)). To gain estimation efficiency, in the equation in levels, Dev_{it} can be instrumented by the vector $(\Delta Dev_{it}, \Delta Dev_{it-1}, .., \Delta Dev_{i2})$ (Arellano and Bover (1995)). The SYS-GMM estimator hence improves the efficiency of the Arellano and Bond GMM estimator.[13]

In brief, I adopt the SYS-GMM estimator to estimate the partial adjustment models for it (1) produces unbiased estimates of speeds of adjustments; (2) addresses the generated regressor problem; (3) significantly improves the Arellano and Bond GMM estimator's efficiency; and (4) performs well in the presence of missing observations, unbalanced panel lengths, and dependent variable censoring.[14]

---

correction mechanism. GMM style robust standard errors in the panel model therefore should be valid (Dang et al. (2012)).

[13] I follow Arellano and Bond (1991) and conduct the $AR2$ test to check the condition of no second-order correlation in the (differenced) error term. I, however, do not report the Sargan test results as the test is undersized and has low power in panels with $T \geq 15$ (Bowsher (2002)).

[14] In Chapter 4, I also employ the SYS-GMM estimator to estimate the cash holdings partial adjustment models.

2.3. Data, Sample Selection and Descriptive Statistics

My sample includes non-financial firms in the G-5 countries (France, Germany, Japan, the UK and the US) over the 1980-2007 period. Firm-year accounting data are collected from *Datastream Worldscope*. I require these sample firms to have at least five consecutive annual observations as the SYS-GMM estimator involves the use of lagged instruments. I exclude financial (with SIC code I from 6000 to 6999) and utility firms (with SIC code I from 4900 to 4999) for they may be heavily regulated and hence have too different financing behaviors. Finally, I winsorize all variables of interest - the regressors in the target leverage model (2.7) at the 0.5% and 99.5% percentiles to remove the impact of extreme outliers. The final sample has 79,525 firm-year observations.

Table 2.1 provides a standard statistics summary for the variables of interest.[15] Firms in France, Germany and Japan appear to be more levered (in terms of market leverage) than those in the UK and the US, which is consistent with previous evidence that firms in bank-based economies tend to prefer debt to equity financing (Rajan and Zingales (1995), and Antoniou et al. (2008)) and firms with closer relationships with banks may borrow more due to lower costs of debt financing (Fukuda and Hirota (1996)). The lower leverage observed among UK and US firms may be driven by their

[15] There are some small differences between the summary statistics reported and this table and those reported in Table 3.1 and Table 4.1 due to different sample size. In Chapter 2 and Chapter 4, following the literature I require firms to have at least five consecutive firm-year observations as the SYS-GMM estimator involves the use of lagged instruments while in Chapter 3 I require firms to have only at least two consecutive firm-year observations since I am using a logistic estimator in this chapter. In addition to the restriction on the number of firm-year observations, the different sample size is also due to the different set of independent variables for each chapter. The sample size difference results in slightly different average leverage ratios and levels of other variables of interest reported in the three tables.

looser relationships with banks, lower levels of ownership concentration (La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997 and 1998)), preference for equity financing, and other institutional factors (Rajan and Zingales (1995)).

Firms in the UK and the US seem to have more growth opportunities (measured by market-to-book ratios) than those in the remaining three countries. Myers (1977) suggests that firms with more growth opportunities may need to eschew debt to mitigate the debt overhang and underinvestment problems.

Firms in bank-oriented economies (with the exception of Japan) appear to have lower asset tangibility than those in the two market-oriented economies. This would suggest the former firms can borrow without or with a few strict collateral requirements due to their close relationships with banks. On average, French, German and Japanese firms seem to be larger than UK and US firms. Since bigger firm size implies better access to the debt market, this finding corroborates the previous observation that firms in bank-oriented economies tend to be more levered than those in market-based economies.

Finally, German firms seem to have the highest dividend payout, followed by Japanese, UK, French, and US firms, which is largely in line with the tax systems in their countries (Antoniou et al. (2008)). In particular, contrary to those in France and the US, German and Japanese tax systems have consistently discouraged internal equity but favor dividend payments. In the UK, dividend payments were only encouraged prior to 1997.

Table 2.1: Summary Statistics

This table presents the summary statistics (mean – MEA, median – MED, and standard deviation – STD) of the major variables considered in the chapter. My sample includes 79,525 firm-year observations for firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Book leverage (BL_t) is the ratio of the book value of total debt (*Worldscope* item WC03255) to the book value of total assets (WC02999). Market leverage (ML_t) is the ratio of total debt to the sum of the market value of equity (market capitalization (WC08001)) and the book value of total debt. Profitability ($PROF_t$) is operating income (WC01250) scaled by the book value of total assets (WC02999). Growth opportunities (GO_t) are the market-to-book ratio (the market value scaled by the book value of total assets). Asset tangibility (AT_t) is fixed assets (WC02501) scaled by the book value of total assets (WC02999). Firm size (FS_t) is the natural log of the book value of total assets measured in 1980 US$ value (WC07230). Effective tax rates (ETR_t) are income taxes (WC01451) scaled by pre-tax income (WC01401). Dividend payout (DPO_t) is total common dividends paid (WC05376) scaled by net income used to calculate basic Earnings Per Share (WC01706). Non-debt tax shields (NDS_t) are depreciation, depletion and amortization (WC01151) scaled by the book value of total assets (WC02999). Share price performance (SPP_t) is changes in share prices (WC05001) scaled by share prices in the last period. Earnings volatility (EV_t) is the absolute value of the difference between first difference of annual earnings (WC01706) (% change) and average of first differences.[16] FG_t is financing gap (Net cash flow from financing-WC04890 + Total cash dividends paid-WC04551 - Other sources/uses of financing-WC04448) scaled by the book value of total assets (WC02999).

	France			Germany			Japan			UK			US		
	MEA	MED	STD	MEA	MED	STD	MEA	MED	STD	MEA	MED	STD	MEA	MED	STD
BL_t	0.229	0.217	0.165	0.216	0.190	0.187	0.237	0.207	0.198	0.180	0.152	0.168	0.220	0.190	0.200
ML_t	0.290	0.251	0.229	0.281	0.232	0.251	0.336	0.302	0.269	0.190	0.137	0.193	0.218	0.142	0.235
$PROF_t$	0.029	0.048	0.130	0.003	0.025	0.167	0.047	0.041	0.053	0.014	0.068	0.256	0.004	0.072	0.276
GO_t	1.141	0.850	1.049	1.097	0.827	1.100	0.883	0.706	0.768	1.574	1.050	1.937	2.017	1.215	2.677
AT_t	0.196	0.162	0.162	0.250	0.219	0.186	0.310	0.296	0.171	0.298	0.244	0.247	0.288	0.230	0.227
FS_t	11.857	11.546	2.195	11.943	11.657	2.021	12.615	12.412	1.560	10.643	10.496	2.122	11.597	11.566	2.267
ETR_t	0.250	0.326	0.473	0.231	0.303	0.631	0.369	0.428	0.611	0.194	0.260	0.429	0.233	0.326	0.396
DPO_t	0.247	0.161	0.679	0.390	0.037	1.577	0.324	0.191	1.036	0.308	0.206	1.041	0.143	0.000	0.523
NDS_t	0.055	0.046	0.046	0.061	0.049	0.054	0.031	0.027	0.023	0.049	0.040	0.043	0.055	0.045	0.047
SPP_t	0.131	0.054	0.575	0.114	0.028	0.587	0.118	0.007	0.519	0.105	0.017	0.639	0.234	0.043	1.040
EV_t	3.688	0.743	11.547	6.006	1.166	19.655	3.555	0.874	11.296	4.224	0.895	13.338	3.978	0.941	12.978
FG_t	0.020	0.000	0.101	0.016	0.000	0.106	-0.005	-0.007	0.073	0.051	0.002	0.210	0.071	0.004	0.392
Observations		4,064			3,602			24,020			11,478			36,361	

[16] Previous studies (e.g., Antoniou et al. (2008)) have used this definition of earnings volatility. I am aware of that definition's limitation since it simply indicates mean-adjusted changes in earnings.

2.4. Empirical Results

2.4.1. Target Leverage Regression Results

Table 2.2 below reports the fixed-effects estimates for the target leverage model (2.7).[17] The relations between target leverage and its major determinants are overall consistent with the trade-off theory, suggesting these estimates of target leverage are plausible. This is important as the second-stage results depend on the precision of these estimates.

First, the results show that profitability has a negative effect on leverage among firms in all the sample countries, which is consistent with both the pecking-order (Myers and Majluf (1984)) and dynamic trade-off theories (Strebulaev (2007)). Empirically, this finding is in line with the previous international evidence of Rajan and Zingales (1995) and de Jong et al. (2008). Further, its impact is more pronounced among firms in bank-oriented economies, Japan in particular, implying profitability may play a more important role in firms' capital structure choices in these countries. This latter finding is inconsistent with the previous cross-country evidence of Antoniou et al. (2008).

I find strong evidence that growth opportunities are inversely related to leverage, which supports both the underinvestment ((Myers (1977)) and overinvestment (Jensen

---

[17] Following Antoniou et al. (2008), I run a pooled regression to examine the effects of country-specific factors on firms' target leverage, including several institutional factors namely anti-director rights, creditor rights, rule of law, and ownership concentration (La Porta et al. (1997 and 1998)) as well as macroeconomic variables such as GDP growth rates, term structure of interest rates, and equity premium. I find that the estimated coefficients for most of these variables are significant and have the expected signs. In addition, the magnitudes of most estimated coefficients for firm-specific variables are unaffected (Table A1 in Appendix 1).

(1986)) arguments and the empirical evidence of Antoniou et al. (2008) and de Jong et al. (2008). Similar to profitability, the effect of growth opportunities appears to be more pronounced in the three bank-oriented economies, Japan in particular, than in the two market-based countries. This finding does not support the argument that growth opportunities may have a stronger impact on firms' capital structures in market-based economies with dispersed corporate ownership and favorable capital market conditions (Antoniou et al. (2008)).

In line with agency models (e.g., Jensen and Meckling (1976)) and the previous international evidence (Antoniou et al. (2008), and de Jong et al. (2008)), I find that asset tangibility has a significant, positive impact on leverage across the sample countries. Further, its impact appears to be relatively stronger among firms in the bank-oriented economies, Japan in particular, which lends support to the argument that collaterals in the form of tangible assets may play an important role in countries with close borrower-lender relationships. This evidence, however, seems to conflict with the descriptive statistics reported in Table 2.1 that firms in these countries on average have lower asset tangibility than those in market-based economies.

Firm size has a significant, positive impact on leverage in all the sample countries, which is consistent with the trade-off view (Titman and Wessels (1988)) and previous evidence (Antoniou et al. (2008), and de Jong et al. (2008)). The estimated coefficients on effective tax rates are only significant for German, UK, and US firms but carry a negative sign, a finding contrary to the prediction that firms facing high tax rates tend to use more debt to exploit the interest tax shields of debt financing (Modigliani and Miller (1963)). This evidence, however, supports Ang and Peterson (1986), Titman and Wessels (1988), and Antoniou et al. (2008) that the inconsistency in the effects of effective tax rates on leverage may be caused by the limited variation in the corporate tax rates across firms.

The impact of dividend payout on leverage is statistically insignificant in most of the sample countries, except for the US. Such weak evidence can be justified since dividend payout is likely to be endogenously determined i.e., dividend payout and leverage may be jointly determined (Blundell, Bond, Devereux and Schiantarelli (1992)).[18] The negative impact of dividend payout on leverage for US firms supports the argument that dividends and leverage can be considered as close substitutes in controlling the free cash flow problem (Fama and French (2002)). High dividend payout may signal firms' positive future prospects, thus resulting in lower costs of equity financing and fewer incentives to visit the debt market (Rozeff (1982)). Overall, the weak and mixed evidence on the impact of dividend payout on leverage is similar to that previously documented by Antoniou et al. (2008).

Inconsistent with the trade-off view that non-debt tax shields may be a substitute for debt tax shields (DeAngelo and Masulis (1980)), the estimated coefficients on non-debt tax shields are statistically significant, positive among French, Japanese, and UK firms. One possible explanation for this finding is that the proxy for non-debt tax shields - depreciation of fixed assets depends on the level of asset tangibility which positively affects leverage (Mao (2003), and Antoniou et al. (2008)).

In favor of the market timing hypothesis (Baker and Wurgler (2002)), the managerial inertia argument (Welch (2004)), and previous empirical evidence (Antoniou et al. (2008)), the coefficients on share price performance are significantly negative across all the sample countries. Similar to Antoniou et al. (2008), I do not observe any noticeable differences in this variable's effect between firms in the two groups of economies, except for US firms where its effect is rather small by magnitude.

[18] To deal with the potential endogeneity problem, I do several unreported robustness checks in which I either use an instrument for (second-lagged value) or exclude this variable. The results for target leverage and subsequent results for the asymmetric partial adjustment models are qualitatively similar.

Finally, in line with Leary and Roberts (2005), I find that the coefficients on earnings volatility are statistically significant but economically insignificant among firms in Japan, the UK, and the US. My results therefore fail to support the argument that firms with higher earnings volatility may face potentially higher costs of financial distress and hence should depend less on debt financing.

Table 2.2: Fixed-Effects Regression of Target Leverage

This table presents the fixed-effects regression results for the target leverage model (2.7):

$$D_{it} = \beta ' \mathbf{x}_{it} + \varepsilon_{it},$$

where D_{it} is firms' market leverage and $\mathbf{x}_{it}$ represents a vector of the independent variables. See Table 2.1 for these variables' definitions. My sample includes 79,525 firm-year observations for firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. ** and * indicate the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

	Predicted sign	France	Germany	Japan	UK	US
		(1)	(2)	(3)	(4)	(5)
$PROF_{it}$	-/+	-0.206**	-0.166**	-0.956**	-0.062**	-0.131**
		(-4.13)	(-5.07)	(-19.81)	(-6.03)	(-14.66)
GO_{it}	-	-0.024**	-0.022**	-0.028**	-0.008**	-0.010**
		(-4.65)	(-3.63)	(-8.64)	(-5.11)	(-15.21)
AT_{it}	+	0.209**	0.395**	0.446**	0.183**	0.168**
		(2.92)	(6.78)	(12.79)	(6.40)	(8.95)
FS_{it}	+	0.035**	0.043**	0.038**	0.045**	0.034**
		(4.63)	(4.34)	(5.65)	(11.31)	(12.80)
ETR_{it}	+	0.003	-0.013**	$9*10^{-6}$	-0.014**	-0.010**
		(0.70)	(-3.44)	(0.01)	(-4.55)	(-3.96)
DPO_{it}	-/+	0.003	$2*10^{-4}$	$-2*10^{-5}$	-0.002	-0.003*
		(1.09)	(-0.17)	(-0.02)	(-1.50)	(-2.00)
NDS_{it}	-/+	0.258*	0.081	0.286*	0.241**	0.052
		(2.28)	(0.84)	(2.06)	(3.55)	(1.33)
SPP_{it}	-	-0.050**	-0.046**	-0.048**	-0.040**	-0.018**
		(-10.20)	(-11.24)	(-32.37)	(-16.25)	(-17.41)
EV_{it}	-	$4*10^{-4}$	$1*10^{-4}$	0.001**	$3*10^{-4}$*	$4*10^{-4}$*
		(1.30)	(0.62)	(7.48)	(2.31)	(4.48)
R^2		0.20	0.20	0.24	0.14	0.14
Observations		4,064	3,602	24,020	11,478	36,361

Table 2.3: Target Leverage Adjustments Conditional on Deviations from Target Leverage

This table presents the SYS-GMM regression results for firms' symmetric and asymmetric partial target adjustments conditional on deviations from target leverage, as modeled by Equations (2.5) and (2.12):

$$\Delta D_{it} = \lambda_0 + \lambda_1 Dev_{it} + u_{it}, \text{and } \Delta D_{it} = \alpha_0 + \alpha_1 Dev_{it} D^a_{it} + \alpha_2 Dev_{it} D^b_{it} + v_{it},$$

where ΔD_{it} is the change in market leverage. $Dev_{it} = D^*_{it} - D_{it-1}$ where D^*_{it} represents target leverage, which is estimated by Equation (2.6). See Table 2.1 for variable definitions and Table 2.2 for target leverage estimation. D^a_{it} (D^b_{it}) is a dummy variable equal to 1 if current market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. My sample includes 79,525 firm-year observations for firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients (i.e., speeds of adjustments) for firms with above-target and those with below-target leverage are equal. *AR*2 reports the *p*-value of the test for no second-order serial correlation, which is asymptotically distributed as *N*(0,1) under the null hypothesis of no serial correlation. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

		France		Germany		Japan		UK		US	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dev_{it}		0.495**		0.471**		0.399**		0.445**		0.409**	
		(22.84)		(18.47)		(37.90)		(29.00)		(45.79)	
$Dev_{it}.\ D^a_{it}$	(i)		0.560**		0.547**		0.356**		0.538**		0.503**
			(20.27)		(14.53)		(23.48)		(26.13)		(33.62)
$Dev_{it}.\ D^b_{it}$	(ii)		0.473**		0.392**		0.451**		0.368**		0.349**
			(16.90)		(11.28)		(36.64)		(13.40)		(18.52)
Intercept		0.001*	0.003*	0.002**	0.006**	-0.004**	-0.007**	0.003**	0.007**	0.002**	0.005**
		(2.31)	(2.35)	(2.93)	(2.89)	(-11.47)	(-9.97)	(7.51)	(6.26)	(7.63)	(6.79)
AR2		0.30	0.41	1.00	0.61	0.00	0.00	0.06	0.03	0.10	0.07
F-test [(i) = (ii)]			0.04		0.01		0.00		0.00		0.00
Observations		4,064	4,064	3,602	3,602	24,020	24,020	11,478	11,478	36,361	36,361

2.4.2. Symmetric Partial Target Adjustments Conditional on Deviations from Target Leverage

Columns (1), (3), (5), (7), and (9) of Table 2.3 report the SYS-GMM estimation results for the symmetric partial adjustment model (2.5). In support of the dynamic trade-off theory and previous empirical evidence (e.g., Flannery and Rangan (2006), Antoniou et al. (2008), and Byoun (2008)), I find that firms in the sample countries adjust toward their target leverage at reasonably fast speeds (from 0.399 (Japanese firms) to 0.495 (French firms)).[19] These are significantly greater than speeds of adjustments previously reported by Antoniou et al. (2008) for firms in these countries (from 0.111 (Japanese firms) to 0.394 (French firms)) and suggest that on average, they can close out deviations from target leverage between two and three years.[20]

Firms in bank-oriented economies (except for Japan) appear to adjust faster than those in market-oriented economies. French and German firms tend to be more levered than UK and US firms, thus possibly facing higher costs of financial distress and having more pressures to adjust, especially when their close relationships with banks may make it easier and less costly to do so.[21] The relatively slow estimated speed of adjustments for Japanese firms may be driven by their especially close relationships with banks that may create fewer pressures to adjust, despite their significant reliance on debt financing.

---

[19] Later, when using the book leverage measure in a robustness check (Section 2.5.1), I obtain relatively slower speeds of adjustments.

[20] The difference here may be driven by both the choice of estimation approach and sample period. My data are from 1980 to 2007 while these of Antoniou et al. are from 1980 to 2000. In addition, the authors employ a one-step GMM estimation approach while I adopt a two-step GMM estimation one.

[21] Following Öztekin and Flannery (2012), I also examine the potential impact of a few relevant institutional factors (e.g., creditor rights, shareholder rights, rule of law, etc.) on these estimated speeds of adjustments. However, due to the limited number of countries (05) and cross-country variation, my analysis does not reveal any strong association between these factors and speeds of adjustments.

2.4.3. Asymmetric Partial Target Adjustments Conditional on Deviations from Target Leverage

The results for the asymmetric partial adjustment model (2.12) reported in columns (2), (4), (6), (8) and (10) of Table 2.3 support Hypothesis 2.1 that over-levered firms adjust significantly faster than their under-levered counterparts (except for Japanese firms). Specifically, over-levered firms in France, Germany, the UK and the US adjust toward their target leverage at speeds of adjustments of 0.560, 0.547, 0.538 and 0.503, respectively, while those of under-levered firms are 0.473, 0.392, 0.368 and 0.349, respectively. This would suggest that the speeds with which firms adjust toward their target leverage when they are over-levered on average are 9-17% faster than when they are under-levered. Such differences are both economically and statistically (as confirmed by the *F*-tests) significant.

Overall, my findings support the argument that over-levered firms are likely to have more pressures or incentives to adjust toward their targets than under-levered firms due to potentially higher costs of deviations from targets (e.g., costs of financial distress) and lower costs of adjustments (e.g., adjustments via debt retirements).

2.4.4. Asymmetric Partial Target Adjustments Conditional on Deviations from Target Leverage and Financing Gaps

Table 2.4 reports the estimations for Equations (2.15) and (2.16) that capture firms' asymmetric leverage adjustments conditional on financing gaps and their interactions with deviations from target leverage. The results in columns (1), (3), (5), (7), and (9) show that except for German firms, firms with a financing deficit adjust toward their target leverage at significantly faster speeds (from 0.429 (US firms) to 0.564 (French firms)) than those with a financing surplus (from 0.356 (Japanese firms) to 0.437 (French firms)). The speeds with which firms adjust toward their target leverage on average are 4-16% faster when they face a deficit than when they face a surplus. This new evidence supports the argument that firms with a financing deficit may be under pressures to visit capital markets to offset it, which then may allow them to adjust their capital structures appropriately while those with a financing surplus tend to be relatively less concerned about their target adjustments.

The results in columns (2), (4), (6), (8), and (10) reveal how firms with different financing gaps may undertake leverage adjustments, controlling for deviations from target leverage. I find that when firms are under-levered, the impact of financing gaps on their leverage adjustments tends to be mixed. Firms with a financing deficit and those with a financing surplus in France do not experience statistically different speeds of adjustments while German, UK, and US firms with a financing surplus adjust toward their targets significantly faster than those with a financing deficit, a behavior contrary to that of Japanese firms. The evidence among German, UK, and US firms is inconsistent with the prediction that under-levered firms with a financing deficit may adjust faster to both move closer toward their target leverage and offset the deficit.

Conditional on facing a financing surplus, speeds of adjustments do not statistically differ between over- and under-levered firms (except for Japanese and US firms and marginally for UK firms). However, contingent on facing a financing deficit, firms adjust much faster when they are over-levered than when they are under-levered (except for Japanese firms). Further, inconsistent with Byoun' (2008) US evidence, I find that among the four groups of firms (under-/over-levered firms with a financing deficit/surplus), over-levered firms with a financing deficit appear to experience fastest speeds of adjustments, ranging from 0.545 (Japanese firms) to 0.755 (German firms). The *F*-tests show that these speeds of adjustments are statistically faster than those observed for both over-levered firms with a financing surplus or under-levered firms with a financing deficit (with the exception of Japanese firms).

Table 2.4: Target Leverage Adjustments Conditional on Deviations from Target Leverage and Financing Gaps

This table presents the SYS-GMM regression results for firms' asymmetric partial target adjustments conditional on deviations from target leverage and financing gaps, as modeled by Equations (2.15) and (2.16):

$$\Delta D_{it} = \varphi_0 + \varphi_1 Dev_{it} D^s_{it} + \varphi_2 Dev_{it} D^d_{it} + \eta_{it}, \text{ and } \Delta D_{it} = \phi_0 + (\phi_1 D^s_{it} + \phi_2 D^d_{it}) Dev_{it} D^a_{it} + (\phi_3 D^s_{it} + \phi_4 D^d_{it}) Dev_{it} D^b_{it} + \omega_{it},$$

where ΔD_{it} is the change in market leverage. $Dev_{it} = D^*_{it} - D_{it-1}$ where D^*_{it} represents target leverage, which is estimated by Equation (2.6). See Table 2.1 for variable definitions and Table 2.2 for target leverage estimation. D^a_{it} (D^b_{it}) is a dummy variable equal to 1 if current market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. D^s_{it} (D^d_{it}) is a dummy variable equal to 1 if the financing gap is negative (positive) and 0 otherwise. My sample includes 79,525 firm-year observations for firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal. *AR2* reports the *p*-value of the test for no second-order serial correlation, which is asymptotically distributed as *N(0,1)* under the null hypothesis of no serial correlation. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

		France		Germany		Japan		UK		US	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$Dev_{it}.\ D^s_{it}$	(i)	0.437**		0.434**		0.356**		0.428**		0.390**	
		(16.92)		(11.91)		(31.12)		(20.64)		(26.27)	
$Dev_{it}.\ D^d_{it}$	(ii)	0.564**		0.514**		0.511**		0.490**		0.429**	
		(21.04)		(15.95)		(39.23)		(23.66)		(30.96)	
$Dev_{it}.\ D^a_{it}.\ D^s_{it}$	(i)		0.444**		0.437**		0.308**		0.400**		0.361**
			(13.09)		(10.55)		(23.50)		(15.76)		(22.46)
$Dev_{it}.\ D^a_{it}.\ D^d_{it}$	(ii)		0.694**		0.755**		0.545**		0.710**		0.625**
			(17.22)		(14.86)		(21.02)		(25.06)		(33.33)
$Dev_{it}.\ D^b_{it}.\ D^s_{it}$	(iii)		0.498**		0.478**		0.445**		0.490**		0.505**
			(12.07)		(8.47)		(28.40)		(11.77)		(21.30)
$Dev_{it}.\ D^b_{it}.\ D^d_{it}$	(iv)		0.498**		0.348**		0.499**		0.332**		0.313**
			(13.38)		(9.60)		(30.65)		(10.73)		(15.92)
Intercept		$3*10^{-4}$	0.001	0.002	0.007**	-0.006**	-0.008**	0.003**	0.006**	0.002**	0.004**
		(0.52)	(0.93)	(1.86)	(3.17)	(-14.38)	(-12.20)	(4.92)	(5.74)	(4.47)	(5.61)
AR2		0.25	0.41	0.96	0.36	0.00	0.00	0.04	0.05	0.11	0.08
F-test [(i) = (ii)]		0.00	0.00	0.13	0.00	0.00	0.00	0.03	0.00	0.05	0.00
F-test [(iii) = (iv)]			0.99		0.05		0.01		0.00		0.00
F-test [(i) = (iii)]			0.32		0.56		0.00		0.08		0.00
F-test [(ii) = (iv)]			0.00		0.00		0.14		0.00		0.00
Observations		4,064	4,064	3,602	3,602	24,020	24,020	11,478	11,478	36,361	36,361

Overall, the results for models (2.15) and (2.16) support the argument that over-levered firms with a financing deficit may adjust toward their target leverage more quickly than the remaining firms in the sample countries due to pressures from both potentially high costs of financial distress and a financing deficit. These firms may also face lower (incremental) costs of adjustments that now can be jointly "shared" with transaction costs that incur when they visit capital markets to offset their cash flow imbalances (e.g., to have net equity issues to both offset the deficit and adjust toward their target leverage). Note that this result is in contrast with Byoun's (2008) US evidence that firms are likely to experience fastest speeds of adjustments in the presence of both above-target leverage and a financing surplus.[22]

2.5. Robustness Checks

2.5.1. An Alternative Measure of Leverage – Book Leverage

So far I have examined the dynamics of market leverage, a widely used measure of capital structure by previous trade-off models and empirical studies (e.g., Strebulaev (2007)). In practice, however, managers may prefer alternative measures of leverage such as book leverage (e.g., Shyam-Sunder and Myers (1999)). Hence, I follow existing empirical research (e.g., Flannery and Rangan (2006)) and examine whether my main

[22] Byoun's (2008) results may be driven by his model specification that assumes firms have target debt levels rather than target debt ratios. Specifically, in the author's hybrid partial adjustment/financing-needs-induced models, the dependent variable is defined as the change in debt levels all scaled by current total assets, which does not take into account changes in firms' equity and total assets that may also affect their leverage adjustments. In addition, Byoun does not provide any statistical tests to support the assertion that speeds of adjustments may be statistically different among different groups of firms.

results are robust to the use of book leverage by re-estimating the main models (2.5), (2.12), (2.15), and (2.16).

Overall, the results for book leverage are qualitatively similar, although speeds of adjustments now are generally slower than those estimated for market leverage reported previously in Table 2.3 and Table 2.4. The results for the symmetric partial adjustment model (2.5), reported in column (1), (3), (5), (7), and (9) of Table 2.5 show that firms adjust at speeds ranging between 31% and 43%, compared to the speeds of 40-50% for market leverage.[23] However, more importantly, I still find asymmetric patterns similar to those for market leverage. Over-levered firms adjust statistically faster than under-levered firms in the UK and the US while the difference between the two groups of firms in Germany is marginally significant. As can be seen from Table 2.6, firms with a financing deficit have speeds of adjustments significantly faster than those of firms with a financing surplus (except for German firms). Finally, over-levered firms with a financing deficit tend to experience fastest speeds of adjustments. In sum, my main findings are not sensitive to the measure of leverage used.

[23] There is a minor difference between these and previous results for market leverage in that by magnitude firms in market-based economies appear to have slightly faster speeds of adjustments than those in bank-based economies.

Table 2.5: Target Leverage Adjustments Conditional on Deviations from Target Leverage Using Book Leverage

This table presents the SYS-GMM regression results for firms' asymmetric partial target adjustments conditional on deviations from target book leverage, as modeled by Equations (2.5) and (2.12):

$$\Delta D_{it} = \lambda_0 + \lambda_1 Dev_{it} + u_{it}, \text{and } \Delta D_{it} = \alpha_0 + \alpha_1 Dev_{it} D^a_{it} + \alpha_2 Dev_{it} D^b_{it} + v_{it},$$

where ΔD_{it} is the change in book leverage. $Dev_{it} = D^*_{it} - D_{it-1}$ where D^*_{it} represents target book leverage, which is estimated by Equation (2.6). See Table 2.1 for variable definitions. D^a_{it} (D^b_{it}) is a dummy variable equal to 1 if current book leverage is higher than or equal to (lower than) target book leverage and 0 otherwise. My sample includes 79,525 firm-year observations for firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are t-statistics. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients (i.e., speeds of adjustments) for firms with above-target and below-target leverage are equal. *AR2* reports the *p*-value of the test for no second-order serial correlation, which is asymptotically distributed as *N(0,1)* under the null hypothesis of no serial correlation. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

		France		Germany		Japan		UK		US	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dev_{it}		0.365**		0.353**		0.305**		0.426**		0.387**	
		(10.31)		(12.03)		(21.76)		(20.32)		(36.68)	
$Dev_{it}. D^a_{it}$	(i)		0.399**		0.494**		0.273**		0.524**		0.430**
			(11.35)		(10.68)		(13.06)		(20.45)		(25.16)
$Dev_{it}. D^b_{it}$	(ii)		0.405**		0.335**		0.365**		0.359**		0.355**
			(5.58)		(5.64)		(15.92)		(10.42)		(17.48)
Intercept		0.002**	0.001	0.002**	0.005*	-0.004**	-0.006**	0.003**	0.005**	0.002**	0.003**
		(3.74)	(0.93)	(3.38)	(2.56)	(-14.77)	(-9.49)	(6.69)	(4.86)	(7.67)	(4.05)
AR2		0.08	0.09	0.51	0.34	0.02	0.02	0.15	0.14	0.43	0.42
F-test [(i) = (ii)]			0.95		0.07		0.01		0.00		0.01
Observations		4,064	4,064	3,602	3,602	24,020	24,020	11,478	11,478	36,361	36,361

Table 2.6: Target Leverage Adjustments Conditional on Deviations from Target Leverage and Financing Gaps Using Book Leverage

This table presents the SYS-GMM regression results for firms' asymmetric partial target adjustments conditional on deviations from target book leverage and financing gaps, as modeled by Equations (2.15) and (2.16):

$$\Delta D_{it} = \varphi_0 + \varphi_1 Dev_{it} D^s_{it} + \varphi_2 Dev_{it} D^d_{it} + \eta_{it}, \text{ and } \Delta D_{it} = \phi_0 + (\phi_1 D^s_{it} + \phi_2 D^d_{it}) Dev_{it} D^a_{it} + (\phi_3 D^s_{it} + \phi_4 D^d_{it}) Dev_{it} D^b_{it} + \omega_{it},$$

where ΔD_{it} is the change in book leverage. $Dev_{it} = D^*_{it} - D_{it-1}$ where D^*_{it} represents target book leverage, which is estimated by Equation (2.6). See Table 2.1 for variable definitions. D^a_{it} (D^b_{it}) is a dummy variable equal to 1 if current book leverage is higher than or equal to (lower than) target book leverage and 0 otherwise. D^s_{it} (D^d_{it}) is a dummy variable equal to 1 if the financing gap is negative (positive) and 0 otherwise. My sample includes 79,525 firm-year observations for firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal. *AR2* reports the *p*-value of the test for no second-order serial correlation, which is asymptotically distributed as *N(0,1)* under the null hypothesis of no serial correlation. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

		France		Germany		Japan		UK		US	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$Dev_{it}.\ D^s_{it}$	(i)	0.262**		0.337**		0.263**		0.358**		0.309**	
		(6.38)		(5.76)		(18.02)		(13.14)		(19.09)	
$Dev_{it}.\ D^d_{it}$	(ii)	0.506**		0.434**		0.437**		0.500**		0.443**	
		(10.35)		(8.73)		(17.90)		(19.37)		(29.86)	
$Dev_{it}.\ D^a_{it}.\ D^s_{it}$	(i)		0.181**		0.338**		0.232**		0.290**		0.257**
			(4.17)		(5.27)		(11.68)		(9.47)		(12.89)
$Dev_{it}.\ D^a_{it}.\ D^d_{it}$	(ii)		0.630**		0.671**		0.452**		0.677**		0.591**
			(11.45)		(9.91)		(12.51)		(20.21)		(28.54)
$Dev_{it}.\ D^b_{it}.\ D^s_{it}$	(iii)		0.404**		0.409**		0.386**		0.452**		0.403**
			(5.00)		(4.04)		(11.82)		(9.83)		(13.61)
$Dev_{it}.\ D^b_{it}.\ D^d_{it}$	(iv)		0.466**		0.327**		0.444**		0.383**		0.366**
			(5.81)		(5.66)		(13.97)		(9.44)		(16.15)
Intercept		1.10^{-4}	-0.001	0.002	0.004*	-0.005**	-0.007**	0.002**	0.002*	0.001*	0.001**
		(0.15)	(-0.70)	(1.89)	(1.98)	(-16.56)	(-10.71)	(3.65)	(2.26)	(2.44)	(2.19)
AR2		0.09	0.17	0.59	0.50	0.01	0.01	0.11	0.06	0.48	0.51
F-test [(i) = (ii)]		0.00	0.02	0.27	0.57	0.00	0.00	0.00	0.00	0.00	0.00
F-test [(iii) = (iv)]			0.09		0.00		0.87		0.00		0.00
F-test [(i) = (iii)]			0.00		0.00		0.00		0.00		0.00
F-test [(ii) = (iv)]			0.54		0.45		0.19		0.22		0.29
Observations		4,064	4,064	3,602	3,602	24,020	24,020	11,478	11,478	36,361	36,361

2.5.2. The Magnitude of Deviations from Target Leverage

The results reported in Table 2.3 show that with the exception of firms in Japan, firms in other sample countries adjust faster when being over-levered than when being under-levered due to potentially higher costs of deviations from target leverage and lower costs of adjustments. I further expect that whether having above- or below-target leverage, firms may experience faster speeds of adjustments in the presence of large deviations from target leverage because of higher costs of deviations and/or lower costs of adjustments. The trade-off theory would suggest that over-levered firms with large deviations from target leverage may face higher costs of financial distress than those which are just slightly over-levered. In addition, when over-levered (under-levered) firms adjust toward their target leverage through either debt retirements (debt issues) or equity issues (equity repurchases), the presence of the fixed cost component associated with these financing activities would suggest that firms with large deviations may face lower incremental costs of adjustments. For example, flotation costs as a percentage of the size of a (an) debt (equity) issue will become smaller as its size becomes larger. To investigate the impact of the magnitude of deviations from target leverage on firms' target adjustments, I develop the following model:

$$\Delta D_{it} = \theta_0 + (\theta_1 Dev_{it}^L + \theta_2 Dev_{it}^S) Dev_{it} D_{it}^a + (\theta_3 Dev_{it}^L + \theta_4 Dev_{it}^S) Dev_{it} D_{it}^b + \varsigma_{it}, \tag{2.17}$$

where Dev_{it}^L (Dev_{it}^S) indicates firms are experiencing large (small) deviations from target leverage. Dev_{it}^L (Dev_{it}^S) is a dummy variable equal to 1 when firms' deviations from target leverage are greater than or equal to (smaller than) the median level and 0 otherwise. θ_1 (θ_3) is expected to be greater than θ_2 (θ_4) for over-levered firms with large deviations from target leverage may face higher costs of financial distress than those which are just slightly over-levered and firms with large deviations may face lower incremental costs of adjustments.

The impact of the magnitude of deviations from target leverage on firms' target adjustments is reported in Table 2.7. The results show that speeds of adjustments for over-levered firms with large deviations are not statistically different from those for over-levered firms with small deviations (with the exception of firms in Japan where the difference is statistically significant). This finding implies that conditional on being over-levered, firms may be more concerned about costs of financial distress than costs of adjustments. In other words, they need to reduce their leverage no matter whether incremental costs of adjustments are high or low.

Table 2.7: Target Leverage Adjustments Conditional on the Magnitude of Deviations from Target Leverage

This table presents the SYS-GMM regression results for firms' asymmetric partial target adjustments conditional on the magnitude of deviations from target leverage, as modeled by Equation (2.17):

$$\Delta D_{it} = \theta_0 + (\theta_1 Dev^L_{it} + \theta_2 Dev^S_{it}) Dev_{it} D^a_{it} + (\theta_3 Dev^L_{it} + \theta_4 Dev^S_{it}) Dev_{it} D^b_{it} + \varsigma_{it},$$

where ΔD_{it} is the change in market leverage. $Dev_{it} = D^*_{it} - D_{it\text{-}1}$ where D^*_{it} represents target leverage, which is estimated by Equation (2.6). See Table 2.1 for variable definitions and Table 2.2 for target leverage estimation. D^a_{it} (D^b_{it}) is a dummy variable equal to 1 if current market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. Dev^L_{it} (Dev^S_{it}) is a dummy variable equal to 1 if deviations from target leverage are larger than or equal to (smaller than) the median level and 0 otherwise. My sample includes 79,525 firm-year observations for firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal. *AR2* reports the *p*-value of the test for no second-order serial correlation, which is asymptotically distributed as *N(0,1)* under the null hypothesis of no serial correlation. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

	France	Germany	Japan	UK	US
	(1)	(2)	(3)	(4)	(5)
Dev_{it}. D^a_{it}.Dev^L_{it} (i)	0.571**	0.553**	0.371**	0.537**	0.489**
	(21.34)	(14.53)	(25.37)	(24.71)	(36.47)
Dev_{it}. D^a_{it}.Dev^S_{it} (ii)	0.564**	0.455**	0.082**	0.645**	0.509**
	(5.70)	(4.83)	(2.19)	(10.29)	(13.09)
Dev_{it}. D^b_{it}.Dev^L_{it} (iii)	0.486**	0.404**	0.456**	0.373**	0.363**
	(17.02)	(11.65)	(36.17)	(13.20)	(20.14)
Dev_{it}. D^b_{it}.Dev^S_{it} (iv)	0.059	0.118	0.462**	0.120	0.184**
	(0.53)	(1.08)	(8.87)	(1.74)	(4.35)
Intercept	0.003*	0.007**	-0.009	0.008	0.005**
	(2.23)	(3.11)	(-11.37)	(7.07)	(7.09)
AR2	0.42	0.52	0.00	0.02	0.07
F-test [(i) = (ii)]	0.94	0.32	0.00	0.11	0.62
F-test [(iii) = (iv)]	0.00	0.01	0.90	0.00	0.00
F-test [(i) = (iii)]	0.05	0.01	0.00	0.00	0.00
F-test [(ii) = (iv)]	0.00	0.02	0.00	0.00	0.00
Observations	4,064	3,602	24,020	11,478	36,361

On the contrary, conditional on being under-levered, firms with large deviations adjust significantly faster than those with small ones (except for Japanese firms where the difference is not statistically significant). This finding may indicate that in the presence of lower costs of deviations due to being under-levered, firms may be relatively less concerned about deviations from target leverage and hence more likely to adjust when costs of adjustments are lower.

2.5.3. The Magnitude of Financing Gaps

In addition to the magnitude of deviations from target leverage, I argue that the magnitude of firms' financing gaps may also have an important impact on their target adjustments. As suggested by Faulkender et al. (2012), firms with large cash flow realizations are likely to adjust faster than those with small ones since costs of leverage adjustments now can be effectively "shared" with transaction costs that incur when they offset these cash flow imbalances. Put it differently, the presence of large operating cash flows may allow firms to adjust toward their target leverage at low marginal costs. The impact of the magnitude of financing gaps on firms' target adjustments can be examined through the following model:

$$(2.18) \qquad \Delta D_{it} = \upsilon_0 + (\upsilon_1 FDS_{it}^L + \upsilon_2 FDS_{it}^S) Dev_{it} D_{it}^s + (\upsilon_3 FDD_{it}^L + \upsilon_4 FDD_{it}^S) Dev_{it} D_{it}^d + \zeta_{it},$$

where $FDS_{it}^L\ (FDS_{it}^S) / FDD_{it}^L\ (FDD_{it}^S)$ indicates firms are facing a large (small) financing surplus/deficit. $FDS_{it}^L\ (FDS_{it}^S) / FDD_{it}^L\ (FDD_{it}^S)$ is a dummy variable equal to 1 when firms' financing surplus/deficit is larger than or equal to (smaller than) the median level and 0 otherwise. Equation (2.18) captures the variation in firms' speeds of adjustments contingent on whether they are facing a large or small financing gap. It is likely that $\upsilon_1\ (\upsilon_3)$ is greater than $\upsilon_2\ (\upsilon_4)$ as firms with a large financing gap may face lower incremental costs of adjustments, thus being able to adjust toward their target leverage faster than those with a small one.

In Table 2.8, there is strong evidence across firms in all the sample countries that no matter whether firms are experiencing a financing surplus or a financing deficit, those with a large financing gap adjust toward their target leverage significantly faster than those with a small one. This finding is consistent with the argument that the former firms are likely to face lower marginal costs of adjustments when a large proportion of costs of leverage adjustments now can be "shared" with transaction costs that incur when they offset their cash flow imbalances. I further find that firms with a large financing deficit experience fastest speeds of adjustments among the four groups of firms.

Table 2.8: Target Leverage Adjustments Conditional on the Magnitude of Financing Gaps

This table presents the SYS-GMM regression results for firms' asymmetric partial target adjustments conditional on the magnitude of financing gaps, as modeled by Equation (2.18):

$$\Delta D_{it} = \upsilon_0 + (\upsilon_1 FDS^L_{it} + \upsilon_2 FDS^S_{it})Dev_{it} D^s_{it} + (\upsilon_3 FDD^L_{it} + \upsilon_4 FDD^S_{it})Dev_{it} D^d_{it} + \zeta_{it},$$

where ΔD_{it} is the change in market leverage. $Dev_{it} = D^*_{it} - D_{it-1}$ where D^*_{it} represents target leverage, which is estimated by Equation (2.6). See Table 2.1 for variable definitions and Table 2.2 for target leverage estimation. D^s_{it} (D^d_{it}) is a dummy variable equal to 1 if the financing gap is negative (positive) and 0 otherwise. FDS^L_{it}/FDD^L_{it} (FDS^S_{it}/FDD^S_{it}) is a dummy variable equal to 1 if the financing surplus/deficit is larger than or equal to (smaller than) the median level and 0 otherwise. My sample includes 79,525 firm-year observations for firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal. *AR2* reports the *p*-value of the test for no second-order serial correlation, which is asymptotically distributed as *N(0,1)* under the null hypothesis of no serial correlation. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

	France	Germany	Japan	UK	US
	(1)	(2)	(3)	(4)	(5)
$Dev_{it}.FDS^L_{it}$ (i)	0.534**	0.496**	0.386**	0.537**	0.447**
	(16.22)	(12.12)	(30.91)	(20.46)	(25.99)
$Dev_{it}.FDS^S_{it}$ (ii)	0.328**	0.354**	0.276**	0.257**	0.310**
	(8.08)	(6.31)	(18.52)	(8.08)	(16.26)
$Dev_{it}.FDD^L_{it}$ (iii)	0.672**	0.611**	0.619**	0.617**	0.528**
	(19.10)	(15.23)	(34.56)	(26.88)	(31.60)
$Dev_{it}.FDD^S_{it}$ (iv)	0.406**	0.360**	0.343**	0.273**	0.293**
	(11.01)	(7.63)	(13.72)	(7.28)	(14.54)
Intercept	$-1*10^{-4}$	0.002	-0.007**	0.003**	0.001**
	(-0.16)	(1.16)	(-17.44)	(5.75)	(2.90)
AR2	0.44	0.86	0.00	0.02	0.11
F-test [(i) = (ii)]	0.00	0.04	0.00	0.00	0.00
F-test [(iii) = (iv)]	0.00	0.00	0.00	0.00	0.00
F-test [(i) = (iii)]	0.01	0.06	0.00	0.03	0.00
F-test [(ii) = (iv)]	0.14	0.93	0.02	0.72	0.54
Observations	4,064	3,602	24,020	11,478	36,361

2.5.4. The Size Mismatch between Deviations from Target Leverage and Financing Gaps

In another robustness check, I investigate whether the size mismatch between deviations from targets and financing gaps may have any impact on firms' target adjustments. Firms with financing imbalances larger than deviations from targets may adjust quickly as costs of adjustments can be fully shared with transaction costs that incur when they offset these imbalances. However, those with deviations larger than financing gaps may adjust slowly for they are likely to face potentially large incremental costs of adjustments when closing the excess deviations. To account for these scenarios, I extend Equation (2.16) and estimate the following augmented model:

$$\Delta D_{it} = \pi_0 + (\pi_1 D_{it}^s + \pi_2 D_{it}^d) Dev_{it} D_{it}^a DIF_{it}^{Dev} + (\pi_3 D_{it}^s + \pi_4 D_{it}^d) Dev_{it} D_{it}^a DIF_{it}^{Gap}$$

(2.19)

$$+ (\pi_5 D_{it}^s + \pi_6 D_{it}^d) Dev_{it} D_{it}^b DIF_{it}^{Dev} + (\pi_7 D_{it}^s + \pi_8 D_{it}^d) Dev_{it} D_{it}^b DIF_{it}^{Dev} + \kappa_{it},$$

where DIF_{it}^{Dev} is equal to 1 when the absolute value of deviations from targets exceeds that of financing gaps $(\left|D_{it}^* - D_{it-1}\right| > \left|FG_{it}\right|)$ and 0 otherwise. DIF_{it}^{Gap} is equal to 1 when $\left|FG_{it}\right| > \left|D_{it}^* - D_{it-1}\right|$ and 0 otherwise. Firms may adjust faster when $DIF_{it}^{Gap} = 1$ than when $DIF_{it}^{Dev} = 1$. Further, over-levered firms with a financing deficit should experience fastest speeds of adjustments, especially when their financing gaps are greater than deviations from targets in absolute values (π_4). Note that Equation (2.19) and Faulkender et al.'s (2012) baseline specification both consider the potential size mismatch between firms' deviations from target leverage and financing gaps. However, I focus on examining the heterogeneous speeds of adjustments for firms with different financing gaps interacted with their deviations while Faulkender et al. investigate the differences in speeds of adjustments according to the compositions of such deviations (e.g., "excess" cash flow and "overlapping" cash flow).

Table 2.9: Target Leverage Adjustments Conditional on the Size Mismatch between Deviations from Target Leverage and Financing Gaps

This table presents the SYS-GMM regression results for firms' asymmetric partial target adjustments conditional on the size mismatch between deviations from target leverage and financing gaps, as modeled by Equation (2.19):

$$\Delta D_{it} = \pi_0 + (\pi_1 D^s_{it} + \pi_2 D^d_{it}) Dev_{it} D^a_{it} DIF^{Dev}_{it} + (\pi_3 D^s_{it} + \pi_4 D^d_{it}) Dev_{it} D^a_{it} DIF^{Gap}_{it} + (\pi_5 D^s_{it} + \pi_6 D^d_{it}) Dev_{it} D^b_{it} DIF^{Dev}_{it} + (\pi_7 D^s_{it} + \pi_8 D^d_{it}) Dev_{it} D^b_{it} DIF^{Dev}_{it} + \kappa_{it},$$

where ΔD_{it} is the change in market leverage. $Dev_{it} = D^*_{it} - D_{it-1}$ where D^*_{it} represents target leverage, which is estimated by Equation (2.6). See Table 2.1 for variable definitions and Table 2.2 for target leverage estimation. D^a_{it} (D^b_{it}) is a dummy variable equal to 1 if current market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. D^s_{it} (D^d_{it}) is a dummy variable equal to 1 if the financing gap is negative (positive) and 0 otherwise. DIF^{Dev}_{it} (DIF^{Gap}_{it}) is a dummy variable equal to 1 if the absolute value of deviations from target leverage (financing gaps) is greater than that of financing gaps (deviations from target leverage) and 0 otherwise. My sample includes 79,525 firm-year observations for firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal. *AR2* reports the *p*-value of the test for no second-order serial correlation, which is asymptotically distributed as *N(0,1)* under the null hypothesis of no serial correlation. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dev_{it}. D^a_{it}. D^s_{it}. DIF^{Dev}_{it} (i)	0.461**	(14.48)	0.474**	(12.73)	0.323**	(23.94)	0.435**	(16.94)	0.383**	(24.69)
Dev_{it}. D^a_{it}. D^s_{it}. DIF^{Gap}_{it} (ii)	0.534**	(5.24)	0.478**	(6.50)	0.265**	(8.78)	0.352**	(6.18)	0.270**	(6.33)
Dev_{it}. D^a_{it}. D^d_{it}. DIF^{Dev}_{it} (iii)	0.636**	(14.75)	0.654**	(9.84)	0.473**	(15.96)	0.525**	(14.37)	0.464**	(22.00)
Dev_{it}. D^a_{it}. D^d_{it}. DIF^{Gap}_{it} (iv)	1.081**	(11.72)	1.156**	(13.10)	0.983**	(16.48)	1.129**	(23.25)	1.189**	(34.46)
Dev_{it}. D^b_{it}. D^s_{it}. DIF^{Dev}_{it} (v)	0.470**	(10.60)	0.410**	(6.44)	0.389**	(21.93)	0.287**	(6.65)	0.386**	(15.30)
Dev_{it}. D^b_{it}. D^s_{it}. DIF^{Gap}_{it} (vi)	1.035**	(7.24)	1.097**	(9.60)	0.943**	(20.21)	1.164**	(26.57)	1.092**	(22.81)
Dev_{it}. D^b_{it}. D^d_{it}. DIF^{Dev}_{it} (vii)	0.492**	(13.03)	0.373**	(10.46)	0.503**	(29.64)	0.342**	(11.12)	0.337**	(17.11)
Dev_{it}. D^b_{it}. D^d_{it}. DIF^{Gap}_{it} (viii)	0.682**	(4.22)	0.367**	(3.02)	0.497**	(8.97)	0.292**	(5.77)	0.210**	(5.36)
Intercept	0.001	(0.59)	0.006**	(2.78)	-0.010**	(-12.12)	0.007**	(5.28)	0.002**	(3.22)
AR2	0.72		0.47		0.00		0.03		0.06	
F-test [(i) = (ii)]	0.48		0.96		0.06		0.17		0.01	
F-test [(iii) = (iv)]	0.00		0.00		0.00		0.00		0.00	
F-test [(v) = (vi)]	0.00		0.00		0.00		0.00		0.00	
F-test [(vii) = (viii)]	0.25		0.96		0.93		0.34		0.00	
Observations	4,064		3,602		24,020		11,478		36,361	

Byoun (2008) also compares firms' financing gaps with deviations from target leverage to derive the excess financing gap, $DIF_{it} = FG_{it} - (D_{it}^* - D_{it})$. However, this definition does not consider the absolute values of the variables and implicitly relies on the assumption that firms only adjust via debt issues/retirements. To illustrate the limitation of this definition, consider a simple example whereby a firm is over-levered by 5% (i.e., a negative deviation of 5%) and has a deficit of 10% (i.e., a positive financing gap of 10%). Using Byoun's definition, the excess financing deficit is calculated to be 15%. However, using my definition, the excess is only 5% since the firm can issue equity (5%) to offset the deficit and simultaneously move closer toward its target leverage.

The results in Table 2.9 show that firms' speeds of adjustments are significantly faster when firms have excess financing gaps than when they have excess deviations in two cases: (1) when over-levered firms face a financing deficit (rows (iii) and (iv)), and (2) when under-levered firms have a financing surplus (rows (v) and (vi)). While there is strong evidence in Table 2.4 that over-levered firms with a financing deficit experience fastest speeds of adjustments (between 55% and 76%), the results in Table 2.9 further reveal that when their financing gaps exceed deviations from target leverage, these speeds of adjustments approach 1 i.e., full target adjustments.[24] This finding supports the argument that these firms may face extremely low incremental costs of adjustments which now can be shared with transaction costs that incur when they offset their financing imbalances and is broadly consistent with Faulkender et al.'s (2012) US evidence that over-levered firms can use a large proportion (up to 90%) of their cash flow realizations i.e., "overlapping" cash flows to reduce deviations from target leverage.

[24] That is almost the same story for under-levered firms with a financing surplus. When financing gaps exceed deviations from target leverage, their speeds of adjustments are also around 1.

2.5.5. The Magnitude of the Size Mismatch between Deviations from Target Leverage and Financing Gaps

In a final robustness check, I examine whether the magnitude of the size mismatch between deviations from targets and financing gaps may have any influence on firms' target leverage adjustments by developing Equation (2.20) as follows:

$$\Delta D_{it} = \Omega_0 + (\Omega_1 MM_{it}^{L} + \Omega_2 MM_{it}^{S}) Dev_{it} DIF_{it}^{Dev} + (\Omega_3 MM_{it}^{L} + \Omega_4 MM_{it}^{S}) Dev_{it} DIF_{it}^{Gap} + \tau_{it}. \quad (2.20)$$

In Equation (2.20), MM_{it}^{L} (MM_{it}^{S}) indicates the size mismatch between deviations from target leverage and financing gaps is larger or equal to (small than) the median level. It is likely that the ability to share costs of leverage adjustments with transaction costs of firms with excess deviations may be inversely related to the magnitude of their excess deviations i.e., Ω_1 is lower than Ω_2. In contrast, firms with excess financing gaps can adjust toward their target leverage faster conditional on experiencing large excess financing gaps i.e., Ω_3 is higher than Ω_4 for the extent at which costs of adjustments can be fully shared with transaction costs may be positively related to the magnitude of the excess financing gaps.

The results reported in Table 2.10 support my prediction. In particular, conditional on having excess deviations, although firms' speeds of adjustments do not statistically vary with the magnitude of the size mismatch (with the exception of Japan where firms with a large size mismatch experience statistically faster speeds of adjustments than those with a small one), by magnitude, firms in France, Germany, the UK, and the US appear to adjust less quickly in the presence of large excess deviations. There is, however, clear asymmetry in speeds of adjustments among firms with excess financing gaps. Firms with a large size mismatch adjust toward their target leverage at speeds of adjustments (about 100% for French firms, 90% for German firms, and 85%

for UK firms) significantly faster than those with a small one (except for German firms where the difference is only marginally significant).

Overall, consistent with the “cost-sharing” argument, I find that firms’ ability to share costs of leverage adjustments with transaction costs that would incur when they visit capital markets to offset their cash flow imbalances may be shaped by the magnitude of the size mismatch between deviations from targets and financing gaps. This new evidence is particularly interesting and provides a further insight into firms’ financing behaviors.

2.6. Conclusions

In this chapter, I have developed asymmetric, partial adjustment models of leverage to study leverage adjustments of firms in the G-5 countries. The results show that the speeds with which firms undertake adjustments are different, according to the levels of costs of deviations from target leverage and costs of leverage adjustments. Importantly, firms adjust toward their target leverage quickly when facing potentially high costs of financial distress due to having above-target leverage or pressures to offset a financing deficit. I find evidence across the sample countries (except for Japan) that over-levered firms with a financing deficit experience fastest speeds of adjustments.

I also find evidence that the magnitude of firms’ deviations from target leverage and financing gaps, and the size mismatch between these two factors together with its magnitude may have an asymmetric impact on firms’ leverage adjustments. Intriguingly, in line with the “cost-sharing” argument, I find that speeds of adjustments tend to approach 1 in the presence of excess financing gaps as firms may be able to fully share costs of adjustments with transaction costs and hence face extremely low incremental costs of adjustments. In brief, I provide new international evidence that firms have target leverage and adjust toward that in complex manners which is consistent with the dynamic trade-off view.

My findings raise a few questions for future empirical corporate capital structure research. In a recent study, Chang and Dasgupta (2009) show through simulations that firms' leverage adjustments captured by partial adjustment models may be driven by the mechanical mean reversion. My results show, however, that in asymmetric, partial adjustment models, firms are likely to adjust toward their target leverage in non-trivial manners. Indeed, there is strong evidence across the sample countries that firms seem to follow well-justified heterogeneous leverage adjustment paths, which hence cannot be reconciled with the argument that capital structure adjustments are caused by random, non-target financing behaviors. Further research is therefore needed to gain a better insight into the complexities behind firms' leverage adjustment mechanisms.

The major limitation of this study is that I only test the predictions of the trade-off theory. As suggested by Myers (2001); Byoun (2008); and de Jong, Verbeek, and Verwijmeren (2011), firms' financing behaviors may also be shaped by other capital structure views such as the pecking-order theory which suggests costs of adverse selection associated with information asymmetries may influence firms' debt and equity choices. In addition, while I examine how fast firms may adjust toward their target leverage conditional on different levels of total costs of leverage adjustments, it would be of interest to see how their leverage adjustments may be undertaken through their choices of securities. To the extent that over-levered firms with a financing deficit experience fastest speeds of adjustments, their incremental financing activities may be largely consistent with the trade-off theory i.e., they retire debt and/or issue equity. Hence, an examination of firms' choices of securities in the presence of total costs of adjustments (proposed by the trade-off view) and costs of adverse selection (proposed by the pecking-order argument) would be useful and I save that for Chapter 3.

Table 2.10: Target Leverage Adjustments Conditional on the Magnitude of the Size Mismatch between Deviations from Target Leverage and Financing Gaps

This table presents the SYS-GMM regression results for firms' asymmetric partial target adjustments conditional on the magnitude of the mismatch between deviations from target leverage and financing gaps, as modeled by Equation (2.20):

$$\Delta D_{it} = \Omega_0 + (\Omega_1 MM^L_{it} + \Omega_2 MM^S_{it})Dev_{it} DIF^{Dev}_{it} + (\Omega_3 MM^L_{it} + \Omega_4 MM^S_{it})Dev_{it} DIF^{Gap}_{it} + \tau_{it},$$

where ΔD_{it} is the change in market leverage. $Dev_{it} = D^*_{it} - D_{it-1}$ where D^*_{it} represents target leverage, which is estimated by Equation (2.6). See Table 2.1 for variable definitions and Table 2.2 for target leverage estimation. D^a_{it} (D^b_{it}) is a dummy variable equal to 1 if current market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. D^s_{it} (D^d_{it}) is a dummy variable equal to 1 if the financing gap is negative (positive) and 0 otherwise. DIF^{Dev}_{it} (DIF^{Gap}_{it}) is a dummy variable equal to 1 if the absolute value of deviations from target leverage (financing gaps) is greater than that of financing gaps (deviations from target leverage) and 0 otherwise. MM^L_{it} (MM^S_{it}) is a dummy variable equal to 1 if the difference between deviations from target leverage and financing gaps is larger than or equal to (smaller than) the median level and 0 otherwise. My sample includes 79,525 firm-year observations for firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal. *AR2* reports the *p*-value of the test for no second-order serial correlation, which is asymptotically distributed as *N(0,1)* under the null hypothesis of no serial correlation. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$Dev_{it}.DIF^{Dev}_{it}$ (i)	0.472**		0.432**		0.377**		0.373**		0.363**	
	(25.22)		(20.64)		(36.43)		(20.63)		(33.35)	
$Dev_{it}.DIF^{Gap}_{it}$ (ii)	0.850**		0.760**		0.575**		0.771**		0.682**	
	(13.12)		(11.72)		(20.69)		(25.68)		(25.88)	
$Dev_{it}.DIF^{Dev}_{it}.MM^L_{it}$ (i)		0.472**		0.439**		0.382**		0.384**		0.373**
		(24.08)		(19.69)		(39.04)		(20.16)		(36.90)
$Dev_{it}.DIF^{Dev}_{it}.MM^S_{it}$ (ii)		0.570**		0.487**		0.322**		0.392**		0.396**
		(10.82)		(8.23)		(15.17)		(12.95)		(15.58)
$Dev_{it}.DIF^{Gap}_{it}.MM^L_{it}$ (iii)		1.060**		0.874**		0.622**		0.851**		0.789**
		(11.90)		(9.26)		(16.99)		(22.93)		(24.09)
$Dev_{it}.DIF^{Gap}_{it}.MM^S_{it}$ (iv)		0.598**		0.640**		0.507**		0.561**		0.517**
		(5.93)		(7.57)		(14.69)		(12.59)		(15.34)
Intercept	0.001	$2*10^{-4}$	0.002**	0.002**	-0.004**	-0.006**	0.002**	0.002**	0.001*	$3*10^{-4}$
	(1.28)	(0.30)	(2.65)	(2.67)	(-12.01)	(-18.45)	(5.04)	(4.81)	(2.44)	(1.18)
AR2	0.53	0.41	0.89	0.83	0.00	0.00	0.06	0.05	0.06	0.05
F-test [(i) = (ii)]	0.00	0.08	0.00	0.45	0.00	0.01	0.00	0.82	0.00	0.41
F-test [(iii) = (iv)]		0.00		0.08		0.02		0.00		0.00
F-test [(i) = (iii)]		0.00		0.00		0.00		0.00		0.00
F-test [(ii) = (iv)]		0.80		0.14		0.00		0.00		0.00
Observations		4,064		3,602		24,020		11,478		36,361

Appendix A

Table A1: Fixed-Effects Regression of Target Leverage with Macro Variables

This table presents the fixed-effects regression results for the target leverage model (2.7):

$$D_{it} = \beta' \mathbf{x}_{it} + \varepsilon_{it},$$

where D_{it} is firms' market leverage and $\mathbf{x}_{it}$ represents a vector of the firm-specific and macro variables. See Table 2.1 for these variables' definitions. My sample includes 79,525 firm-year observations for firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. ** and * indicate the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

	(1)	(2)
$PROF_{it}$	-0.039**	(-8.00)
GO_{it}	-0.002**	(-5.11)
AT_{it}	0.223**	(15.62)
FS_{it}	0.041**	(19.47)
ETR_{it}	-0.008**	(-7.15)
DPO_{it}	-0.001	(-1.06)
NDS_{it}	0.209**	(6.65)
SPP_{it}	-0.033**	(-39.73)
EV_{it}	0.001**	(9.74)
Anti-Director Rights	-0.008**	(-5.33)
Creditor Rights	-0.005**	(-4.88)
Rule of Law	0.016**	(5.23)
Ownership Concentration	-0.029	(-1.79)
Terms Structure of Interest Rate	-0.364**	(-6.51)
Equity Premium	-0.134**	(-37.51)
GDP Growth	-0.381**	(-6.58)
Intercept	-0.271**	(-10.54)
R^2	0.15	
Observations	79,525	

Table A2: Target Leverage Adjustments Conditional on Deviations from Target Leverage and Financing Gaps with Slope Dummies

This table presents the SYS-GMM regression results for firms' symmetric and asymmetric partial target adjustments conditional on deviations from target leverage and financing gaps with slope dummies, as modeled by the following Equation:

$$\Delta D_{it} = o_1 D^s_{it} + o_2 D^d_{it} + (o_3 D^s_{it} + o_4 D^d_{it}) Dev_{it} D^a_{it} + (o_5 D^s_{it} + o_6 D^d_{it}) Dev_{it} D^b_{it} + \sigma_{it},$$

where ΔD_{it} is the change in market leverage. $Dev_{it} = D^*_{it} - D_{it-1}$ where D^*_{it} represents target leverage, which is estimated by Equation (2.6). See Table 2.1 for variable definitions and Table 2.2 for target leverage estimation. D^a_{it} (D^b_{it}) is a dummy variable equal to 1 if current market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. D^s_{it} (D^d_{it}) is a dummy variable equal to 1 if the financing gap is negative (positive) and 0 otherwise. My sample includes 79,525 firm-year observations for firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal. *AR2* reports the *p*-value of the test for no second-order serial correlation, which is asymptotically distributed as *N(0,1)* under the null hypothesis of no serial correlation. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

		France	Germany	Japan	UK	US
		(1)	(2)	(3)	(4)	(5)
D^s_{it}	(i)	-0.011	-0.023	-0.037**	-0.035**	-0.026**
		(-0.61)	(-1.72)	(-8.36)	(-5.75)	(-6.75)
D^d_{it}	(ii)	0.026	0.036**	0.021**	0.023**	0.027**
		(1.42)	(2.84)	(4.47)	(3.98)	(7.01)
$Dev_{it}.\ D^a_{it}.\ D^s_{it}$	(iii)	0.396**	0.349**	0.224**	0.290**	0.277**
		(10.19)	(7.34)	(16.42)	(10.77)	(16.34)
$Dev_{it}.\ D^a_{it}.\ D^d_{it}$	(iv)	0.732**	0.792**	0.646**	0.740**	0.664**
		(19.74)	(17.89)	(27.63)	(27.60)	(37.53)
$Dev_{it}.\ D^b_{it}.\ D^s_{it}$	(v)	0.562**	0.550**	0.500**	0.555**	0.569**
		(14.69)	(10.54)	(35.61)	(16.02)	(26.49)
$Dev_{it}.\ D^b_{it}.\ D^d_{it}$	(vi)	0.433**	0.257**	0.339**	0.245**	0.241**
		(9.91)	(6.27)	(16.34)	(6.99)	(10.55)
Intercept		-0.006	0.001	0.007	0.008	0.000
		(-0.35)	(0.08)	(1.68)	(1.49)	(-0.12)
AR2		0.30	0.44	0.00	0.16	0.27
F-test [(i) = (ii)]		0.00	0.00	0.00	0.00	0.00
F-test [(iii) = (iv)]		0.00	0.00	0.00	0.00	0.00
F-test [(v) = (vi)]		0.04	0.00	0.00	0.00	0.00
F-test [(iii) = (v)]		0.00	0.01	0.00	0.00	0.00
F-test [(iv) = (vi)]		0.00	0.00	0.00	0.00	0.00
Observations		4,064	3,602	24,020	11,478	36,361

Chapter 3: Firms' Choices of Securities - International Evidence

3.1. Introduction

In Chapter 2 I have examined how fast firms may adjust toward their target leverage in the presence of costs of deviations from target leverage and costs of adjustments. Since over-levered firms with a financing deficit are likely to experience fastest speeds of adjustments, their incremental financing activities may be guided by the trade-off theory i.e., these firms may retire debt and/or issue equity. Hence, it is interesting to see how these firms' choices of securities may reflect their target leverage adjustments. In addition, according to Myers (2001), Byoun (2008), and de Jong, Verbeek, and Verwijmeren (2011), beside the trade-off theory, firms' financing decisions may be also guided by other capital structure views such as its "close mate" - the pecking-order argument. In this chapter, I take both total costs of leverage adjustments (proposed by the trade-off theory) and costs of adverse selection (proposed by the pecking-order theory) into account to develop asymmetric, logistic models that help examine firms' choices of securities using international data. As far as I am aware, I am among the first in the literature to investigate firms' target adjustments through their choices of securities.

According to Myers (2001), "there is no universal theory of the debt-equity choice, and no reason to expect one" (p. 81). In line with this view, Byoun (2008) develops asymmetric partial adjustment models that allow costs of adverse selection associated with information asymmetries proposed by the pecking-order view and total costs of leverage adjustments (costs of deviations from target leverage and costs of leverage adjustments) suggested by the trade-off argument to be considered within a financing needs-induced adjustment framework. Different from the finding of Chapter 2 that over-levered firms with a financing deficit experience fastest speeds of adjustments, the author shows that leverage adjustments are most likely to occur when over-levered firms face a financing surplus probably due to high costs of deviations from target leverage and low costs of adjustments. However, little is known about how these firms may adjust toward their target leverage through their choices of securities.

Before Byoun (2008), there has been some research on firms' choices of securities. In support of the trade-off view, Hovakimian, Opler, and Titman (2001) show that firms' choices between debt and equity securities do reflect their target adjustments as when visiting capital markets, these choices enable them to adjust toward their target leverage. In line with this view, Hovakimian (2004) shows that firms' debt retirements may reduce their deviations from target leverage. Firms' deviations from target leverage therefore have become an important factor in testing the trade-off theory since their financing behaviors may be said to follow this view if they issue equity (debt) or retire debt (repurchase equity) when being over-levered (under-levered) relative to their target leverage. However, both Hovakimian et al. (2001) and Hovakimian (2004) do not fully account for the asymmetry in firms' choices of securities i.e., how firms' choices of securities may vary contingent on whether being over-levered or under-levered relatively to their target leverage. Costs of deviations from target leverage (e.g., costs of financial distress) for over-levered firms may be higher than those for under-levered firms (Byoun (2008)). Further, over-levered firms are likely to face lower costs of adjustments as they may adjust via debt retirements which tend to be relatively less costly than debt issues. Different levels of costs of deviations from target leverage and costs of adjustments therefore may have some important implications about firms' choices of securities.

In addition to the strand of research on firms' choices of securities that is in favor of the trade-off theory, there are other attempts to examine the relevance of the pecking-order view on these choices. Investigating how well the financing hierarchy can empirically explain firms' observed choices between internal and external and between debt and equity financing by allowing their debt capacities to vary, Leary and Roberts (2010) show that costs of adverse selection associated with information asymmetries can explain about 80% of firms' observed debt and equity issue decisions, which is in line with Byoun (2008) that when these costs are higher for equity than for debt financing, firms with a financing surplus are more likely to retire debt than equity to both save their debt capacities and avoid higher costs of re-issuing equity.[25]

de Jong et al. (2011), through examining which theory of the pecking-order and trade-off theories can explain firms' financing decisions better (e.g., the percentage of firm-years in which their actual financing decisions follow it), find that these two arguments may have different predictions on firms' choices of securities in certain situations when their debt capacities are considered. First, when firms that would be considered as being over-levered by the trade-off theory with a financing deficit have not used up their debt capacities, as guided by the pecking-order view, they may issue debt to avoid relatively higher costs of equity financing. In contrast, according to the trade-off argument, they are likely to issue equity to avoid potential costs of financial distress associated with being over-levered. Second, the trade-off view argues that firms that would be considered as being under-levered by the trade-off theory with a financing surplus may repurchase equity to adjust toward their target leverage while the pecking-

[25] Firms' choices of securities may be also driven by other considerations rather than these two views. In line with the market-timing hypothesis (Baker and Wurgler (2002)), Klein, O'Brien, and Peters (2002); and Elliot, Koëter-Kant, and Warr (2008) find that equity mispricing may be the major driver of such choices. The "managerial investment anatomy" model, however, suggests firms are likely to issue equity if they can achieve an agreement with new investors (Dittmar and Thakor (2007)).

order theory suggests these firms are likely to retire debt to save their debt capacities and avoid higher costs of re-issuing equity.

Following the above lines of argument, I argue that firms' choices of securities can be effectively examined by a unified framework that simultaneously considers both total costs of leverage adjustments and costs of adverse selection associated with information asymmetries. I hence develop asymmetric, logistic models on non-financial firms in five countries - France, Germany, Japan, the UK, and the US to explore the joint impact of these costs on such choices. I expect over-levered (under-levered) firms to be less (more) likely to issue debt but more (less) likely to retire it. When both firms' deviations from targets and financing gaps are considered, I expect firms that would be considered as being over-levered (under-levered) by the trade-off theory with a financing surplus (deficit) to be less (more) likely to issue debt but more (less) likely to retire it, as guided by both the pecking-order and the trade-off views. In situations where these two theories have different predictions on firms' choices of securities, I expect firms' choices of securities to be guided by the trade-off theory as the results in Chapter 2 show that firms exhibit financing behaviors largely consistent with this theoretical framework. Specifically, firms that would be considered as being over-levered (under-levered) by the trade-off theory with a financing deficit (surplus) may stand a lower (higher) probability of issuing debt but a higher (lower) probability of retiring it.

I find that firms' deviations from target leverage may influence their choices of securities largely in the manner suggested by the trade-off theory with under-levered firms being consistently more likely to issue debt. There is, however, weak and mixed evidence for over-levered firms. The coefficients on the interaction term for French and UK firms carry the expected sign (contrary to that for German firms) but are not statistically significant. Over-levered firms in Japan exhibit target adjustments (being less likely to issue debt) while those in the US are still more likely to issue it although their likelihood of debt issues is statistically less than that when they are under-levered. In addition, there is strong evidence that over-levered firms are likely to retire debt, which is contrary to under-levered firms (except for German and Japanese firms).

Letting firms' deviations from target leverage interact with their financing gaps, I find that firms' choices of securities may be explained by both the pecking-order and trade-off theories, especially when these two views have similar predictions on such choices. In favor of both theories, there is strong evidence that firms that would be considered as being over-levered by the trade-off theory with a financing surplus are less likely to issue debt (except for German firms) but more likely to retire it (across all the sample countries). In contrast, firms that would be considered as being under-levered by the trade-off theory with a financing deficit are more likely to issue debt (across all the sample countries) but less likely to retire it (except for French and German firms).

Weakly in line with Leary and Roberts (2010) that firms' debt capacities and costs of adverse selection can effectively explain their choices between debt and equity, when the pecking-order and trade-off theories have conflicting predictions, I generally find mixed and/or weak evidence that on balance seems to lend relatively more support to the former view. Firms that would be considered as being over-levered by the trade-off theory with a financing deficit are more likely to issue debt (except for French firms)[26] but less likely to retire it (particularly relevant to Japanese firms, a behavior contrary to that of French and German firms). Firms that would be considered as being under-levered by the trade-off theory with a financing surplus are less likely to issue debt (except for French and German firms) but more likely to retire it (particularly relevant to Japanese firms).

[26] However, the probability of debt issues in this case is statistically lower than that when they are under-levered, which is still in support of the trade-off theory.

Following Hovakimian et al. (2001) that firms' choices of the form of financing should be examined separately from their choices of the size of financing as firms may determine the level of capital they wish to raise before deciding whether the capital should be raised from debt and equity, I examine how firms' issue/retirement (repurchase) size may be jointly determined by their deviations from target leverage and financing gaps. The results for the issue/retirement (repurchase) equations show patterns largely similar to those of the logistic models.

My mixed and/or weak evidence on firms' choices of securities in situations where the pecking-order and trade-off theories have conflicting predictions on firms' choices of securities suggests the necessity to examine the role of firms' debt capacities on these choices. In a robustness check, in line with the pecking-order theory, I find some evidence that firms that would be considered as being over-levered by the trade-off theory with a financing deficit are likely to issue debt, especially when their leverage exceeds debt capacities by only small amounts while firms that would be considered as being under-levered by the trade-off theory with a financing surplus are more likely to retire it when having small unused debt capacities.

Overall, I find empirical evidence that firms' choices of securities may be influenced by costs of adverse selection proposed by the pecking-order theory even when they have target leverage and attempt to adjust toward it over time. The rest of the chapter is organized as follows. Section 3.2 presents the empirical asymmetric logistic models. Section 3.3 describes the data. Section 3.4 presents the empirical findings. Section 3.5 discusses some additional tests. Section 3.6 reports the robustness checks. Section 3.7 concludes.

3.2. Empirical Models and Methods

3.2.1. Symmetric Logistic Models of Firms' Security Choices

Largely following Hovakimian et al. (2001), I specify the probability that firms issue or retire debt as:

(3.1)
$$\text{Prob}\ (S_{it} = 1 | z_{it}) = \frac{e^{z_{it}}}{1 + e^{z_{it}}},$$

where
$$z_{it} = \lambda_0 + \lambda_1 AbsDev_{it-1}$$

$$+\lambda_2 PROF_{it-1} + \lambda_3 GO_{it-1} + \lambda_4 SPP_{it-1} + \lambda_5 AT_{it-1} + \lambda_6 FS_{it-1} + \lambda_7 NDS_{it-1} + u_{it}.$$

In Equation (3.1), $AbsDev_{it-1}$ stands for the absolute value of firms' deviations from target leverage. $PROF_{it-1}$, GO_{it-1}, SPP_{it-1}, AT_{it-1}, FS_{it-1}, and NDS_{it-1} are firms' profitability, growth opportunities, share price performance, asset tangibility, size, and non-debt tax shields, respectively (see Table 3.1 for these variables' definitions). From Equation (3.1), I will estimate two models, one for firms' debt issues and the other for debt retirements. For the first model, S_{it} is a binary dependent variable that is equal to 1 if firms issue debt and 0 if they issue equity. For the second model, S_{it} is equal to 1 if firms retire debt and 0 if they repurchase equity. Following Hovakimian et al. (2001) and Leary and Roberts (2005), I define debt issues (retirements) as increases (decreases) in firms' total debt (both short-term and long-term) which are greater than or equal to 5% of the book value of their total assets within a given year. Similarly, firms are defined as issuing (repurchasing) equity when increases (decreases) in their common equity divided by total assets are greater than or equal to 5%. The relations between the independent variables in Equation (3.1) and firm' choices of securities are as follows:

Profitability (PROF). The pecking-order theory suggests profitable firms tend to depend less on debt financing as they may have more retained earnings (Myers and Majluf (1984), and Myers (1984)). Recent trade-off models (e.g., Strebulaev (2007)) also share this view. These firms therefore are expected to stand a lower probability of issuing but a higher probability of retiring debt.

Growth opportunities (GO). High-growth firms are more likely to face the debt overhang and underinvestment problems (Myers (1977)) and information asymmetries (Myers and Majluf (1984), and Myers (1984)). They therefore may be less active in the debt market (less likely to issue and retire debt). The story for low-growth firms is different as agency theories argue that cash-rich firms with limited growth opportunities may need to use debt to mitigate the free cash flow problem (Jensen (1986)), implying a higher probability of debt issues but a lower probability of debt retirements.

Share price performance (SPP). Firms with impressive share price performance are less likely to issue debt but more likely to retire it to take advantage of relatively lower costs of equity financing (Baker and Wurgler (2002)).

Asset tangibility (AT). Leary and Roberts (2010) show that firms with high asset tangibility tend to be more active in the debt market to avoid relatively more costly equity financing. According to the agency view, these firms may have more access to the debt market as tangible assets can serve as collaterals better which then help reduce the risk-shifting and asset substitution problems and hence agency costs of debt financing (Jensen and Meckling (1976)), suggesting they are more likely to issue debt but less likely to retire it.

Firm size (FS). The trade-off theory suggests large firms may have more access to the debt market due to lower information costs (Jensen and Meckling (1976), and Titman and Wessels (1988)) and face lower costs of financial distress and agency costs of debt financing, implying they are more likely to issue debt but less likely to retire it.

Non-debt tax shields (NDS). DeAngelo and Masulis (1980) show that non-debt tax shields can be seen as a substitute for the tax benefit of debt financing. The implication here is that firms with large non-debt tax shields may depend less on leverage and hence be less likely to issue but more likely to retire debt to avoid costs of financial distress associated with debt financing.

$AbsDev_{it-1}$ is the absolute value of the difference between firms' target leverage and actual leverage in the last accounting period. It is the most important independent variable in Equation (3.1) to test the trade-off theory which suggests the presence of deviations from target leverage may present firms with a convenient time to adjust toward their targets through their debt versus equity decisions. $AbsDev_{it-1}$ is defined as:

(3.2)
$$AbsDev_{it-1} = \left| D^{*}_{it-1} - D_{it-1} \right|,$$

where D_{it-1} is the book value of firms' total debt scaled by the sum of their market capitalization and the book value of total debt in the last accounting period. D^{*}_{it} is firms' target leverage, which is unobserved but can be specified as:

(3.3)
$$D^{*}_{it} = \hat{\beta}' \mathbf{x}_{it-1},$$

where $\hat{\beta}'$ is a vector of the parameters estimated from a fixed-effects regression of leverage on a vector of firms' characteristics, $\mathbf{x}_{it-1}$. To implement this, I regress firms' actual leverage D_{it} on $\mathbf{x}_{it-1}$ using the following static fixed-effects model:

(3.4)
$$D_{it} = \beta' \mathbf{x}_{it-1} + \varepsilon_{it},$$

where $\mathbf{x}_{it-1}$ represents the vector of independent variables - firms' fundamentals.[27] ε_{it} is an error component that includes firm fixed-effects and an *i.i.d.* error term.

3.2.2. Asymmetric Logistic Models of Firms' Security Choices

Since deviations from target leverage may have an asymmetric impact on firms' target adjustments, they are also likely to exhibit the same pattern of impact on their

[27] Refer to Chapter 2 for the definitions of these variables and the relations between them and leverage.

choices of securities. To adjust toward their target leverage, over-levered firms are less likely to issue debt but likely to retire it, behaviors contrary to those of under-levered firms. Hence, I modify Equation (3.1) to allow for that asymmetry as follows:

(3.5)

$$\text{Prob}\ (S_{it} = 1 | l_{it}) = \frac{e^{l_{it}}}{1 + e^{l_{it}}},$$

where

$$l_{it} = \alpha_0 + \alpha_1 AbsDev_{it-1} D^a_{it-1} + \alpha_2 AbsDev_{it-1} D^b_{it-1}$$

$$+ \alpha_3 PROF_{it-1} + \alpha_4 GO_{it-1} + \alpha_5 SPP_{it-1} + \alpha_6 AT_{it-1} + \alpha_7 FS_{it-1} + \alpha_8 NDS_{it-1} + v_{it},$$

where D^a_{it-1} (D^b_{it-1}) is a dummy variable equal to 1 when firms are over-levered (under-levered) and 0 otherwise. For this chapter, firms are defined as being over-levered (under-levered) if $Dev_{it-1} < 0$ ($Dev_{it-1} \geq 0$). A positive (negative) coefficient on α_1 and α_2 suggests that firms may adjust toward their target leverage via debt issues or retirements (equity issues or repurchases). Different from Hovakimian (2004), I estimate a novel model which fully accounts for the asymmetry in firms' financing choices contingent on whether they have above- or below-target leverage.

The findings in Chapter 2 suggest that firms' financing behaviors may be better guided by the trade-off theory. According to this view, since over-levered firms are likely to face higher costs of financial distress associated with debt financing (Byoun (2008)), they are less likely to issue debt but more likely to retire it. This line of argument leads to the following hypotheses:

Hypothesis 3.1a: The presence of above-target leverage reduces firms' probability of issuing debt.

Hypothesis 3.1b: The presence of above-target leverage increases firms' probability of retiring debt.

In contrast, the trade-off theory suggests under-levered firms are more likely to issue debt to adjust toward their target leverage but less likely to retire it to avoid further deviations from target leverage. Hence, I develop the following hypotheses:

Hypothesis 3.2a: The presence of below-target leverage increases firms' probability of issuing debt.

Hypothesis 3.2b. The presence of below-target leverage reduces firms' probability of retiring debt.

In what follows I discuss the joint impact of firms' deviations from targets and financing gaps on their choices of securities. A financing gap (FG_{it}) is defined as:

(3.6)
$$FG_{it} = NCF_{it} + CDIV_{it} - OSUF_{it} \equiv ND_{it} + NE_{it}.$$

Refer to Chapter 2 for the definitions of NCF_{it}, $CDIV_{it}$, $OSUF_{it}$, ND_{it}, and NE_{it}. Firms experience a financing surplus (deficit) if FG_{it} is negative (positive). Letting firms' financing gaps interact with deviations from targets, I expand Equation (3.5) into:

(3.7)
$$\text{Prob }(S_{it} = 1 | h_{it}) = \frac{e^{h_{it}}}{1+e^{h_{it}}},$$

where
$$h_{it} = \varphi_0 + (\varphi_1 D^s_{it} + \varphi_2 D^d_{it}) AbsDev_{it-1} D^a_{it-1} + (\varphi_3 D^s_{it} + \varphi_4 D^d_{it}) AbsDev_{it-1} D^b_{it-1}$$
$$+\varphi_5 PROF_{it-1} + \varphi_6 GO_{it-1} + \varphi_7 SPP_{it-1} + \varphi_8 AT_{it-1} + \varphi_9 FS_{it-1} + \varphi_{10} NDS_{it-1} + \eta_{it}.$$

Here D^s_{it} (D^d_{it}) is a dummy variable equal to 1 in case of a financing surplus $(FG_{it} < 0)$ (deficit $((FG_{it} \geq 0))$ and 0 otherwise. Firms with a financing deficit may issue either debt or equity or both to offset the gap. In contrast, those with a financing surplus are likely to retire debt or repurchase equity or do both. By letting firms' deviations from target leverage interact with financing gaps, I can borrow the main arguments of both the pecking-order and trade-off theories (e.g., the relevance of adverse selection costs and total costs of leverage adjustments) to shed light on their choices of securities.

First, both the trade-off and pecking-order theories would suggest that firms that would be considered as being over-levered by the trade-off theory with a financing surplus are more likely to use surplus funds to retire their excess debt to avoid potentially high costs of financial distress and save their debt capacities but less likely to issue it. Guided by these views, I develop the following hypotheses:

Hypothesis 3.3a: The presence of both over-target leverage and a financing surplus reduces firms' probability of issuing debt.

Hypothesis 3.3b: The presence of both over-target leverage and a financing surplus increases firms' probability of retiring debt.

The story for firms that would be considered as being over-levered by the trade-off theory with a financing deficit is more complex. As guided by the trade-off theory, they may retire their excess debt to avoid potentially high costs of financial distress associated with being over-levered. However, the deficit may undermine their ability to do so, suggesting a lower likelihood of debt retirements compared with that of over-levered firms with a financing surplus. The pecking-order view, in contrast, argues that due to relatively higher costs of equity financing, firms with a financing deficit may issue debt to offset the deficit as long as they have not used up their debt capacities (de Jong et al. (2011)). However, the fact that they are over-levered in the spirit of the trade-off theory may reduce their access to the debt market, implying a lower probability of debt issues compared with that of firms that would be considered as being under-levered by the trade-off theory with a financing deficit. The results previously reported in Chapter 2 suggest that firms exhibit financing behaviors which are in strong support of the trade-off view. I therefore develop the following hypotheses:

Hypothesis 3.4a: The presence of both over-target leverage and a financing deficit reduces firms' probability of issuing debt.

Hypothesis 3.4b: The presence of both over-target leverage and a financing deficit increases firms' probability of retiring debt.

The trade-off and pecking-order theories also have conflicting predictions on the financing decisions of firms that would be considered as being under-levered by the trade-off theory with a financing surplus (de Jong et al. (2011)). Arguing that these firms should stay close to their target leverage, the former view suggests they are more likely to issue debt but less likely to retire it. In contrast, according to the latter view, they are less likely to issue debt but more likely to retire it to save their debt capacities for future growth opportunities and avoid higher costs of re-issuing equity. I follow the trade-off view and develop the following hypotheses:

Hypothesis 3.5a: The presence of both below-target leverage and a financing surplus increases firms' probability of issuing debt.

Hypothesis 3.5b: The presence of both below-target leverage and a financing surplus reduces firms' probability of retiring debt.

Finally, conditional on having a financing deficit, both theories suggest that firms that would be considered as being under-levered by the trade-off theory should issue debt to offset it. Their probability of debt issues may be higher than that of firms that would be considered as being over-levered by the trade-off theory with a financing deficit. In addition, they are also less likely to retire debt to avoid further deviations and a larger financing deficit. These arguments lead to the following hypotheses:

Hypothesis 3.6a: The presence of both below-target leverage and a financing deficit increases firms' probability of issuing debt.

Hypothesis 3.6b: The presence of both below-target leverage and a financing deficit reduces firms' probability of retiring debt.

3.3. Data, Sample Selection and Descriptive Statistics

Similar to Chapter 2, I use firm-level data during the 1980-2007 period from *Datastream Worldscope*. To construct the share price performance variable, firms are required to have at least two consecutive firm-year observations.[28] In addition, to examine firms' choices of securities, following Hovakimian et al. (2001), I require them to have financial statement and stock price information in the issue year and in the two preceding years. Firms in the financial and utility sectors are excluded. All variables of interest are winsorized at the 0.5% and 99.5% percentiles.

My final sample has 30,584 firm-year observations with 5,513 debt issues (France-395, Germany-330, Japan-1,352, the UK-841, and the US-2,595), 13,369 equity issues (France-570, Germany-515, Japan-2,601, the UK-2,053, and the US-7,630), 5,022 debt retirements (France-294, Germany-236, Japan-2,125, the UK-652, and the US-1,715), and 6,680 equity repurchases (France-282, Germany-289, Japan-872, the UK-1,261, and the US-3,976). Following Hovakimian et al. (2001), I exclude firms which experience dual activities i.e., debt issues and equity issues, debt retirements and equity repurchases, debt issues and equity repurchases, and debt retirements and equity issues. Table 3.1 below summarizes the number of firms and firm-year observations available for each of the sample countries and provides a standard statistics summary for the variables of interest. In Chapter 2, I have discussed these firm-specific characteristics in details so here I only highlight a few important points.

Issuers and retirers (repurchasers) in bank-oriented economies (France, Germany, and Japan), especially those in Japan, on average, tend to be more levered than those in market-oriented economies (the UK and the US) in both measures of

[28] This restriction is different from the 5-year restriction in the previous chapter, thus resulting in a different sample.

leverage, especially the market-based measure. This finding is in line with Fukuda and Hirota (1996) and Antoniou et al. (2008) that due to their close relationships with banks, firms in bank-oriented economies tend to depend relatively more on debt financing as a relatively cheaper source of external financing. Firms in market-oriented economies seem to have relatively more growth opportunities and smaller firm size, which may have an interesting implication about their relative preference for equity financing. The statistics on effective tax rates is closely consistent with that on profitability since firms in both the UK and the US appear to be less profitable and hence subject to lower effective tax rates.

3.4. Empirical Results

3.4.1. Target Leverage Regression Results

Table 3.2 reports the fixed-effect estimation results for firms' target leverage, as specified by Equation (3.4). The estimation results here are largely similar to those reported previously in Table 2.2 of Chapter 2 so refer to this chapter for the discussion of the relations between target leverage and its determinants.

Table 3.1: Summary Statistics

This table presents the descriptive statistics (mean – MEA, median – MED, and standard deviation – STD) of the variables considered in the chapter. My sample includes 80,049 firm-year observations for firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Book leverage (BL_{t-1}) is the ratio of the book value of total debt (WC03255) to the book value of total assets (WC02999). Market leverage (ML_{t-1}) is the ratio of the book value of total debt to the sum of the market value of equity (market capitalization (WC08001)) and the book value of total debt. Profitability ($PROF_{t-1}$) is operating income (WC01250) scaled by book value of total assets (WC02999). Growth opportunities (GO_{t-1}) are the market-to-book ratio (market value of total assets scaled by the book value of total assets). Share price performance (SPP_{t-1}) is changes in share prices (WC05001) scaled by share prices in the last period. Asset tangibility (AT_{t-1}) is fixed assets (WC02501) scaled by the book value of total assets (WC02999). Firm size (FS_{t-1}) is the natural log of the book value of total assets measured in 1980 US$ value (WC07230). Effective tax rates (ETR_{t-1}) are income taxes (WC01451) scaled by pre-tax income (WC01401). Dividend payout (DPO_{t-1}) is total common dividends paid (WC05376) scaled by net income used to calculate basic Earnings Per Share (WC01706). Non-debt tax shields (NDS_{t-1}) are depreciation, depletion and amortization (WC01151) scaled by the book value of total assets (WC02999). Earnings volatility (EV_{t-1}) is the absolute value of the difference between first difference of annual earnings (WC01706) (% change) and average of first differences.

	France			Germany			Japan			UK			US		
	MEA	MED	STD	MEA	MED	STD	MEA	MED	STD	MEA	MED	STD	MEA	MED	STD
BL_{t-1}	0.231	0.220	0.165	0.218	0.195	0.186	0.244	0.215	0.201	0.178	0.152	0.165	0.220	0.192	0.198
ML_{t-1}	0.300	0.265	0.232	0.289	0.245	0.250	0.346	0.314	0.273	0.190	0.137	0.192	0.219	0.144	0.234
$PROF_{t-1}$	0.027	0.047	0.132	0.004	0.021	0.178	0.046	0.039	0.055	0.003	0.066	0.279	-0.012	0.070	0.304
GO_{t-1}	1.131	0.826	1.048	1.098	0.815	1.135	0.924	0.712	0.870	1.678	1.082	2.184	2.158	1.231	3.022
SPP_{t-1}	-0.163	0.054	0.956	-0.322	0.023	1.647	-0.053	0.020	0.508	-0.286	0.023	1.278	-0.419	0.041	2.965
AT_{t-1}	0.199	0.163	0.163	0.253	0.225	0.186	0.309	0.296	0.172	0.300	0.249	0.247	0.288	0.229	0.228
FS_{t-1}	11.751	11.459	2.200	11.889	11.634	2.032	12.574	12.370	1.579	10.482	10.325	2.110	11.412	11.385	2.331
ETR_{t-1}	0.254	0.330	0.475	0.234	0.302	0.626	0.375	0.431	0.602	0.193	0.256	0.411	0.230	0.322	0.385
DPO_{t-1}	0.245	0.157	0.666	0.383	0.025	1.517	0.330	0.185	1.082	0.302	0.195	1.028	0.139	0.000	0.517
NDS_{t-1}	0.057	0.047	0.048	0.064	0.051	0.057	0.031	0.027	0.023	0.049	0.039	0.045	0.055	0.045	0.051
EV_{t-1}	3.546	0.754	11.044	6.396	1.167	21.778	3.636	0.887	11.573	4.239	0.897	13.560	4.219	0.964	13.703
Observations		4,348			3,564			24,362			12,645			39,130	

Table 3.2: Fixed-Effects Regression of Target Leverage

This table presents the fixed-effects regression results for the target leverage model (3.4):

$$D_{it} = \beta' \mathbf{x}_{it-1} + \varepsilon_{it},$$

where D_{it} is firms' market leverage and $\mathbf{x}_{it-1}$ represents the vector of the independent variables. See Table 3.1 for these variables' definitions. My sample includes 84,049 firm-year observations for France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. ** and * indicate the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

	Predicted sign	France	Germany	Japan	UK	US
		(1)	(2)	(3)	(4)	(5)
$PROF_{it-1}$	-/+	-0.164**	-0.113**	-0.843**	-0.057**	-0.104**
		(-3.86)	(-3.48)	(-17.94)	(-5.80)	(-13.07)
GO_{it-1}	-	-0.010**	-0.007	0.001	-0.003**	-0.006**
		(-3.19)	(-1.67)	(0.31)	(-3.38)	(-11.28)
AT_{it-1}	+	0.197**	0.262**	0.126**	0.139**	0.136**
		(2.77)	(4.37)	(4.17)	(5.51)	(7.64)
FS_{it-1}	+	0.034**	0.054**	0.041**	0.055**	0.048**
		(4.50)	(5.51)	(6.72)	(14.55)	(18.41)
ETR_{it-1}	+	0.003	-0.013**	0.002	-0.010**	-0.004
		(0.76)	(-3.29)	(1.57)	(-2.59)	(-1.53)
DPO_{it-1}	-/+	0.004	0.002	-0.002*	0.001	-0.001
		(1.25)	(1.45)	(-2.40)	(0.85)	(-0.37)
NDS_{it-1}	-/+	-0.244**	-0.251**	-0.094	0.052	0.004
		(-2.68)	(-2.89)	(-0.75)	(0.86)	(0.13)
SPP_{it-1}	-	-0.024**	-0.010**	-0.058**	-0.009**	-0.003**
		(-7.94)	(-3.78)	(-22.64)	(-6.50)	(-3.91)
EV_{it-1}	-	0.001*	$2*10^{-4}$	0.001**	$5*10^{-4}$**	0.001**
		(2.05)	(0.71)	(9.57)	(2.59)	(5.52)
R^2		0.13	0.10	0.19	0.10	0.09
Observations		4,348	3,564	24,362	12,645	39,130

3.4.2. Major Features of Issuers/Retirers (Repurchasers) of Securities

In Table 3.3, I discuss some main features of four groups of firms including debt issuers (1), debt retirers (2), equity issuers (3), and equity repurchasers (4) (e.g., the mean levels of their leverage, fundamentals, and deviations from target leverage in the last accounting period and financing gaps in the current accounting period) to see whether there is any link between these features and their actual financing decisions.

Debt issuers. As can be seen from Panel A of Table 3.3, there is consistent evidence across all the sample countries that debt issuers tend to be highly levered in both measures of leverage relative to equity issuers and repurchasers in the last accounting period. In addition, they on average have relatively few growth opportunities (except for German and Japanese firms), high asset tangibility, big firm size, and low earnings volatility. In the spirit of the trade-off theory, these features may suggest lower costs of financial distress associated with debt financing and better access to the debt market for these firms. More importantly, debt issuers on average seem to be under-levered in the last accounting period and face a financing deficit in the current period. These findings lend strong support to both Hypothesis 3.2a and Hypothesis 3.6a.

Debt retirers. According to Panel B of Table 3.3, these firms appear to be most levered and hence need to reduce their leverage. Further, they have relatively few growth opportunities, high asset tangibility, and big firm size. According to the trade-off view, similar to debt issuers, these firms may have more access to the debt market. Contrary to debt issuers, however, debt retirers tend to be over-levered and face a financing surplus. This evidence is hence in favor of Hypothesis 3.1b and Hypothesis 3.3b.

Equity issuers. Panel C of Table 3.3 shows that these are consistently least levered among the four groups of firms. The presence of relatively high levels of growth opportunities (especially UK and US firms), low asset tangibility, and small firm size may undermine their access to the debt market. Equity issuers' financing choices therefore may be driven by their growth perspective and limited access to that market. Although they on average seem to be under-levered (except for French firms which are slightly over-levered), the magnitude of their deviations from targets is usually small compared with that of debt issuers' and debt retirers', suggesting these firms may have stayed close to their target leverage. Hence, given their limited access, they may not visit the debt market when in need of external financing. Finally, different from firms in other countries, UK and US firms on average appear to face a large financing deficit.

Equity repurchasers. As can be seen from Panel D of Table 3.3, these firms are lowly levered and have a lot of growth opportunities (except for German and Japanese firms), relatively low asset tangibility, small firm size, and high earnings volatility, which may limit their access to the debt market. Except for Japanese equity issuers, those in other sample countries seem to be slightly under-levered. French and Japanese firms turn out to face a small financing surplus while those in Germany and the UK appear to experience a small financing deficit. US firms repurchase their equity even when facing a large financing deficit, probably to complete their committed share repurchase programs.

Overall, from Table 3.3, I find evidence in support of hypotheses 3.1b, 3.2a, 3.3b, and 3.6a on firms' choices of securities. Conditional on having better access to the debt market, under-levered (over-levered) firms with a financing deficit (surplus) may issue (retire) debt to both offset cash flow imbalances and close out deviations from targets. These findings support both the trade-off and pecking-order theories. In line with Hovakimian (2004) that firms' target adjustments may be exhibited more prominently through their debt financing decisions, I find that, different from debt issuers and debt retirers, equity issuers and repurchasers on average tend to have stayed close to their targets (very small deviations) and have less access to the debt market.

Table 3.3: Firms' Major Characteristics Conditional on Financing Activities

This table summarizes major characteristics of different kinds of security issuers/ retirers (repurchasers) in five countries - France, Germany, Japan, the UK, and the US. See Table 3.1 for the definitions of book leverage (BL_{t-1}), market leverage (ML_{t-1}), profitability ($PROF_{t-1}$), growth opportunities (GO_{t-1}), asset tangibility (AT_{t-1}), firm size (FS_{t-1}), earnings volatility (EV_{t-1}), and financing gap (FG_t). Deviations from target leverage (Dev_{t-1}) are the difference between target and actual leverage. *t*-statistics reports the *t*-value of the *t*-test for the hypothesis that the coefficient estimates for each pair of scenarios are equal.

	Panel A	**Panel B**	**Panel C**	**Panel D**						
	Debt Issuers (1)	Debt Retirers (2)	Equity Issuers (3)	Equity Repurchasers (4)	*t* - stats					
POOLED	Mean	Mean	Mean	Mean	(1)-(2)	(1)-(3)	(1)-(4)	(2)-(3)	(2)-(4)	(3)-(4)
BL_{t-1}	0.270	0.376	0.122	0.145	-23.90	48.12	31.27	78.65	55.38	-8.19
ML_{t-1}	0.291	0.472	0.106	0.181	-32.23	54.04	21.11	99.80	52.32	-22.79
$PROF_{t-1}$	0.061	0.032	0.050	-0.177	9.03	1.54	23.99	-2.54	19.68	27.77
GO_{t-1}	1.269	0.957	2.777	2.124	10.25	-15.85	-8.08	-17.93	-10.40	6.41
AT_{t-1}	0.358	0.325	0.254	0.215	6.12	25.73	30.18	17.41	23.71	11.04
FS_{t-1}	12.294	12.449	11.515	10.544	-3.10	18.79	36.51	21.23	37.75	25.23
EV_{t-1}	3.247	4.046	2.922	6.210	-2.75	1.55	-9.22	4.76	-6.00	-14.23
Dev_{t-1}	0.035	-0.085	0.016	0.002	41.77	10.91	13.88	-51.45	-33.34	8.39
FG_t	0.088	-0.084	0.064	0.078	43.46	5.08	1.15	-28.33	-16.35	-2.05
Observations	3,593	3,099	9,947	4,890						
FRANCE										
BL_{t-1}	0.254	0.366	0.181	0.213	-3.89	2.49	0.97	5.75	3.25	-0.75
ML_{t-1}	0.359	0.459	0.172	0.256	-2.06	4.87	1.78	7.42	3.48	-1.84
$PROF_{t-1}$	0.043	0.022	0.045	-0.073	1.33	-0.08	4.31	-1.01	3.89	4.01
GO_{t-1}	0.951	0.955	1.392	1.011	-0.04	-2.30	-0.42	-2.26	-0.42	1.70
AT_{t-1}	0.226	0.273	0.163	0.143	-1.49	2.47	2.46	3.79	3.27	0.63
FS_{t-1}	13.457	13.665	12.280	11.414	-0.40	2.62	3.51	2.95	3.67	1.65
EV_{t-1}	1.611	7.491	4.024	8.351	-1.90	-1.16	-2.04	1.14	-0.18	-1.30
Dev_{t-1}	0.033	-0.063	-0.002	0.010	4.39	2.40	1.15	-3.83	-3.37	-0.89
FG_t	0.067	-0.072	0.011	-0.004	10.20	5.15	3.50	-9.24	-3.73	1.07
Observations	43	41	77	32						

Table 3.3 – Cont.

	Panel A	**Panel B**	**Panel C**	**Panel D**						
	Debt Issuers (1)	Debt Retirers (2)	Equity Issuers (3)	Equity Repurchasers (4)	*t* - stats					
GERMANY	Mean	Mean	Mean	Mean	(1)-(2)	(1)-(3)	(1)-(4)	(2)-(3)	(2)-(4)	(3)-(4)
BL_{t-1}	0.274	0.340	0.111	0.130	-1.83	6.30	4.65	7.30	5.61	-0.76
ML_{t-1}	0.322	0.479	0.113	0.192	-3.04	6.92	3.11	9.25	5.17	-2.57
$PROF_{t-1}$	0.025	-0.011	0.055	-0.139	1.32	-1.04	4.60	-1.64	2.57	5.95
GO_{t-1}	0.988	0.860	1.585	0.933	1.13	-2.75	0.41	-2.44	-0.42	3.32
AT_{t-1}	0.268	0.263	0.198	0.154	0.12	2.29	3.75	1.75	3.22	1.83
FS_{t-1}	12.388	12.900	11.609	11.012	-0.94	2.35	3.83	2.93	4.00	2.09
EV_{t-1}	6.394	13.293	6.419	9.955	-1.05	-0.01	-0.92	1.18	0.56	-1.01
Dev_{t-1}	0.024	-0.062	0.007	0.010	3.28	1.27	0.91	-4.26	-3.66	-0.23
FG_t	0.098	-0.065	0.017	0.002	8.74	5.83	8.22	-4.66	-5.20	1.38
Observations	52	27	109	73						
JAPAN										
BL_{t-1}	0.309	0.397	0.132	0.225	-9.56	23.43	6.65	42.14	15.72	-10.39
ML_{t-1}	0.376	0.538	0.152	0.323	-13.65	23.45	3.20	47.19	14.61	-14.53
$PROF_{t-1}$	0.047	0.032	0.100	0.018	7.39	-19.38	8.33	-32.04	5.23	22.52
GO_{t-1}	0.991	0.810	1.491	0.935	6.98	-9.61	1.21	-17.37	-3.73	8.25
AT_{t-1}	0.352	0.337	0.270	0.294	1.82	11.09	5.26	10.84	4.35	-2.79
FS_{t-1}	13.501	13.576	13.258	12.993	-1.09	3.55	5.51	5.72	7.21	3.21
EV_{t-1}	2.485	3.697	1.770	10.242	-2.16	2.14	-8.15	5.18	-7.15	-13.40
Dev_{t-1}	0.029	-0.064	0.019	-0.024	17.93	2.52	8.74	-22.77	-6.51	9.11
FG_t	0.070	-0.086	0.001	-0.016	60.70	30.66	24.30	-48.91	-24.23	6.68
Observations	643	1,109	1,614	382						

Table 3.3 – Cont.

	Panel A	**Panel B**	**Panel C**	**Panel D**						
	Debt Issuers (1)	Debt Retirers (2)	Equity Issuers (3)	Equity Repurchasers (4)	*t* - stats					
UK	Mean	Mean	Mean	Mean	(1)-(2)	(1)-(3)	(1)-(4)	(2)-(3)	(2)-(4)	(3)-(4)
BL_{t-1}	0.215	0.301	0.114	0.133	-9.63	14.54	10.30	25.28	20.00	-2.90
ML_{t-1}	0.222	0.379	0.105	0.174	-14.51	16.16	4.69	33.00	17.65	-9.27
$PROF_{t-1}$	0.073	0.048	0.034	-0.095	4.14	3.29	14.21	1.02	10.73	10.26
GO_{t-1}	1.219	0.985	2.059	1.457	4.28	-8.90	-3.04	-10.06	-5.39	6.45
AT_{t-1}	0.376	0.337	0.264	0.236	2.72	9.64	11.32	5.97	8.10	2.83
FS_{t-1}	11.126	11.099	10.323	9.938	0.24	8.40	11.28	7.34	10.05	4.24
EV_{t-1}	3.187	3.695	3.477	5.115	-0.80	-0.49	-2.95	0.34	-2.01	-2.81
Dev_{t-1}	0.038	-0.090	0.010	0.003	20.04	6.93	6.65	-20.66	-15.07	1.67
FG_t	0.093	-0.107	0.080	0.019	30.30	1.40	9.65	-18.41	-14.43	7.06
Observations	653	502	1,376	862						
US										
BL_{t-1}	0.276	0.387	0.121	0.140	-17.91	39.62	27.15	57.89	42.40	-5.51
ML_{t-1}	0.284	0.454	0.095	0.167	-21.90	46.03	18.23	74.51	37.74	-18.93
$PROF_{t-1}$	0.063	0.027	0.053	-0.174	7.22	1.66	30.43	-3.43	21.06	36.31
GO_{t-1}	1.358	1.061	2.933	2.068	7.39	-21.98	-10.31	-21.35	-12.17	13.02
AT_{t-1}	0.358	0.314	0.250	0.204	5.71	21.13	26.53	10.86	17.12	11.03
FS_{t-1}	12.264	12.001	11.331	10.409	3.79	18.45	31.78	11.05	23.13	20.82
EV_{t-1}	3.439	4.092	3.019	5.997	-1.69	1.59	-6.26	3.29	-3.77	-10.71
Dev_{t-1}	0.037	-0.089	0.015	0.004	30.30	9.78	10.93	-37.79	-25.48	5.59
FG_t	0.092	-0.075	0.079	0.118	23.36	1.84	-1.43	-15.86	-8.68	-3.40
Observations	2,202	1,420	6,771	3,541						

3.4.3. Univariate Analysis

Table 3.4 summarizes the financing behaviors of different groups of firms conditional on their deviations from target leverage (over- versus under-levered firms), financing gaps (firms with a financing surplus versus those with a financing deficit), and the interaction between these factors (over-/ under-levered firms with a financing surplus/ deficit). In particular, I report the mean levels of their leverage and financing gaps in the last and current accounting periods, respectively and the mean levels of debt and equity issues, debt retirements, and equity repurchases in the current accounting period for each of these groups of firms.

Over-levered versus under-levered firms (A-firms versus B-firms). The results in Panel A of Table 3.4 suggest that over-levered firms tend to be much more levered than under-levered firms (in both measures of leverage). In line with the trade-off theory (Hypothesis 3.1a and Hypothesis 3.1b), I find that over-levered firms attempt to adjust toward their targets by having positive net equity issues and negative net debt issues. Contrary to UK and US firms, under-levered firms in France and Germany also exhibit their target adjustments by having positive net debt issues which on average are larger than their net equity issues, a finding in favor of Hypothesis 3.2a and Hypothesis 3.2b.

Firms with a financing surplus versus firms with a financing deficit (S-firms versus D-firms). Panel B of Table 3.4 outlines some major differences between firms' financing behaviors conditional on their financing gaps. I show that firms with a financing surplus tend to be more levered than those with a financing deficit (except for French and German firms where the difference is not statistically significant). Their surplus funds allow these firms to repurchase a part of their equity and retire some of their debt. However, debt reductions, especially long-term debt reductions, seem to be far more significant than equity repurchases, a finding in line with both the trade-off and pecking-order theories. My evidence to some extent supports the US finding of

Hovakimian (2004) that over-levered firms clearly exhibit their target adjustments through long-term debt reductions. In contrast, firms with a financing deficit need to offset it by issuing both debt and equity (positive net debt issues and net equity issues), a finding in support of the evidence reported earlier in Chapter 2 that these firms tend to have more pressures to visit capital markets to offset the deficit, thus having more opportunities to adjust their debt-equity mixes appropriately. As expected, firms in bank-oriented economies appear to depend relatively more on debt while those in market-oriented economies seem to rely relatively more on equity financing.

Panel C of Table 3.4 reports firms' financing behaviors contingent on different interactions between their deviations from target leverage and financing gaps.

Over-levered firms with a financing surplus (AS-firms). The results show that these firms are most levered among the four groups of firms. They experience both negative net equity issues (with the exception of French firms which on average have positive net equity issues) and net debt issues although the magnitude of the latter is far more significant due to large amounts of both long-term and short-term debt reductions, thus leading to an overall decline in their leverage. This evidence therefore appears to support Hypothesis 3.3b (both the trade-off and the pecking-order theories) that in the presence of a financing surplus, firms that would be considered as being over-levered by the trade-off theory are likely to retire debt to avoid potential costs of financial distress and save their debt capacities.

Over-levered firms with a financing deficit (AD-firms). These firms are also highly levered. To offset the deficit, they depend on both debt and equity financing. Comparing the magnitude of their net debt issues with that of their net equity issues, it seems that French and especially UK and US firms depend relatively more on equity financing. This finding appears to support the trade-off argument (Hypothesis 3.4a) that over-levered firms with a financing deficit may stand a lower probability of debt issues.

However, German and Japanese firms' net debt issues are larger than net equity issues, suggesting their financing behaviors may be better guided by the pecking-order view, a finding in rejection of Hypothesis 3.4a.

Under-levered firms with a financing surplus (BS-firms). There is evidence that these lowly levered firms use their surplus funds mainly to retire debt (except for US firms which experience larger negative net equity issues than net debt issues), which is in rejection of Hypothesis 3.5b but consistent with the pecking-order argument that firms that would be considered as being under-levered by the trade-off theory with a financing surplus are more likely to retire debt to save their debt capacities and avoid high costs of re-issuing equity. The financing behaviors of US firms may lend more support to the trade-off view (Hypothesis 3.5b).

Under-levered firms with a financing deficit (BD-firms). These firms on average also tend to be lowly levered. To offset the deficit, firms in bank-oriented (market-based) economies appear to rely more on debt (equity) financing. The finding for under-levered firms in bank-oriented economies supports Hypothesis 3.6a (both the trade-off and the pecking-order theories) that these firms may issue debt to both move closer to their target leverage and offset the deficit. UK and US firms' relative more reliance on equity financing even when they are under-levered may partially capture their preference for this source of financing.

In brief, from Table 3.4, largely in favor of hypotheses 3.3b, 3.4a, 3.5b, and 3.6a, I find evidence that firms' financing decisions may be significantly influenced by their deviations from targets and financing gaps. The financing behaviors of firms that would be considered as being over-levered (under-levered) by the trade-off theory with a financing surplus (deficit) tend to support both the trade-off and pecking-order theories. However, those of firms that would be considered as being over-levered by the trade-off theory with a financing deficit can be better explained by either the trade-off

(French, UK, and US firms) or the pecking-order views (German and Japanese firms). Firms that would be considered as being under-levered by the trade-off theory with a financing surplus in the US seem to follow this view while those in other sample countries exhibit behaviors consistent with the pecking-order argument.

3.4.4. Multivariate Analysis

3.4.4.1. Determinants of Firms' Choices of Security Issues

This section discusses the influence of firms' fundamentals on their propensity to issue debt before proceeding to the asymmetric impact of firms' deviations from target leverage and financing gaps on that propensity. Table 3.5, Table 3.6, and Table 3.7 present how firms' choices of security issues may be shaped based on Equations (3.1), (3.5), and (3.7) respectively. The pseudo R^2 measures the logistic models' predictive strength and the classification test evaluates their predictive accuracy i.e., the percentage of correctly predicted cases. I also report robust standard errors (White heteroskedastic-consistent errors) and the marginal effects.[29]

A. The impact of firms' fundamentals on their choices of security issues

According to Table 3.5 (columns 1, 3, 5, 7, and 9), consistent with the pecking-order and dynamic trade-off theories (Myers and Majluf (1984), Myers (1984), and Strebulaev (2007)), profitable firms in Japan and the US are less likely to issue debt. In line with the debt overhang and underinvestment (Myers (1977)) and information asymmetry (Myers and Majluf (1984), and Myers (1984)) arguments, high-growth firms are less likely to do so, a finding to some extent in support of Fama and French (2002) and Lemmon and Zender (2010) that equity issuers tend to be high-growth firms.

[29] In Chapter 2 and Chapter 4, unobserved individual fixed effects and the generated regressor problem have been accounted for by the SYS-GMM estimator. However, in this chapter, the logistic estimator does not account for these issues. I deal with these issues in a robustness check in Section 3.6.2.

There is evidence in favor of the market timing hypothesis (Baker and Wurgler (2002)) (except for French and US firms). Conditional on having impressive share price performance, firms are less likely to issue debt when in need of external financing.

In support of the agency view (Jensen and Meckling (1976)), I find that firms with high asset tangibility are more likely to issue debt. This tendency is particularly clear among firms in bank-oriented economies, implying their relative preference for debt financing. As tangible assets serve as collaterals better, firms with higher asset tangibility may experience fewer risk-shifting and asset substitution problems and hence lower costs of debt financing. They therefore should be more active in the debt market to avoid higher costs associated with equity financing (Leary and Roberts (2010)).

I also find evidence on the impact of firms' size on their choices of securities. Consistent with the trade-off theory (Jensen and Meckling (1976), and Titman and Wessels (1988)), except for firms in Japan, big firms in all other countries are more likely to issue debt. The evidence among Japanese firms remains somewhat puzzling.

Finally, the results show that non-debt tax shields may have significant effects on firms' choices of securities in the UK and the US. An increase in this variable may lead to a rise in the likelihood of debt issues among UK firms, which is in contrast to the argument of DeAngelo and Masulis (1980) that firms are less likely to issue debt in the presence of large non-debt tax shields. However, consistent with that argument, an increase in the variable may reduce the probability of debt issues among US firms. The inconsistent impact of non-debt tax shields on firms' financing decisions has been well documented by previous studies. According to Mackie-Mason (1990), a positive relation between firms' leverage and non-debt tax shields can be justified when depreciation accounts for the major part of their non-debt tax shields. In addition, Antoniou et al. (2008) find that non-debt tax shields may be endogenously determined for they are a function of firms' investment decisions.

Table 3.4: Firms' Financing Decisions Conditional on Deviations from Target Leverage and Financing Gaps

This table summarizes major characteristics of different groups of firms: A-firms with above-target leverage in the last accounting period, B-firms with below-target leverage, S-firms with a financing surplus, D-firms with a financing deficit, AS-firms with above-target leverage and a financing surplus, AD-firms with above-target leverage and a financing deficit, BS-firms with below-target leverage and a financing surplus, and BD-firms with below-target leverage and a financing deficit in five countries-France, Germany, Japan, the UK, and the US. See Table 3.1 for the definitions of book leverage (BL_{t-1}) and market leverage (ML_{t-1}). *Equity proceeds* are net proceeds from sales/issues of common and preferred equity (WC04251) scaled by total assets (WC02999). *Equity repurchases* are common/preferred equity purchased, retired, converted, and redeemed (WC04751) scaled by total assets. Long-term (L-T) borrowings (WC04401), increase/decrease in short-term (S-T) borrowing (WC04821), and long-term (L-T) debt reductions (WC04701) are scaled by total assets. *Net equity issues* and *net debt issues* are the net difference between equity proceeds and equity repurchases and between L-T borrowings, L-T debt reductions and S-T borrowings, respectively. *t*-statistics reports the *t*-value of the *t*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal.

	Panel A			Panel B			Panel C									
	A (1)	B (2)	*t* - stats	S (1)	D (2)	*t* - stats	AS (1)	AD (2)	BS (3)	BD (4)	*t* - stats					
POOLED	Mean	Mean	(1)-(2)	Mean	Mean	(1)-(2)	Mean	Mean	Mean	Mean	(1)-(2)	(1)-(3)	(1)-(4)	(2)-(3)	(2)-(4)	(3)-(4)
BL_{t-1}	0.244	0.141	40.97	0.225	0.159	25.80	0.289	0.197	0.153	0.133	22.78	36.01	47.42	11.38	19.10	6.61
ML_{t-1}	0.296	0.130	54.19	0.264	0.161	32.08	0.367	0.222	0.146	0.119	27.51	45.91	62.06	16.47	26.79	8.31
Equity Proceeds $_t$	0.058	0.056	0.77	0.007	0.097	-29.68	0.006	0.113	0.008	0.086	-24.23	-4.41	-20.23	22.22	4.89	-18.43
Equity Repurchases $_t$	0.008	0.014	-13.92	0.020	0.004	33.29	0.012	0.003	0.029	0.005	15.76	-17.74	13.76	-30.71	-5.90	32.88
L-T Borrowings $_t$	0.060	0.055	1.74	0.042	0.070	-11.81	0.051	0.069	0.032	0.070	-4.98	5.74	-6.05	10.85	-0.46	-12.40
L-T Debt Reductions $_t$	0.067	0.041	13.37	0.069	0.040	14.82	0.087	0.046	0.048	0.037	13.24	12.53	18.82	-0.94	3.64	4.80
S-T Borrowings $_t$	-0.008	0.004	-15.88	-0.015	0.010	-33.03	-0.022	0.007	-0.008	0.012	-24.59	-14.98	-31.45	13.85	-4.68	-19.67
Net Equity Issues $_t$	0.050	0.042	2.90	-0.013	0.093	-34.42	-0.006	0.110	-0.021	0.081	-26.00	16.83	-21.75	27.34	5.24	-23.74
Net Debt Issues $_t$	-0.015	0.018	-22.11	-0.042	0.040	-55.94	-0.058	0.030	-0.024	0.045	-43.34	-24.80	-49.84	27.72	-6.68	-33.58
FG_{it}	0.035	0.060	-5.62	-0.055	0.133	-45.60	-0.064	0.140	-0.045	0.136	-34.95	-11.85	-34.38	30.17	1.67	-29.47
Observations	10,040	11,489		9,598	11,931		5,156	4,884	4,442	7,047						
FRANCE																
BL_{t-1}	0.294	0.192	3.99	0.257	0.229	1.05	0.301	0.286	0.203	0.183	0.36	2.40	3.39	2.15	3.16	0.71
ML_{t-1}	0.374	0.206	5.08	0.315	0.265	1.44	0.399	0.346	0.215	0.199	0.95	3.67	4.55	2.59	3.31	0.44
Equity Proceeds $_t$	0.013	0.009	0.79	0.004	0.018	-2.70	0.005	0.022	0.002	0.014	-2.45	1.24	-1.23	2.78	0.82	-1.56
Equity Repurchases $_t$	0.002	0.004	-1.39	0.004	0.003	0.58	0.003	0.001	0.005	0.004	0.71	-0.77	-0.60	-1.31	-1.49	0.39
L-T Borrowings $_t$	0.034	0.041	-0.75	0.028	0.045	-1.95	0.031	0.037	0.025	0.052	-0.47	0.45	-1.61	1.08	-1.27	-2.25
L-T Debt Reductions $_t$	0.046	0.031	1.80	0.054	0.023	3.90	0.062	0.027	0.045	0.020	2.65	1.23	3.78	-1.58	0.84	2.73
S-T Borrowings $_t$	-0.010	0.000	-1.38	-0.024	0.013	-5.29	-0.026	0.008	-0.022	0.017	-3.20	-0.36	-3.85	3.91	-1.07	-4.14
Net Equity Issues $_t$	0.011	0.005	1.12	0.000	0.015	-2.75	0.002	0.021	-0.003	0.010	-2.65	1.43	-1.05	3.13	1.06	-1.54
Net Debt Issues $_t$	-0.023	0.010	-3.30	-0.050	0.035	-10.60	-0.057	0.018	-0.042	0.049	-7.65	-1.30	-8.77	6.41	-2.98	-7.39
FG_{it}	-0.012	0.015	-2.29	-0.050	0.050	-11.60	-0.055	0.039	-0.045	0.059	-8.86	-0.72	-8.95	7.53	-1.75	-7.69
BL_{t-1}	95	98		92	101		50	45	42	56						

Table 3.4 – Cont.

	Panel A			Panel B			Panel C									
	A	B		S	D		AS	AD	BS	BD						
	(1)	(2)	*t* - stats	(1)	(2)	*t* - stats	(1)	(2)	(3)	(4)	*t* - stats					
GERMANY	Mean	Mean	(1)-(2)	Mean	Mean	(1)-(2)	Mean	Mean	Mean	Mean	(1)-(2)	(1)-(3)	(1)-(4)	(2)-(3)	(2)-(4)	(3)-(4)
BL_{t-1}	0.198	0.149	2.20	0.181	0.168	0.59	0.208	0.189	0.142	0.153	0.57	1.87	1.87	1.33	1.26	-0.33
ML_{t-1}	0.283	0.153	4.56	0.234	0.204	0.99	0.289	0.277	0.154	0.152	0.23	2.79	3.73	2.52	3.45	0.05
Equity Proceeds $_t$	0.011	0.020	-1.33	0.003	0.023	-3.34	0.002	0.019	0.003	0.026	-3.03	-0.45	-2.54	2.41	-0.73	-2.03
Equity Repurchases $_t$	0.003	0.002	0.53	0.005	0.001	2.92	0.005	0.000	0.004	0.001	2.06	0.19	2.19	-1.95	-0.52	1.97
L-T Borrowings $_t$	0.031	0.037	-0.63	0.020	0.043	-2.75	0.021	0.041	0.018	0.045	-1.68	0.27	-2.15	1.71	-0.33	-2.10
L-T Debt Reductions $_t$	0.025	0.020	1.12	0.031	0.016	3.18	0.033	0.017	0.029	0.016	2.14	0.50	3.01	-1.42	0.33	2.12
S-T Borrowings $_t$	-0.010	0.004	-2.56	-0.023	0.010	-6.06	-0.027	0.005	-0.017	0.013	-4.17	-0.97	-5.40	2.88	-1.43	-3.84
Net Equity Issues $_t$	0.008	0.018	-1.44	-0.002	0.022	-3.93	-0.003	0.019	-0.001	0.025	-3.68	-0.57	-2.96	2.87	-0.70	-2.31
Net Debt Issues $_t$	-0.004	0.021	-3.03	-0.033	0.037	-9.95	-0.039	0.029	-0.028	0.042	-7.46	-1.39	-8.41	5.41	-1.29	-6.16
FG_{it}	0.004	0.039	-3.22	-0.036	0.059	-11.42	-0.042	0.048	-0.029	0.067	-9.21	-0.99	-9.12	7.00	-1.62	-6.93
Observations	125	136		98	163		58	67	40	96						
JAPAN																
BL_{t-1}	0.298	0.197	15.41	0.268	0.221	6.81	0.318	0.250	0.195	0.200	6.47	14.51	13.30	5.47	4.88	-0.50
ML_{t-1}	0.414	0.221	22.92	0.356	0.266	9.86	0.449	0.333	0.223	0.218	8.19	20.33	20.05	8.52	8.89	0.53
Equity Proceeds $_t$	0.006	0.006	0.23	0.002	0.013	-11.12	0.002	0.015	0.001	0.011	-8.34	2.43	-7.30	8.48	1.36	-7.70
Equity Repurchases $_t$	0.003	0.004	-2.56	0.004	0.002	6.46	0.004	0.002	0.005	0.002	3.90	-3.42	3.20	-5.93	-1.42	5.79
L-T Borrowings $_t$	0.042	0.037	2.24	0.030	0.056	-13.80	0.035	0.057	0.022	0.055	-7.69	6.49	-7.79	12.82	0.38	-12.77
L-T Debt Reductions $_t$	0.057	0.034	12.63	0.055	0.031	12.74	0.066	0.036	0.039	0.028	10.02	10.55	14.99	-1.36	3.36	5.21
S-T Borrowings $_t$	-0.018	-0.001	-12.31	-0.023	0.013	-26.01	-0.029	0.007	-0.015	0.016	-16.65	-7.76	-23.54	12.11	-4.61	-18.51
Net Equity Issues $_t$	0.003	0.002	1.51	-0.002	0.011	-13.59	-0.002	0.013	-0.004	0.009	-9.48	4.38	-8.46	10.82	1.92	-10.60
Net Debt Issues $_t$	-0.033	0.002	-17.74	-0.048	0.038	-51.60	-0.060	0.028	-0.032	0.043	-36.40	-13.54	-44.49	28.87	-5.91	-34.37
FG_{it}	-0.030	0.004	-15.48	-0.050	0.049	-57.04	-0.062	0.041	-0.036	0.052	-41.53	-11.99	-47.50	33.41	-3.86	-36.90
Observations	1,966	1,782		2,336	1,412		1,376	590	960	822						

Table 3.4 – Cont.

	Panel A			Panel B			Panel C									
	A	B		S	D		AS	AD	BS	BD						
	(1)	(2)	*t* - stats	(1)	(2)	*t* - stats	(1)	(2)	(3)	(4)	*t* - stats					
UK	Mean	Mean	(1)-(2)	Mean	Mean	(1)-(2)	Mean	Mean	Mean	Mean	(1)-(2)	(1)-(3)	(1)-(4)	(2)-(3)	(2)-(4)	(3)-(4)
BL_{t-1}	0.217	0.118	18.78	0.203	0.138	11.78	0.252	0.181	0.136	0.108	8.38	14.13	22.09	5.13	10.57	4.30
ML_{t-1}	0.265	0.111	24.44	0.242	0.144	14.70	0.325	0.203	0.128	0.102	11.38	19.53	28.54	7.43	12.92	4.03
Equity Proceeds $_t$	0.054	0.046	1.54	0.004	0.084	-14.73	0.004	0.106	0.004	0.068	-13.09	0.37	-9.71	11.27	4.03	-8.38
Equity Repurchases $_t$	0.004	0.006	-3.46	0.010	0.001	10.27	0.006	0.001	0.015	0.002	5.73	-4.52	4.73	-9.52	-3.14	9.63
L-T Borrowings $_t$	0.027	0.031	-1.56	0.015	0.040	-10.87	0.019	0.037	0.010	0.042	-5.36	3.54	-7.68	7.77	-1.64	-9.97
L-T Debt Reductions $_t$	0.039	0.021	7.98	0.045	0.018	12.40	0.054	0.023	0.033	0.015	8.66	5.17	14.04	-3.01	3.43	7.21
S-T Borrowings $_t$	-0.014	0.005	-10.13	-0.026	0.012	-19.96	-0.035	0.007	-0.013	0.015	-13.87	-6.35	-18.73	8.26	-4.02	-12.46
Net Equity Issues $_t$	0.050	0.040	2.00	-0.006	0.083	-16.00	-0.002	0.105	-0.011	0.066	-13.68	4.03	-10.22	12.56	4.18	-9.76
Net Debt Issues $_t$	-0.026	0.015	-13.51	-0.056	0.034	-33.42	-0.071	0.024	-0.036	0.042	-22.54	-7.25	-30.84	15.38	-6.95	-22.47
FG_{it}	0.024	0.055	-4.43	-0.062	0.117	-31.69	-0.073	0.129	-0.047	0.108	-23.94	-4.70	-26.09	18.76	1.91	-20.19
Observations	1,635	1,758		1,445	1,948		832	803	613	1,145						
US																
BL_{t-1}	0.229	0.136	29.50	0.214	0.152	19.01	0.279	0.187	0.148	0.128	17.69	26.63	35.44	8.12	14.32	5.04
ML_{t-1}	0.260	0.115	39.45	0.231	0.145	22.11	0.331	0.201	0.128	0.107	19.71	33.51	45.51	13.11	20.82	5.50
Equity Proceeds $_t$	0.074	0.079	-0.73	0.010	0.122	-20.19	0.008	0.130	0.011	0.117	-15.56	-4.00	-13.82	15.05	1.44	-13.32
Equity Repurchases $_t$	0.011	0.019	-11.17	0.030	0.005	34.14	0.019	0.004	0.041	0.006	16.94	-14.18	15.57	-30.09	-5.14	32.27
L-T Borrowings $_t$	0.075	0.067	2.10	0.056	0.081	-6.49	0.069	0.080	0.042	0.081	-1.71	4.63	-2.18	7.08	-0.31	-7.98
L-T Debt Reductions $_t$	0.079	0.050	9.23	0.084	0.049	10.81	0.108	0.054	0.058	0.046	10.25	9.03	13.95	-0.84	2.41	3.27
S-T Borrowings $_t$	-0.003	0.006	-7.80	-0.009	0.009	-14.65	-0.013	0.005	-0.004	0.012	-15.53	-9.59	-12.29	8.83	-3.43	-7.84
Net Equity Issues $_t$	0.063	0.060	0.71	-0.020	0.117	-24.72	-0.011	0.126	-0.030	0.111	-17.61	13.71	-15.55	19.78	1.73	-17.76
Net Debt Issues $_t$	-0.007	0.023	-12.67	-0.037	0.041	-32.47	-0.054	0.031	-0.020	0.047	-28.11	-18.32	-27.26	18.27	-4.41	-18.71
FG_{it}	0.056	0.083	-3.67	-0.057	0.158	-27.65	-0.065	0.157	-0.050	0.158	-21.60	-6.16	-19.41	20.22	-0.45	-18.18
Observations	6,219	7,715		5,627	8,307		2,840	3,379	2,787	4,928						

Table 3.5: Firms' Choices of Security Issues

This table presents the logistic regression results for firms' choices of security issues, as modeled by Equation (3.1) where the probability of debt issues is:

$$\text{Prob}\,(S_{it} = 1 | z_{it}) = \frac{e^{z_{it}}}{1 + e^{z_{it}}}.$$

Firms are defined as issuing a security when the net amount issued divided by the book value of total assets is greater than or equal to 5%. Cases when firms issue both debt and equity in a given year are omitted. z_{it} is defined as:

$$z_{it} = \lambda_0 + \lambda_1 AbsDev_{it-1} + \lambda_2 PROF_{it-1} + \lambda_3 GO_{it-1} + \lambda_4 SPP_{it-1} + \lambda_5 AT_{it-1} + \lambda_6 FS_{it-1} + \lambda_7 NDS_{it-1} + u_{it},$$

where target leverage is estimated by Equation (3.3). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. See Table 3.1 for the definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 18,882 issues by firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *z*-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. Pseudo R^2 is calculated as [1-(log-likelihood)]/(log-likelihood) when the slopes are restricted to be 0. Columns (1), (3), (5), (7), and (9) report the estimated coefficients and columns (2), (4), (6), (8), and (10) report their marginal effects. *t*-test reports the *p*-value of the test for the hypothesis that the estimated coefficients for $AbsDev_{it-1}$ in Table 3.5 and Table 3.8 are equal.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$AbsDev_{it-1}$	3.775**	0.898**	7.120**	1.629**	3.258**	0.671**	4.218**	0.780**	3.996**	0.580**
	(3.11)	(3.09)	(5.16)	(5.05)	(5.23)	(5.21)	(6.09)	(5.97)	(11.03)	(9.62)
$PROF_{it-1}$	-1.629	-0.388	-1.041	-0.238	-14.421**	-2.971**	0.175	0.032	-1.291**	-0.187**
	(-1.94)	(-1.93)	(-1.14)	(-1.14)	(-12.98)	(-12.98)	(0.67)	(0.67)	(-8.21)	(-7.41)
GO_{it-1}	-0.413**	-0.098**	-0.529**	-0.121**	-0.197**	-0.041**	-0.390**	-0.072**	-0.526**	-0.076**
	(-3.36)	(-3.43)	(-3.33)	(-3.47)	(-2.62)	(-2.67)	(-6.29)	(-6.96)	(-11.16)	(-16.18)
SPP_{it-1}	-0.104	-0.025	-0.523**	-0.120**	-0.459**	-0.094**	-0.150*	-0.028*	0.002	$3*10^{-4}$
	(-0.73)	(-0.73)	(-2.61)	(-2.58)	(-4.70)	(-4.68)	(-2.08)	(-2.07)	(0.15)	(0.15)
AT_{it-1}	1.789**	0.426**	2.316**	0.530**	2.469**	0.509**	1.070**	0.198**	1.396**	0.203**
	(3.39)	(3.37)	(4.60)	(4.57)	(9.27)	(9.40)	(6.14)	(6.07)	(11.14)	(10.17)
FS_{it-1}	0.181**	0.043**	0.142**	0.032**	-0.061*	-0.013*	0.187**	0.035**	0.186**	0.027**
	(5.01)	(5.02)	(3.28)	(3.26)	(-2.44)	(-2.43)	(7.75)	(7.68)	(13.62)	(12.39)
NDS_{it-1}	-0.581	-0.138	-3.073	-0.703	-1.761	-0.363	3.852**	0.713**	-3.480**	-0.505**
	(-0.30)	(-0.30)	(-1.37)	(-1.37)	(-0.96)	(-0.97)	(3.31)	(3.31)	(-3.76)	(-3.71)
Pseudo R^2	0.10		0.16		0.17		0.11		0.15	
Correct classification	0.67		0.68		0.72		0.72		0.75	
t-test	0.00		0.00		0.00		0.00		0.00	
Equity issues	570		515		2,601		2,053		7,630	
Debt issues	395		330		1,352		841		2,595	
Observations	965		845		3,953		2,894		10,225	

The coefficients on $AbsDev_{it-1}$ in model (3.1) are significant among firms in all the sample countries. In models (3.5) and (3.7), I let $AbsDev_{it-1}$ interact with firms' position relative to their target leverage (over- or under-levered) to allow for the asymmetry and examine its impact on firms' choices of securities.

B. The asymmetric impact of firms' deviations from target leverage on their choices of security issues

In Table 3.6 (columns 1, 3, 5, 7, and 9), I present the logistic results for Equation (3.5) which takes into account the asymmetric impact of firms' deviations from target leverage on their issue choices. The results on the control variables are qualitatively similar to those discussed above so here I only discuss the results on firms' deviations from target leverage. I show that their impact on firms' choices of securities among the under-levered group is largely consistent with the trade-off view. In particular, under-levered firms are more likely to issue debt to adjust toward their target leverage, which provides strong empirical support to Hypothesis 3.2a.

I, however, find mixed and weak evidence on the impact of deviations from target leverage on firms' choices of security issues among over-levered firms. The estimated coefficients for the interaction term are not statistically significant among French, German, and UK firms. In line with the trade-off theory, Japanese firms are less likely to issue debt when they are over-levered, a finding in support of Hypothesis 3.1a that over-levered firms are less likely to visit the debt market to avoid potential further financial distress. In contrast, US firms are still likely to issue debt when being over-levered. This evidence does not necessarily contradict the trade-off view since the *F*-tests reveal that the probability of debt issues among US firms in this case is not the same as that when they are under-levered. The size of the coefficients on the interaction terms then further indicates that the probability of debt issues among US firms is statistically much lower than that when these firms are under-levered.

The finding that over-levered firms in the US are still more likely to issue debt is somewhat puzzling as among this group of firms there are actually only 894 debt issues but 3,228 equity issues during the sample period. Such evidence may not necessarily be in conflict with the earlier result reported in Chapter 2 that these firms may adjust toward their target leverage faster than under-levered firms. Panel A of Table 3.4 shows that although these firms on average tend to issue a lot of long-term debt (7.5% of total assets), they also experience very significant long-term debt deductions (7.9%) and minor short-term debt deductions (0.3%), which then overall lead to slightly negative net debt issues (-0.7%). Further, their equity proceeds appear to be almost equal to long-term debt borrowings (7.4%). Slightly negative debt issues together with significant, positive net equity issues (6.3%) hence allow them to close out a significant part of deviations from target leverage and adjust quickly toward their target leverage.

The mixed evidence among over-levered firms in my sample may be also driven by the presence of firms' debt capacities (de Jong et al. (2011)). The trade-off view, which does not consider these capacities, suggests that firms are less likely to issue debt to avoid potential financial distress associated with being over-levered. In contrast, the pecking-order argument suggests firms that would be considered as being over-levered by the trade-off theory may issue debt if they have not used up their debt capacities to avoid relatively higher costs of equity financing. de Jong et al. (2011) find that on average the latter view justifies firms' choices of securities to be issued better when their leverage is less than debt capacities. I will address this issue latter in a robustness check that considers the role of debt capacities.

In Table 3.7, I let firms' deviations from target leverage interact with financing gaps to examine the joint impact of these two factors on firms' choices of securities. The interaction between these generally leads to an improvement in the explanatory power of the models in terms of the Pseudo R^2 and the classification measure.

Table 3.6: Firms' Choices of Security Issues Conditional on Deviations from Target Leverage

This table presents the logistic regression results for firms' choices of security issues conditional on deviations from target leverage, as modeled by Equation (3.5) where the probability of debt issues is:

$$\text{Prob}\,(S_{it} = 1 | I_{it}) = \frac{e^{I_{it}}}{1+e^{I_{it}}}.$$

Firms are defined as issuing a security when the net amount issued divided by the book value of total assets is greater than or equal to 5%. Cases when firms issue both debt and equity in a given year are omitted. I_{it} is defined as:

$$I_{it} = \alpha_0 + \alpha_1 AbsDev_{it-1} D^a_{it-1} + \alpha_2 AbsDev_{it-1} D^b_{it-1} + \alpha_3 PROF_{it-1} + \alpha_4 GO_{it-1} + \alpha_5 SPP_{it-1} + \alpha_6 AT_{it-1} + \alpha_7 FS_{it-1} + \alpha_8 NDS_{it-1} + v_{it},$$

where target leverage is estimated by Equation (3.3). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. D^a_{it-1} (D^b_{it-1}) is a dummy variable equal to 1 if market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. See Table 3.1 for the definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 18,882 issues by firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *z*-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. Pseudo R^2 is calculated as [1-(log-likelihood)]/(log-likelihood) when the slopes are restricted to be 0. Columns (1), (3), (5), (7), and (9) report the estimated coefficients and columns (2), (4), (6), (8), and (10) report their marginal effects. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$AbsDev_{it-1}.D^a_{it-1}$ (i)	-2.107	-0.500	3.100	0.705	-2.299*	-0.468*	-0.482	-0.088	1.475**	0.210**
	(-1.12)	(-1.12)	(1.87)	(1.86)	(-2.32)	(-2.33)	(-0.46)	(-0.46)	(2.95)	(2.85)
$AbsDev_{it-1}.D^b_{it-1}$ (ii)	5.819**	1.381**	9.068**	2.063**	5.118**	1.041**	6.071**	1.107**	5.159**	0.733**
	(4.14)	(4.10)	(5.54)	(5.43)	(7.44)	(7.48)	(8.04)	(7.84)	(12.96)	(11.21)
$PROF_{it-1}$	-1.523	-0.361	-0.992	-0.226	-14.892**	-3.029**	0.155	0.028	-1.355**	-0.193**
	(-1.63)	(-1.62)	(-1.04)	(-1.04)	(-13.03)	(-13.09)	(0.60)	(0.60)	(-8.45)	(-7.55)
GO_{it-1}	-0.455**	-0.108**	-0.572**	-0.130**	-0.244**	-0.050**	-0.422**	-0.077	-0.555**	-0.079**
	(-3.34)	(-3.42)	(-3.38)	(-3.55)	(-3.01)	(-3.10)	(-6.39)	(-7.19)	(-11.10)	(-16.76)
SPP_{it-1}	-0.243	-0.058	-0.648**	-0.147**	-0.753**	-0.153**	-0.220**	-0.040	-0.010	-0.001
	(-1.25)	(-1.25)	(-2.96)	(-2.92)	(-6.34)	(-6.36)	(-2.86)	(-2.85)	(-0.51)	(-0.51)
AT_{it-1}	1.877**	0.445**	2.391**	0.544**	2.532**	0.515**	1.160**	0.212	1.432**	0.203**
	(3.51)	(3.47)	(4.62)	(4.59)	(9.40)	(9.56)	(6.62)	(6.54)	(11.48)	(10.32)
FS_{it-1}	0.186**	0.044**	0.142**	0.032**	-0.065*	-0.013*	0.184**	0.034	0.188**	0.027**
	(5.05)	(5.06)	(3.27)	(3.24)	(-2.56)	(-2.55)	(7.62)	(7.55)	(13.74)	(12.34)
NDS_{it-1}	-0.554	-0.132	-3.313	-0.754	-1.472	-0.299	3.279**	0.598	-3.681**	-0.523**
	(-0.28)	(-0.28)	(-1.37)	(-1.37)	(-0.79)	(-0.79)	(2.76)	(2.76)	(-4.02)	(-3.95)

Pseudo R^2	0.11	0.17	0.18	0.12	0.15
Correct classification	0.67	0.69	0.75	0.73	0.75
F-test [(i) = (ii)]	0.00	0.00	0.00	0.00	0.00
Equity issues	570	515	2,601	2,053	7,630
Debt issues	395	330	1,352	841	2,595
Observations	965	845	3,953	2,894	10,225

Table 3.7: Firms' Choices of Security Issues Conditional on Deviations from Target Leverage and Financing Gaps

This table presents the logistic regression results for firms' choices of security issues conditional on deviations from target leverage and financing gaps, as modeled by Equation (3.7) where the probability of debt issues is:

$$\text{Prob}\,(S_{it} = 1 | h_{it}) = \frac{e^{h_{it}}}{1 + e^{h_{it}}}.$$

Firms are defined as issuing a security when the net amount issued divided by the book value of total assets is greater than or equal to 5%. Cases when firms issue both debt and equity in a given year are omitted. h_{it} is defined as:

$$h_{it} = \varphi_0 + (\varphi_1 D^s_{it} + \varphi_2 D^d_{it}) AbsDev_{it-1} D^a_{it-1} + (\varphi_3 D^s_{it} + \varphi_4 D^d_{it}) AbsDev_{it-1} D^b_{it-1} + \varphi_5 PROF_{it-1} + \varphi_6 GO_{it-1} + \varphi_7 SPP_{it-1} + \varphi_8 AT_{it-1} + \varphi_9 FS_{it-1} + \varphi_{10} NDS_{it-1} + \eta_{it},$$

where target leverage is estimated by Equation (3.3). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. D^a_{it-1} (D^b_{it-1}) is a dummy variable equal to 1 if market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. D^s_{it} (D^d_{it}) is a dummy variable equal to 1 if financing gap is negative (positive) and 0 otherwise. See Table 3.1 for the definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 18,882 issues by firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are z-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. Pseudo R^2 is calculated as [1-(log-likelihood)]/(log-likelihood) when the slopes are restricted to be 0. Columns (1), (3), (5), (7), and (9) report the estimated coefficients and columns (2), (4), (6), (8), and (10) report their marginal effects. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$AbsDev_{it-1}.D^a_{it-1}D^s_{it}$ (i)	-15.976**	-3.771**	-10.346	-2.348	-27.017**	-5.002**	-17.675**	-3.062**	-7.604**	-1.034**
	(-2.69)	(-2.73)	(-1.83)	(-1.85)	(-6.33)	(-6.91)	(-3.27)	(-3.42)	(-5.85)	(-6.04)
$AbsDev_{it-1}.D^a_{it-1}D^d_{it}$ (ii)	1.626	0.384	5.361**	1.217*	4.702**	0.871**	3.084*	0.534*	4.865**	0.662**
	(0.75)	(0.75)	(2.58)	(2.54)	(3.31)	(3.20)	(2.39)	(2.35)	(7.49)	(6.74)
$AbsDev_{it-1}.D^b_{it-1}D^s_{it}$ (iii)	-4.381	-1.034	-1.084	-0.246	-15.507**	-2.871**	-8.110**	-1.405**	-5.302**	-0.721**
	(-1.72)	(-1.73)	(-0.38)	(-0.38)	(-4.36)	(-4.70)	(-3.64)	(-3.72)	(-5.01)	(-5.09)
$AbsDev_{it-1}.D^b_{it-1}D^d_{it}$ (iv)	10.500**	2.479**	10.599**	2.406**	9.554**	1.769**	9.601**	1.663**	8.957**	1.218**
	(5.31)	(5.18)	(5.32)	(5.16)	(9.87)	(8.90)	(9.20)	(8.41)	(17.23)	(13.73)
$PROF_{it-1}$	-1.640	-0.387	-0.858	-0.195	-13.038**	-2.414**	0.454	0.079	-1.125**	-0.153**
	(-1.84)	(-1.83)	(-0.96)	(-0.96)	(-11.39)	(-11.10)	(1.56)	(1.58)	(-6.56)	(-5.93)
GO_{it-1}	-0.489**	-0.116**	-0.591**	-0.134**	-0.354**	-0.066**	-0.457**	-0.079**	-0.572**	-0.078**
	(-3.59)	(-3.69)	(-3.44)	(-3.63)	(-4.41)	(-4.64)	(-6.59)	(-7.58)	(-10.95)	(-17.10)
SPP_{it-1}	-0.175	-0.041	-0.663**	-0.150**	-0.808**	-0.150**	-0.248**	-0.043**	-0.005	-0.001
	(-0.95)	(-0.95)	(-3.19)	(-3.15)	(-6.33)	(-6.30)	(-3.04)	(-3.02)	(-0.28)	(-0.28)
AT_{it-1}	1.989**	0.469**	2.346**	0.533**	2.764**	0.512**	1.122**	0.194**	1.413**	0.192**
	(3.56)	(3.53)	(4.46)	(4.42)	(9.56)	(9.43)	(6.22)	(6.05)	(10.88)	(9.73)

FS_{it-1}	0.16**	0.039**	0.152**	0.034**	-0.032	-0.006	0.203**	0.035**	0.210**	0.029**
	(4.34)	(4.35)	(3.48)	(3.45)	(-1.24)	(-1.24)	(8.13)	(8.17)	(14.88)	(12.94)
NDS_{it-1}	-0.578	-0.136	-3.792	-0.861	-1.186	-0.220	3.690**	0.639**	-2.929**	-0.398**
	(-0.27)	(-0.27)	(-1.55)	(-1.55)	(-0.61)	(-0.61)	(3.00)	(2.98)	(-3.10)	(-3.05)
Pseudo R^2	0.16		0.20		0.29		0.18		0.20	
Correct classification	0.72		0.73		0.81		0.76		0.79	
F-test [(i) = (ii)]	0.00		0.00		0.00		0.00		0.00	
F-test [(iii) = (iv)]	0.00		0.00		0.00		0.00		0.00	
F-test [(i) = (iii)]	0.06		0.12		0.02		0.08		0.13	
F-test [(ii) = (iv)]	0.00		0.03		0.00		0.00		0.00	
Equity issues	570		515		2,601		2,053		7,630	
Debt issues	395		330		1,352		841		2,595	
Observations	965		845		3,953		2,894		10,225	

I find that firms with a financing deficit are likely to issue debt to offset it regardless of whether they are over-levered (except for French firms) or under-levered (across all the sample countries). The evidence that firms that would be considered as being over-levered by the trade-off theory with a financing deficit are likely to issue debt seems to support the pecking-order theory that as long as these firms have not used up their debt capacities, they may offset the deficit by issuing debt to avoid relatively higher costs associated with equity financing.

The evidence that firms that would be considered as being over-levered by the trade-off theory with a financing deficit are likely to issue debt, however, does not necessarily contradict the finding reported earlier in Chapter 2 that these firms tend to experience fastest speeds of adjustments, which is consistent with the target adjustment behaviors predicted by the trade-off theory. First, the *F*-tests show that the probability of debt issues among these firms is statistically much lower than that of under-levered firms with a financing deficit. Second, the statistics summary for the pooled data in Panel C of Table 3.4 shows that on average, while appearing to experience significant long-term borrowings (6.9% of their total assets), over-levered firms with a financing deficit also retire a lot of long-term debt (4.6%). These together with their short-term borrowings (0.7%) result in positive net debt issues of 3.0%. However, these firms' equity proceeds seem to be far more significant than the sum of their long-term and short-term borrowings (11.3%), which then lead to large, positive net equity issues (11.0%). These incremental financing activities explain why among the four groups of firms in Panel C of Table 3.4, over-levered firms with a financing deficit on average experience the most noticeable reduction in their deviations from target leverage (8%), a result fitting nicely with the finding in Chapter 2 about their fastest speeds of adjustments. Overall, similar to the case of over-levered firms in the US, over-levered firms with a financing deficit also exhibit strong target adjustment behaviors.

Consistent with both the pecking-order and trade-off theories, I show that firms that would be considered as being over-levered by the trade-off theory with a financing surplus are less likely to issue debt (except for German firms), which strongly supports Hypothesis 3.3a that these firms may release themselves from potential financial distress associated with being over-levered and have better ability to save their debt capacities. Also in favor of both theories (Hypothesis 3.6a), firms that would be considered as being under-levered by the trade-off theory with a financing deficit are consistently more likely to issue debt (across all sample countries).

Finally, in the presence of a financing surplus and below-target leverage in the spirit of the trade-off theory, Japanese, UK, and US firms are less likely to issue debt, a finding in support of the pecking-order argument but not the trade-off view. Note that by magnitude, the coefficients for these firms seem to be less than those for firms that would be considered as being over-levered by the trade-off theory with a financing surplus which are probably more concerned about deviations from target leverage.

Overall, I find that firms' choices of securities to be issued may be guided by both the pecking-order and trade-off theories. In controversial cases when these two arguments have different predictions on these choices among firms that would be considered as being over-levered (under-levered) by the trade-off theory with a financing deficit (surplus), the earlier view seems to explain these relatively better. However, more importantly, my analysis shows that even when costs of adverse selection and transaction costs associated with equity financing may matter when firms are making their choices of securities to be issued, they still have their target leverage and attempt to adjust toward it. I also provide further evidence on why over-levered firms and over-levered firms with a financing deficit may adjust more quickly than the other groups of firms. Their security mixes allow these firms to close out a significant part of deviations from targets, suggesting fast speeds of adjustments.

3.4.4.2. Determinants of Firms' Choices of Security Retirements/Repurchases

In this section I discuss the influence of firms' fundamentals on their choices of security retirements/repurchases and then the asymmetric impact of their deviations from target leverage and financing gaps on these choices. Table 3.8, Table 3.9, and Table 3.10 report the results for the determinants of firms' retirement/repurchase choices based on Equations (3.1), (3.5), and (3.7), respectively.

A. The impact of firms' fundamentals on their choices of security retirements/ repurchases

From Table 3.8 (columns 1, 3, 5, 7, and 9), there is strong evidence in favor of both the pecking-order and dynamic trade-off views (Myers and Majluf (1984), Myers (1984), and Strebulaev (2007)) (especially among bank-oriented economies) that profitable firms are more likely to retire debt. As expected, Japanese and US firms with more growth opportunities are less likely to retire debt. This finding supports the argument that high-growth firms are more likely to face the debt overhang and underinvestment problems (Myers (1977)) and information asymmetries (Myers and Majluf (1984), and Myers (1984)), thus being less active in the debt market.

I find that in line with the market timing hypothesis (Baker and Wurgler (2002)), share price performance may have a significant, positive impact on firms' probability of retiring debt in Japan and the US. Inconsistent with the trade-off theory, there is strong evidence that firms with high asset tangibility and big size are more likely to retire debt. One possible explanation for these findings is that due to their better access to the debt market and incentives to avoid more costly equity financing, firms with high asset tangibility and large size may be highly levered, thus leading to pressures to retire debt to avoid potential costs of financial distress. Finally, the coefficients on non-debt tax shields have the expected sign but are statistically insignificant across all the sample countries, a finding to some extent in favor of the trade-off view.

The coefficients on $AbsDev_{it-1}$ in model (3.1) are significant in all the sample countries. In models (3.5) and (3.7), I interact $AbsDev_{it-1}$ with firms' position relative to their target leverage to allow for the asymmetry and see how it may asymmetrically influence firms' choices of security retirements/repurchases.

B. The asymmetric impact of firms' deviations from target leverage on their choices of security repurchases/ retirements

Compared to the issue equation, the estimated coefficients for $AbsDev_{it-1}$ in the retirement/repurchase equation flip signs as expected. In Table 3.9 (columns 1, 3, 5, 7, and 9), I present the results for Equation (3.5) that takes into account the asymmetric impact of firms' deviations from target leverage on their retirement (repurchase) choices. The results on firms' major fundamentals are mostly similar to those discussed earlier so here I only discuss the asymmetric impact of firms' deviations from targets.

In support of Hypothesis 3.1b, I find that over-levered firms across all the sample countries (especially bank-oriented economies) are likely to retire debt. Under-levered firms (except for German and Japanese firms), however, are less likely to retire debt to avoid further deviations from targets. By magnitude, the coefficients for over-levered firms tend to be greater than those for under-levered firms, suggesting target adjustment behaviors may be exhibited more prominently among over-levered firms.

The impact of over-levered firms' deviations from targets on their retirement (repurchase) choices (as reported in Table 3.9) seems to exhibit a clearer pattern than that on their issue choices (as reported in Table 3.6), which is consistent with Hovakimian et al. (2001) and Hovakimian (2004) that firms' target adjustments tend to be more prominent when they are making debt retirement than when they are making debt issue decisions. This clearer pattern, to some extent, is consistent with the finding reported earlier in Chapter 2 that over-levered firms adjust toward their target leverage faster than (through debt retirements) than under-levered firms (through debt issues).

Letting firms' deviations from targets interact with their financing gaps (Table 3.10), I find evidence in support of both Hypothesis 3.3b and Hypothesis 3.6b (both the pecking-order and trade-off theories). Firms that would be considered as being over-levered by the trade-off theory with a financing surplus in all the sample countries are more likely to use their surplus funds to retire debt, a finding in favor of Hypothesis 3.3b. In contrast, in support of Hypothesis 3.6b, firms that would be considered as being under-levered by the trade-off theory with a financing deficit (except for German firms) are less likely to retire it.

The evidence for firms that would be considered as being under-levered by the trade-off theory with a financing surplus is weak as the estimated coefficients for the interaction term are statistically insignificant for most countries. Consistent with the pecking-order view that they may retire debt to save their debt capacities and avoid high costs of re-issuing equity but inconsistent with the trade-off theory's suggestion that they may repurchase equity to close out deviations from targets, Japanese firms are more likely to retire debt although their probability of debt retirements is statistically lower than that of firms that would be considered as being over-levered by the trade-off theory with a financing surplus. The results in Panel C of Table 3.4 seem to support the pecking-order view as on average, firms' debt reductions are more significant than equity repurchases although on balance there is only some evidence for one country (Japan in particular) in Table 3.10.

I find mixed evidence among firms that would be considered as being over-levered by the trade-off theory with a financing deficit. In favor of the pecking-order view, these firms in Japan are less likely to retire debt while in line with the trade-off view, those in France and Germany are more likely to do so. The statistics in Panel C of Table 3.4 shows that, like firms that would be considered as being under-levered by the trade-off theory with a financing surplus, firms that would be considered as being over-levered by the trade-off theory with a financing deficit also reduce much more debt than equity. This again explains why they can adjust quickly, as reported in Chapter 2.

In brief, firms' choices of securities to be retired (repurchased) may be explained by both of the two dominant theories of capital structure. I find mixed and/or weak evidence when they have different predictions on such choices among over-levered (under-levered) firms with a financing deficit (surplus).

3.5. Determinants of Issue/Retirement (Repurchase) Size

The above analyses show how firms' choices of securities may be influenced by their fundamentals, deviations from target leverage, and financing gaps. The next issue to be addressed is that once firms have made their decisions on these choices, how much of these securities they may actually issue/retire (repurchase). Hovakimian et al. (2001) suggest firms' choices of the form of financing should be examined separately from their choices of the size of financing and show that issue/retirement (repurchase) size may be determined by firms' financing needs rather than deviations from target leverage, implying the pecking-order view may have more to do with the amounts of securities firms wish to issue/retire (repurchase). To see whether it is the case, I examine how issue/retirement (repurchase) size is determined by developing the following model:

(3.8)
$$\Delta D_{it}(E_{it}) = \phi_0 + (\phi_1 D_{it}^s + \phi_2 D_{it}^d) AbsDev_{it-1} D_{it-1}^a + (\phi_3 D_{it}^s + \phi_4 D_{it}^d) AbsDev_{it-1} D_{it-1}^b$$
$$+\phi_5 PROF_{it-1} + \phi_6 GO_{it-1} + \phi_7 SPP_{it-1} + \phi_8 AT_{it-1} + \phi_9 FS_{it-1} + \phi_{10} NDS_{it-1} + \omega_{it},$$

where $\Delta D_{it}(E_{it})$ is the change in firms' total debt (common equity) scaled by total assets.

Table 3.8: Firms' Choices of Security Retirements/Repurchases

This table presents the logistic regression results for firms' choices of security retirements/repurchases, as modeled by Equation (3.1) where the probability of debt retirements is:

$$\text{Prob}\,(S_{it} = 1 | z_{it}) = \frac{e^{z_{it}}}{1 + e^{z_{it}}}.$$

Firms are defined as retiring/repurchasing a security when the net amount retired/repurchased divided by the book value of total assets is greater than or equal to 5%. Cases when firms both retire debt and repurchase equity in a given year are omitted. z_{it} is defined as:

$$z_{it} = \lambda_0 + \lambda_1 AbsDev_{it-1} + \lambda_2 PROF_{it-1} + \lambda_3 GO_{it-1} + \lambda_4 SPP_{it-1} + \lambda_5 AT_{it-1} + \lambda_6 FS_{it-1} + \lambda_7 NDS_{it-1} + u_{it},$$

where target leverage is estimated by Equation (3.3). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. See Table 3.1 for the definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 11,702 retirements/repurchases by firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *z*-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. Pseudo R^2 is calculated as [1-(log-likelihood)]/(log-likelihood) when the slopes are restricted to be 0. Columns (1), (3), (5), (7), and (9) report the estimated coefficients and columns (2), (4), (6), (8), and (10) report their marginal effects. *t*-test reports the *p*-value of the test for the hypothesis that the estimated coefficients for $AbsDev_{it-1}$ in Table 3.5 and Table 3.8 are equal.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$AbsDev_{it-1}$	6.482**	1.619**	7.320**	1.759**	7.157**	1.403**	6.551**	1.274**	4.975**	0.809**
	(3.88)	(3.88)	(4.89)	(4.80)	(9.42)	(9.67)	(9.39)	(8.50)	(13.26)	(11.62)
$PROF_{it-1}$	7.159**	1.788**	4.137**	0.994**	10.101**	1.981**	4.495**	0.874**	3.179**	0.517**
	(5.38)	(5.41)	(4.08)	(4.23)	(8.19)	(8.16)	(6.10)	(7.27)	(8.29)	(10.30)
GO_{it-1}	-0.090	-0.022	-0.087	-0.021	-0.283**	-0.055**	-0.058	-0.011	-0.256**	-0.042**
	(-0.48)	(-0.48)	(-0.50)	(-0.50)	(-2.97)	(-2.96)	(-0.68)	(-0.69)	(-4.99)	(-5.66)
SPP_{it-1}	0.141	0.035	0.112	0.027	0.387**	0.076**	0.055	0.011	0.173**	0.028**
	(1.47)	(1.48)	(1.26)	(1.27)	(4.73)	(4.73)	(1.24)	(1.23)	(4.48)	(4.55)
AT_{it-1}	2.065**	0.516**	3.208**	0.771**	1.183**	0.232**	1.013**	0.197**	0.982**	0.160**
	(2.79)	(2.78)	(5.19)	(5.12)	(4.21)	(4.20)	(4.15)	(4.02)	(6.04)	(5.64)
FS_{it-1}	0.098*	0.025*	0.167**	0.040**	0.204**	0.040**	0.142**	0.028**	0.148**	0.024**
	(2.04)	(2.04)	(2.78)	(2.77)	(6.87)	(6.88)	(4.89)	(4.70)	(8.59)	(7.94)
NDS_{it-1}	3.664	0.915	0.128	0.031	3.485	0.683	1.319	0.257	1.303	0.212
	(1.42)	(1.42)	(0.07)	(0.07)	(1.45)	(1.45)	(0.94)	(0.94)	(1.50)	(1.50)
Pseudo R^2	0.18		0.23		0.11		0.18		0.18	
Correct classification	0.71		0.73		0.73		0.71		0.73	
t-test	0.00		0.00		0.00		0.00		0.00	
Equity repurchases	282		289		872		1,261		3,976	
Debt retirements	294		236		2,125		652		1,715	
Observations	576		525		2,997		1,913		5,691	

Table 3.9: Firms' Choices of Security Retirements/Repurchases Conditional on Deviations from Target Leverage

This table presents the logistic regression results for firms' choices of security retirements/repurchases conditional on deviations from target leverage, as modeled by Equation (3.5) where the probability of debt retirements is:

$$\text{Prob}\,(S_{it} = 1 | I_{it}) = \frac{e^{I_{it}}}{1 + e^{I_{it}}}.$$

Firms are defined as retiring/repurchasing a security when the net amount retired/repurchased divided by the book value of total assets is greater than or equal to 5%. Cases when firms both retire debt and repurchase equity in a given year are omitted. I_{it} is defined as:

$$I_{it} = \alpha_0 + \alpha_1 AbsDev_{it-1} D^a_{it-1} + \alpha_2 AbsDev_{it-1} D^b_{it-1} + \alpha_3 PROF_{it-1} + \alpha_4 GO_{it-1} + \alpha_5 SPP_{it-1} + \alpha_6 AT_{it-1} + \alpha_7 FS_{it-1} + \alpha_8 NDS_{it-1} + v_{it},$$

where target leverage is estimated by Equation (3.3). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. D^a_{it-1} (D^b_{it-1}) is a dummy variable equal to 1 if market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. See Table 3.1 for the definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 11,702 retirements/repurchases by firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *z*-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. Pseudo R^2 is calculated as [1-(log-likelihood)]/(log-likelihood) when the slopes are restricted to be 0. Columns (1), (3), (5), (7), and (9) report the estimated coefficients and columns (2), (4), (6), (8), and (10) report their marginal effects. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$AbsDev_{it-1}.D^a_{it-1}$ (i)	11.929**	2.981**	11.111**	2.665**	10.964**	2.089**	9.554**	1.804**	7.159**	1.143**
	(4.83)	(4.82)	(5.88)	(5.69)	(12.22)	(13.00)	(9.84)	(8.54)	(13.87)	(11.89)
$AbsDev_{it-1}.D^b_{it-1}$ (ii)	-6.338*	-1.584*	0.043	0.010	0.453	0.086	-4.829**	-0.912**	-4.394**	-0.702**
	(-2.40)	(-2.40)	(0.02)	(0.02)	(0.55)	(0.55)	(-3.29)	(-3.40)	(-5.39)	(-5.44)
$PROF_{it-1}$	7.118**	1.779**	4.295**	1.030**	9.416**	1.794**	4.628**	0.874**	3.125**	0.499**
	(5.32)	(5.34)	(4.20)	(4.36)	(7.60)	(7.56)	(5.76)	(6.98)	(7.78)	(9.47)
GO_{it-1}	0.122	0.030	-0.019	-0.005	-0.073	-0.014	0.007	0.001	-0.191**	-0.030**
	(0.66)	(0.66)	(-0.12)	(-0.12)	(-0.71)	(-0.71)	(0.10)	(0.10)	(-4.29)	(-4.70)
SPP_{it-1}	0.398**	0.099**	0.200	0.048	0.669**	0.127**	0.194**	0.037**	0.285**	0.046**
	(2.96)	(2.96)	(1.89)	(1.92)	(7.12)	(7.09)	(3.14)	(3.11)	(5.03)	(5.21)
AT_{it-1}	1.414	0.353	2.704**	0.649**	1.170**	0.223**	0.878**	0.166**	0.894**	0.143**
	(1.91)	(1.91)	(4.40)	(4.35)	(4.18)	(4.18)	(3.39)	(3.33)	(5.28)	(4.99)
FS_{it-1}	0.095	0.024	0.148*	0.035*	0.183**	0.035**	0.123**	0.023**	0.129**	0.021**
	(1.86)	(1.86)	(2.43)	(2.42)	(6.09)	(6.11)	(4.03)	(3.86)	(7.28)	(6.75)
NDS_{it-1}	4.608	1.152	0.671	0.161	2.779	0.529	2.178	0.411	1.832*	0.292*
	(1.76)	(1.76)	(0.35)	(0.35)	(1.16)	(1.16)	(1.44)	(1.43)	(1.97)	(1.97)

Pseudo R^2	0.25	0.27	0.14	0.24	0.23
Correct classification	0.72	0.76	0.75	0.75	0.77
F-test [(i) = (ii)]	0.00	0.00	0.00	0.00	0.00
Equity repurchases	282	289	872	1,261	3,976
Debt retirements	294	236	2,125	652	1,715
Observations	576	525	2,997	1,913	5,691

Table 3.10: Firms' Choices of Security Retirements/Repurchases Conditional on Deviations from Target Leverage and Financing Gaps

This table presents the logistic regression results for firms' choices of security retirements/repurchases conditional on deviations from target leverage and financing gaps, as modeled by Equation (3.7) where the probability of debt retirements is:

$$\text{Prob}\,(S_{it} = 1 | h_{it}) = \frac{e^{h_{it}}}{1 + e^{h_{it}}}.$$

Firms are defined as retiring/repurchasing a security when the net amount retired/repurchased divided by total assets is greater than or equal to 5%. Cases when firms both retire debt and repurchase equity in a given year are omitted. h_{it} is defined as:

$$h_{it} = \varphi_0 + (\varphi_1 D^s_{it} + \varphi_2 D^d_{it}) AbsDev_{it-1} D^a_{it-1} + (\varphi_3 D^s_{it} + \varphi_4 D^d_{it}) AbsDev_{it-1} D^b_{it-1} + \varphi_5 PROF_{it-1} + \varphi_6 GO_{it-1} + \varphi_7 SPP_{it-1} + \varphi_8 AT_{it-1} + \varphi_9 FS_{it-1} + \varphi_{10} NDS_{it-1} + \eta_{it},$$

where target leverage is estimated by Equation (3.3). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. D^a_{it-1} (D^b_{it-1}) is a dummy variable equal to 1 if market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. D^s_{it} (D^d_{it}) is a dummy variable equal to 1 if financing gap is negative (positive) and 0 otherwise. See Table 3.1 for the definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 11,702 retirements/repurchases by firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *z*-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. Pseudo R^2 is calculated as [1-(log-likelihood)]/(log-likelihood) when the slopes are restricted to be 0. Columns (1), (3), (5), (7), and (9) report the estimated coefficients and columns (2), (4), (6), (8), and (10) report their marginal effects. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$AbsDev_{it-1}.D^a_{it-1}D^s_{it}$ (i)	12.406**	3.078**	13.513**	3.272**	13.648**	2.584**	11.668**	1.636**	9.404**	1.468**
	(4.51)	(4.45)	(5.77)	(5.49)	(12.29)	(14.00)	(8.98)	(3.60)	(14.56)	(11.61)
$AbsDev_{it-1}.D^a_{it-1}D^d_{it}$ (ii)	9.778**	2.426**	6.222*	1.506*	-9.127**	-1.728**	-1.470	-0.206	0.583	0.091
	(3.37)	(3.34)	(2.14)	(2.13)	(-3.00)	(-2.93)	(-0.71)	(-0.73)	(0.70)	(0.70)
$AbsDev_{it-1}.D^b_{it-1}D^s_{it}$ (iii)	-1.044	-0.259	2.912	0.705	3.563**	0.675**	-0.262	-0.037	-0.625	-0.098
	(-0.38)	(-0.38)	(1.33)	(1.33)	(2.93)	(2.97)	(-0.18)	(-0.18)	(-0.78)	(-0.78)
$AbsDev_{it-1}.D^b_{it-1}D^d_{it}$ (iv)	-28.122*	-6.977*	-3.501	-0.848	-35.559**	-6.733**	-54.823*	-7.688**	-13.754**	-2.146**
	(-2.16)	(-2.20)	(-0.80)	(-0.81)	(-3.53)	(-3.30)	(-2.32)	(-4.42)	(-5.59)	(-5.94)
$PROF_{it-1}$	7.033**	1.745**	4.313**	1.044**	7.537**	1.427**	3.848**	0.540**	2.634**	0.411**
	(5.41)	(5.50)	(4.42)	(4.50)	(5.55)	(5.51)	(4.65)	(3.66)	(6.56)	(7.55)
GO_{it-1}	0.074	0.018	-0.008	-0.002	-0.069	-0.013	0.008	0.001	-0.173**	-0.027**
	(0.39)	(0.39)	(-0.05)	(-0.05)	(-0.62)	(-0.62)	(0.12)	(0.12)	(-3.96)	(-4.31)
SPP_{it-1}	0.377**	0.094**	0.134	0.032	0.632**	0.120**	0.236**	0.033**	0.284**	0.044**
	(2.89)	(2.89)	(1.04)	(1.05)	(5.90)	(5.70)	(3.33)	(2.58)	(4.76)	(4.93)

AT_{it-1}	1.440	0.357	2.638**	0.639**	1.092**	0.207**	0.777**	0.109**	1.012**	0.158**
	(1.93)	(1.92)	(4.18)	(4.14)	(3.64)	(3.64)	(2.89)	(2.44)	(5.78)	(5.43)
FS_{it-1}	0.102*	0.025*	0.143*	0.035*	0.181**	0.034**	0.104**	0.015**	0.127**	0.020**
	(1.96)	(1.96)	(2.28)	(2.28)	(5.66)	(5.64)	(3.20)	(2.44)	(7.00)	(6.49)
NDS_{it-1}	4.977*	1.235*	0.159	0.039	3.181	0.602	2.000	0.281	1.561	0.244
	(2.08)	(2.08)	(0.09)	(0.09)	(1.29)	(1.28)	(1.27)	(1.20)	(1.62)	(1.61)
Pseudo R^2	0.27		0.29		0.23		0.31		0.26	
Correct classification	0.75		0.77		0.79		0.79		0.79	
F-test [(i) = (ii)]	0.38		0.03		0.00		0.00		0.00	
F-test [(iii) = (iv)]	0.04		0.15		0.00		0.02		0.00	
F-test [(i) = (iii)]	0.00		0.00		0.00		0.00		0.00	
F-test [(ii) = (iv)]	0.00		0.05		0.01		0.02		0.00	
Equity repurchases	282		289		872		1,261		3,976	
Debt retirements	294		236		2,125		652		1,715	
Observations	576		525		2,997		1,913		5,691	

3.5.1. Determinants of Issue Size

Table 3.11 and Table 3.12 report the estimation results for the OLS models on the major determinants of issue/ retirement (repurchase) size as specified by Equation (3.8).[30] I show that both deviations from target leverage and financing gaps may jointly determine the size of the security to be issued/retired (repurchased).

As can be seen from Panel A of Table 3.11, in support of Hypothesis 3.3a (both the pecking-order and trade-off views), firms that would be considered as being over-levered by the trade-off theory with a financing surplus consistently issue less debt. In contrast, in rejection of Hypothesis 3.4a (the trade-off theory) but in support of the finding reported in Table 3.6 that firms that would be considered as being over-levered by the trade-off theory with a financing deficit are still likely to issue debt, firms that would be considered as being over-levered by the trade-off theory with a financing deficit (except for those in France and Germany) issue more debt. However, these coefficients are statistically smaller than those for firms that would be considered as being over-levered by the trade-off theory with a financing surplus, possibly suggesting that overall debt issues may be reduced among over-levered firms, a finding consistent with the trade-off theory (Hypothesis 3.1a).

The estimated coefficients for the interaction term for firms that would be considered as being under-levered by the trade-off theory with a financing surplus are only statistically significant in Japan and the UK. In rejection of Hypothesis 3.5a, firms that would be considered as being under-levered by the trade-off theory with a financing surplus in Japan and the UK issue less debt although the magnitude of the fall in their

[30] Following Hovakimian et al. (2001), I estimate model (3.8) using the OLS method. In an unreported robustness check, I also re-estimate this model using the fixed effects method and obtain qualitatively similar results.

debt issue size is much smaller than that among firms that would be considered as being over-levered by the trade-off theory with a financing surplus. Strikingly, in favor of both the pecking-order and trade-off views (Hypothesis 3.6a), firms that would be considered as being under-levered by the trade-off theory with a financing deficit across all the sample countries issue more debt.

The estimates for equity issue size in Panel B of Table 3.11 are overall much less significant than those for debt issue size as the coefficients for the interaction term are statistically insignificant in most countries. In support of the trade-off view, over-levered (under-levered) firms with a financing surplus (deficit) in Japan and the US (in Japan) issue more (less) equity. Over-levered firms with a financing deficit in the UK issue more equity, which is also consistent with the trade-off theory. Finally, under-levered firms with a financing surplus in Japan and the US appear to issue more equity, which does not support any views.

For the sake of completeness, I now briefly discuss the other independent variables in Table 3.11. In support of the pecking-order view, profitability and debt (equity) issue size are inversely related among Japanese firms (German, UK, and US firms). However, consistent with the trade-off view, high-growth firms tend to issue less debt (particularly relevant to French firms) but more equity (except for French firms). Firms with impressive share price performance seem to issue less debt (among Japanese and UK firms), which supports the market timing hypothesis. Share price performance, however, has no implication about equity issue size. In line with the trade-off view, asset tangibility positively influences debt issue size (across all sample countries) but negatively affects equity issue size (among German and Japanese firms). Finally, I find that firm size has a negative impact on equity issue size (among German, Japanese, and US firms), which is also in support of the trade-off theory.

Table 3.11: Determinants of Issue Size

This table presents the OLS regression results for firms' issue size, as modeled by Equation (3.8):

$$\Delta D_{it}(E_{it}) = \phi_0 + (\phi_1 D^s_{it} + \phi_2 D^d_{it}) AbsDev_{it-1} D^a_{it-1} + (\phi_3 D^s_{it} + \phi_4 D^d_{it}) AbsDev_{it-1} D^b_{it-1} + \phi_5 PROF_{it-1} + \phi_6 GO_{it-1} + \phi_7 SPP_{it-1} + \phi_8 AT_{it-1} + \phi_9 FS_{it-1} + \phi_{10} NDS_{it-1} + \omega_{it},$$

where ΔD_{it} (E_{it}) is the increase (>=5%) in total debt (equity) scaled by the book value of total assets at the beginning of the accounting period. Firms are defined as issuing a security when the net amount issued divided by the book value of total assets is greater than or equal to 5%. Cases when firms issue both debt and equity in a given year are omitted. Target leverage is estimated by Equation (3.3). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. D^a_{it-1} (D^b_{it-1}) is a dummy variable equal to 1 if market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. D^s_{it} (D^d_{it}) is a dummy variable equal to 1 if financing gap is negative (positive) and 0 otherwise. See Table 3.1 for the definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 18,882 firm-years with issues in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal.

	Panel A - Debt issue size					**Panel B - Equity issue size**				
	France	Germany	Japan	UK	US	France	Germany	Japan	UK	US
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$AbsDev_{it-1}.D^a_{it-1}D^s_{it}$ (i)	-0.467**	-0.288**	-0.415**	-0.285**	-0.113*	2.046	0.005	0.155**	0.400	2.041*
	(-5.77)	(-2.14)	(-12.43)	(-5.30)	(-2.44)	(1.38)	(0.03)	(2.95)	(0.47)	(2.45)
$AbsDev_{it-1}.D^a_{it-1}D^d_{it}$ (ii)	-0.015	0.059	0.166**	0.136**	0.283**	0.281	-0.107	-0.050	2.389*	-0.037
	(-0.21)	(1.09)	(2.62)	(2.15)	(5.18)	(0.36)	(-1.21)	(-0.57)	(2.12)	(-0.08)
$AbsDev_{it-1}.D^b_{it-1}D^s_{it}$ (iii)	-0.028	-0.144	-0.152**	-0.164**	0.058	-0.776	-0.186	0.080*	1.272	1.332**
	(-0.22)	(-1.41)	(-2.86)	(-3.46)	(0.95)	(-0.66)	(-1.80)	(2.26)	(1.55)	(2.65)
$AbsDev_{it-1}.D^b_{it-1}D^d_{it}$ (iv)	0.537**	0.373**	0.401**	0.552**	0.649**	1.623	-0.147	-0.123*	1.540	1.269
	(5.83)	(4.84)	(8.94)	(8.28)	(10.76)	(1.01)	(-1.36)	(-2.46)	(1.40)	(1.76)
$PROF_{it-1}$	-0.050	-0.110	-0.256**	0.004	-0.082	-6.454	-0.243*	-0.304	-3.074**	-2.365**
	(-1.51)	(-1.18)	(-6.09)	(0.50)	(-1.27)	(-1.38)	(-2.39)	(-1.88)	(-2.64)	(-2.82)
GO_{it-1}	-0.007**	-0.005	0.003	-0.001	0.002	0.621	0.039**	0.045**	0.266**	0.226**
	(-4.05)	(-1.87)	(1.58)	(-0.90)	(0.37)	(1.45)	(4.09)	(4.57)	(2.59)	(3.14)
SPP_{it-1}	-0.005	$4*10^{-4}$	-0.017**	-0.007*	$-2*10^{-5}$	0.035	0.026	0.016	0.007	0.030
	(-1.01)	(0.06)	(-4.65)	(-2.33)	(-0.02)	(0.23)	(1.57)	(1.71)	(0.04)	(1.11)
AT_{it-1}	0.056*	0.065**	0.032**	0.026**	0.031**	1.422	-0.125**	-0.104**	0.342	0.325
	(2.20)	(2.76)	(2.74)	(3.01)	(2.72)	(1.21)	(-4.50)	(-5.00)	(1.00)	(1.16)
FS_{it-1}	0.001	$-3*10^{-6}$	-0.004**	0.004**	0.008	-0.054	-0.013**	-0.010**	-0.085	-0.094**
	(0.63)	(0.00)	(-3.24)	(3.96)	(1.73)	(-1.27)	(-3.79)	(-4.39)	(-1.78)	(-2.68)
NDS_{it-1}	-0.155	-0.207	0.151	0.051	-0.063	-4.322	0.324	0.328	-6.037*	1.187
	(-1.36)	(-1.45)	(1.64)	(1.01)	(-0.43)	(-1.00)	(1.20)	(1.52)	(-2.57)	(0.48)

R^2	0.10	0.08	0.15	0.11	0.02	0.16	0.18	0.13	0.14	0.06
F-test [(i) = (ii)]	0.00	0.01	0.00	0.00	0.00	0.27	0.48	0.01	0.03	0.05
F-test [(iii) = (iv)]	0.00	0.00	0.00	0.00	0.00	0.31	0.74	0.00	0.79	0.91
F-test [(i) = (iii)]	0.00	0.38	0.00	0.06	0.00	0.22	0.26	0.21	0.24	0.23
F-test [(ii) = (iv)]	0.00	0.00	0.00	0.00	0.00	0.44	0.79	0.44	0.59	0.12
Observations	395	330	1,352	841	2,595	570	515	2,601	2,053	7,630

Table 3.12: Determinants of Retirement/Repurchase Size

This table presents the OLS regression results for firms' retirement/repurchase size, as modeled by Equation (3.8):

$$\Delta D_{it}(E_{it}) = \phi_0 + (\phi_1 D^s_{it} + \phi_2 D^d_{it})AbsDev_{it-1}D^a_{it-1} + (\phi_3 D^s_{it} + \phi_4 D^d_{it})AbsDev_{it-1}D^b_{it-1} + \phi_5 PROF_{it-1} + \phi_6 GO_{it-1} + \phi_7 SPP_{it-1} + \phi_8 AT_{it-1} + \phi_9 FS_{it-1} + \phi_{10} NDS_{it-1} + \omega_{it},$$

where ΔD_{it} (E_{it}) is the decrease (>=5%) in total debt (equity) scaled by the book value of total assets at the beginning of the accounting period. Firms are defined as retiring/repurchasing a security when the net amount retired/repurchased divided by the book value of total assets is greater than or equal to 5%. Cases when firms both retire debt and repurchase equity in a given year are omitted. Target leverage is estimated by Equation (3.3). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. D^a_{it-1} (D^b_{it-1}) is a dummy variable equal to 1 if market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. D^s_{it} (D^d_{it}) is a dummy variable equal to 1 if financing gap is negative (positive) and 0 otherwise. See Table 3.1 for the definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 11,702 firm-years with retirements/repurchases in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal.

	Panel A - Debt retirement size					**Panel B - Equity repurchase size**				
	France	Germany	Japan	UK	US	France	Germany	Japan	UK	US
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$AbsDev_{it-1}.D^a_{it-1}D^s_{it}$ (i)	-0.301**	-0.497**	-0.257**	-0.372**	-0.305**	0.394**	0.418**	0.190**	0.392**	0.012
	(-5.31)	(-4.89)	(-14.02)	(-10.32)	(-17.08)	(4.11)	(7.95)	(10.83)	(8.21)	(0.05)
$AbsDev_{it-1}.D^a_{it-1}D^d_{it}$ (ii)	-0.256**	-0.307*	0.124	0.020	-0.064	0.384**	0.255**	-0.245**	-0.315	-0.119
	(-3.95)	(-2.46)	(1.29)	(0.44)	(-1.95)	(4.01)	(2.94)	(-3.47)	(-1.17)	(-0.85)
$AbsDev_{it-1}.D^b_{it-1}D^s_{it}$ (iii)	-0.056	-0.117*	-0.062*	-0.044	-0.026	-0.059	0.266**	0.030	-0.093	-0.310
	(-0.88)	(-2.30)	(-2.43)	(-1.50)	(-1.47)	(-0.39)	(2.62)	(0.46)	(-0.52)	(-1.17)
$AbsDev_{it-1}.D^b_{it-1}D^d_{it}$ (iv)	0.223**	0.015	0.358**	0.207**	0.136**	-0.320	0.060	-0.530**	-0.115	-1.134
	(4.67)	(0.27)	(5.99)	(8.48)	(9.61)	(-1.41)	(0.49)	(-5.40)	(-0.59)	(-1.34)
$PROF_{it-1}$	-0.046**	-0.026*	-0.025	-0.015**	-0.006	0.476**	0.117**	0.368**	0.441*	0.392**
	(-2.68)	(-2.53)	(-0.88)	(-2.93)	(-1.46)	(5.01)	(3.36)	(8.96)	(2.48)	(9.13)
GO_{it-1}	-0.003	-0.006	-0.008*	$-3*10^{-4}$	$5*10^{-4}$*	-0.017	-0.006	-0.012**	-0.006	-0.049
	(-0.97)	(-1.74)	(-2.40)	(-0.35)	(2.31)	(-1.59)	(-0.83)	(-3.17)	(-0.44)	(-1.73)
SPP_{it-1}	-0.007**	$-1*10^{-4}$	-0.006*	-0.001	-0.001**	0.011*	0.002	0.014**	0.006	0.007**
	(-2.96)	(-0.08)	(-2.29)	(-1.30)	(-3.62)	(2.43)	(0.76)	(5.07)	(1.00)	(3.00)
AT_{it-1}	-0.026	-0.026	-0.013	-0.009	-0.016**	0.065*	0.233**	0.026**	$4*10^{-4}$	-0.004
	(-1.39)	(-1.26)	(-1.78)	(-1.34)	(-3.30)	(2.33)	(7.93)	(2.82)	(0.01)	(-0.10)
FS_{it-1}	-0.002*	0.001	-0.003**	-0.001	-0.002**	0.003	0.006	0.004**	0.018**	0.019**
	(-2.16)	(0.43)	(-3.69)	(-1.44)	(-4.16)	(1.67)	(1.95)	(6.16)	(3.89)	(2.77)
NDS_{it-1}	-0.106	-0.008	0.216**	-0.004	-0.032	0.095	-0.199	0.152*	0.182	0.433
	(-1.38)	(-0.25)	(4.29)	(-0.19)	(-1.79)	(0.79)	(-1.73)	(2.43)	(0.61)	(1.07)

R^2	0.20	0.32	0.15	0.28	0.19	0.29	0.31	0.25	0.15	0.09
F-test [(i) = (ii)]	0.51	0.20	0.00	0.00	0.00	0.90	0.05	0.00	0.01	0.31
F-test [(iii) = (iv)]	0.00	0.02	0.00	0.00	0.00	0.31	0.17	0.00	0.93	0.17
F-test [(i) = (iii)]	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.01	0.00	0.00
F-test [(ii) = (iv)]	0.00	0.01	0.03	0.00	0.00	0.00	0.17	0.01	0.59	0.16
Observations	294	236	2,125	652	1,715	282	289	872	1,261	3,976

3.5.2. Determinants of Retirement (Repurchase) Size

Panel A of Table 3.12 contains strong evidence across all sample countries that firms that would be considered as being over-levered by the trade-off theory with a financing surplus retire more debt.[31] This finding is in support of Hypothesis 3.3b (both the pecking-order and trade-off theories). Consistent with Hypothesis 3.4b (the trade-off view), over-levered firms with a financing deficit in France and Germany appear to retire more debt. However, the magnitude of their coefficients is smaller than when these firms are over-levered and face a financing surplus, suggesting that the presence of a financing deficit limits their ability to do so. Firms that would be considered as being under-levered by the trade-off theory with a financing surplus in Germany and Japan retire more debt, a finding in favor of the pecking-order view (in rejection of Hypothesis 3.5b). Finally, my data support both the pecking-order and trade-off theories (Hypothesis 3.6b) as firms that would be considered as being under-levered by the trade-off theory with a financing deficit retire less debt (except for German firms).

The evidence for equity repurchase size is generally less significant than that for debt retirement size. I find that in line with the trade-off view, over-levered firms with a financing surplus repurchase less equity (with the exception of US firms). There is mixed evidence among over-levered firms with a financing deficit. The coefficients for the interaction term are not statistically significant among UK and US firms. In support of both the pecking-order and trade-off theories, firms that would be considered as being over-levered by the trade-off theory with a financing deficit in France and Germany repurchase less equity, a behavior contrary to that of those firms in Japan. Finally, the coefficients for the interaction terms are statistically insignificant among under-levered firms with a financing surplus/ deficit in almost all countries. Under-

[31] Different from Table 3.11, a minus sign in this table indicates a positive relation between retirement (repurchase) size and the independent variables since the size is not in absolute values.

levered firms with a financing surplus in Germany repurchase less equity, which does not support any theories. Consistent with the trade-off view, however, under-levered firms with a financing deficit in Japan repurchase more equity.

For completeness, I discuss some other independent variables in Table 3.12. I find that profitability and equity repurchase size are inversely related among firms in all the sample countries. Profitability, however, consistent with the pecking-order view, positively influences debt retirement size (except for Japanese and US firms). Growth opportunities have a positive impact on both debt retirement size and equity repurchase size among Japanese firms but negatively affect US firms' debt retirement size. There is a positive relation between share price performance and debt retirement size but negative relation between this variable and equity repurchase size (except for German and UK firms), which fits nicely with the market timing hypothesis. Asset tangibility (firm size) is inversely related to equity repurchase size among firms in France, Germany, and Japan (Japan, the UK, and the US) but positively related to debt retirement size among US firms (French, Japanese and US firms). The coefficients on these two variables support the trade-off theory that firms with high asset tangibility and big size tend to be more active in the debt market.

Overall, the findings on the security issue/retirement (repurchase) size models are largely in support of the findings from the logistic regressions reported in Section 3.4.4 that firms' financing choices may be jointly guided by both the pecking-order and trade-off theories. When these two views have similar predictions on firms' financing decisions, I find strong evidence that firms that would be considered as being over-levered by the trade-off theory with a financing surplus tend to issue less but retire more debt, a behavior contrary to that of firms that would be considered as being under-levered by the trade-off theory with a financing deficit. When these two views have contradictory predictions, I find weak and/or mixed evidence which on balance seems to lend relatively more support to the former view. My evidence for the equity issue (repurchase) size model is generally less significant than that for the debt issue (retirement) size model, which may fit nicely with Hovakimian (2004) that firms' target adjustments may be exhibited more prominently through their debt financing decisions rather than their equity financing decisions.

3.6. Robustness Checks

3.6.1. Multinomial Logistic Models

My first concern is that logistic models can allow only two choices to be considered at the same time i.e., the choice between debt issues and equity issues and that between debt retirements and equity repurchases although in practice firms may adjust via debt issues, debt retirements, equity issues, or equity repurchases. Multinomial logistic models can overcome this problem since they allow more than two choices to be simultaneously considered (Hovakimian (2004)). Hence, in this robustness check I examine firms' choices among debt issues, equity issues, debt retirements, and equity repurchases by employing these models. If I define debt issues as 1, debt retirements as 2, equity issues as 3, and equity repurchases as 4, following Hovakimian (2004), Equation (3.1) can be modified as:

(3.9)

$$\text{Prob}\left(S_{it} = m\right) = \frac{e^{k_{it}}}{1 + \sum_{1}^{m} e^{k_{it}}} \quad \text{for } m = 1, 2, 3, \text{and } 4$$

where

$$k_{it} = \gamma_0 + \gamma_1 AbsDev_{it-1} + \gamma_2 PROF_{it-1} + \gamma_3 GO_{it-1} + \gamma_4 SPP_{it-1}$$

$$+\gamma_5 AT_{it-1} + \gamma_6 FS_{it-1} + \gamma_7 NDS_{it-1} + \xi_{it}.$$

Equation (3.9) can be further developed to allow for asymmetry. When the asymmetric impact of costs of deviations from targets is considered, I expand k_{it} into:

(3.10) $$n_{it} = \delta_0 + \delta_1 AbsDev_{it-1}D^a_{it-1} + \delta_2 AbsDev_{it-1}D^b_{it-1} + \delta_3 PROF_{it-1} + \delta_4 GO_{it-1}$$

$$+\delta_5 SPP_{it-1} + \delta_6 AT_{it-1} + \delta_7 FS_{it-1} + \delta_8 NDS_{it-1} + \chi_{it}.$$

Similarly, when firms' financing gaps are taken into account, I have:

(3.11) $$q_{it} = \rho_0 + \rho_1 AbsDev_{it-1}D^s_{it} + \rho_2 AbsDev_{it-1}D^d_{it} + \rho_3 PROF_{it-1} + \rho_4 GO_{it-1}$$

$$+\rho_5 SPP_{it-1} + \rho_6 AT_{it-1} + \rho_7 FS_{it-1} + \rho_8 NDS_{it-1} + \vartheta_{it}.$$

To see how the interaction between deviations from target leverage and financing gaps affect firms' choices of securities, I expand Equation (3.11) into:

(3.12) $$r_{it} = \theta_0 + (\theta_1 D^s_{it} + \theta_2 D^d_{it}) AbsDev_{it-1}D^a_{it-1} + (\theta_3 D^s_{it} + \theta_4 D^d_{it}) AbsDev_{it-1}D^b_{it-1}$$

$$+\theta_5 PROF_{it-1} + \theta_6 GO_{it-1} + \theta_7 SPP_{it-1} + \theta_8 AT_{it-1} + \theta_9 FS_{it-1} + \theta_{10} NDS_{it-1} + \varsigma_{it}.$$

The estimation results for multinomial logistic models of firms' issue and retirement/repurchase choices are reported in Table 3.13 and Table 3.14, respectively. The impact of firms' fundamentals i.e., profitability, growth opportunities, share price performance, asset tangibility, and non-debt tax shields are generally similar to those reported by the logistic models with a few exceptions. For example, it turns out that profitability tends to boost the probability of debt issues among German firms and reduce the possibility of debt retirements among French, Japanese and US firms. Similarly, it remains puzzling why high-growth firms across all the sample countries are more likely to issue debt and stand a higher chance of retiring it. Finally, firm size has unexpected effects on the probability of debt issues among Japanese firms and the likelihood of debt retirements among French, German, Japanese, and US firms.

As can be seen from Table 3.13, the presence of above-target leverage may reduce firms' probability of issuing debt (except for Germany and the US) (Panel A) but increase firms' probability of retiring it in all the sample countries (Panel C). These findings are in strong support of Hypothesis 3.1a and Hypothesis 3.1b. By magnitude, the coefficients in the debt retirement equation are significantly greater than those in the debt issue equation, suggesting firms' target adjustment behaviors may be reflected more prominently through their debt retirement decisions. It is, however, puzzling why the probability of equity issues is reduced among German and US firms (Panel B).

I find that under-levered firms are more likely to issue debt when having to visit capital markets (across all the sample countries) (Panel A), a finding in favor of Hypothesis 3.2a. These firms are also less likely to retire debt (significant in the UK, though negative in France and the US) (Panel C), a finding to some extent in support of Hypothesis 3.2b. In addition, there is strong evidence that these firms are likely to repurchase equity to move back to their target leverage. It remains unclear why under-levered firms (except for those in Germany) are more likely to issue equity. However, by magnitude, the coefficients in the equity issue equation seem to be smaller those in the equity repurchase equation, suggesting overall under-levered firms are still more likely to repurchase equity (except for those in Japan).

When firms' financing gaps are introduced, as reported in Table 3.14, the presence of above-target leverage (in the spirit of the trade-off theory) and a financing surplus seems to strongly reduce the probability of debt issues but increase that of debt retirements among all firms in the sample, a behavior consistent with both the pecking-order and trade-off theories (Hypothesis 3.3a and Hypothesis 3.3b). Having a financing surplus also reduces these firms' need to visit the equity market i.e., a lower likelihood of issuing equity.

Over-levered firms with a financing deficit (except for French firms) are still likely to issue debt to offset it although the probability of debt issues in this case is statistically less than that when they are under-levered. These firms are also likely to retire debt (except for Japanese firms). By magnitude, the coefficients for the debt retirement equation appear to be larger than these in the debt issue equation, suggesting all else being equal, these firms overall are perhaps more likely to retire debt, which is in favor of the trade-off argument. I find that the presence of both above-target leverage and a financing deficit boosts the likelihood of equity issues and equity repurchases (except for French and German firms). The latter finding that these firms are likely to repurchase equity, however, is not consistent with any theories.

Under-levered firms with a financing surplus are less likely to issue debt (except for French firms) and equity (except for French and Japanese firms). By magnitude, the coefficients in the debt issue equation are greater than those in the equity issue equation. Firms that would be considered as being under-levered by the trade-off theory with a financing surplus are also likely to retire debt (except for French firms), a behavior consistent with the pecking-order view, and repurchase equity (except for French and Japanese firms), a finding more in line with the trade-off argument. However, the coefficients for the equity repurchase equation by magnitude seem to be smaller, suggesting the likelihood of firms retiring debt is higher, which is more in line with the pecking-order view.

Finally, the presence of below-target leverage (in the spirit of the trade-off theory) and a financing deficit boosts the probability of debt issues and equity issues in all countries. Also, by magnitude, the coefficients in the debt equation are larger, suggesting firms overall are more likely to issue debt than equity, which is in support of both the pecking-order and trade-off theories (Hypothesis 3.6a). Further, in favor of these two arguments (Hypothesis 3.6b), I find that these firms are less likely to retire debt (except for German firms). The finding of a higher probability of equity repurchases lends support to the trade-off view.

Overall, I find that the results from the multinomial logistic models are largely similar to those reported in Table 3.6, Table 3.7, Table 3.9, and Table 3.10. There is strong evidence in support of Hypothesis 3.1a and Hypothesis 3.1b (Hypothesis 3.2a and Hypothesis 3.2b) that over-levered (under-levered) firms are less (more) likely to issue but more (less) likely to retire debt, a behavior consistent with the trade-off view. In support of Hypothesis 3.3a, Hypothesis 3.3b, Hypothesis 3.6a and Hypothesis 3.6b (both the pecking-order and trade-off theories), firms that would be considered as being over-levered by the trade-off theory with a financing surplus are less likely to issue but more likely to retire debt, a behavior contrary to that of firms that would be considered as being under-levered by the trade-off theory with a financing deficit. Among over-levered firms with a financing deficit and under-levered firms with a financing surplus, I find mixed and weak evidence that fails to provide strong support for any theories. All in all, since these models' statistical significance is considerably lower than that of the logistic models, they may not be a better option to estimate firms' choices of securities.

3.6.2. Alternative Measures of Leverage, Estimation Approaches, and Standard Error Specifications

In this section I perform several other robustness checks. First, I examine whether the main results are sensitive to the measure of leverage used. Second, I adopt the estimation approaches suggested by Hovakimian and Li (2011) to see if the current models produce spuriously significant estimates. Finally, I account for unobserved individual fixed effects and the generated regressor problem.

An alternative measure of leverage - book leverage. Following existing empirical research (e.g., Flannery and Rangan (2006)), I examine whether the main results are robust to the use of book leverage by re-estimating the main models (3.5) and (3.7). I find that the results for both the issue and retirement/repurchase equations (Table B1, Table B2, Table B3, and Table B4 in Appendix 2) are qualitatively similar.

Alternative estimation approaches. Hovakimian and Li (2011) find that current partial adjustment and debt-equity choice models tend produce spuriously significant estimates consistent with the trade-off theory and suggest a combination of methods to eliminate the bias. In an unreported robustness check, following Hovakimian and Li (2011), I therefore re-estimate models (3.5) and (3.7) by (1) entering firms' target leverage and lagged actual leverage separately into the second-stage partial adjustment models and (2) excluding firm years with extremely high leverage ratios (greater than 0.8). The results for (2) are qualitatively similar but those for (1) are mixed.

Alternative standard error specifications. In Chapter 2 and Chapter 4, unobserved individual fixed effects and the generated regressor problem have been accounted for by the SYS-GMM estimator. However, in this chapter, the logistic estimator does not account for these issues. Hence, in another unreported robustness check, I follow Petersen (2009) and also specify by-firm clustered standard errors which are robust to heteroskedasticity and moreover capture the unspecified correlation among observations on the same firm in different years for models (3.5) and (3.7). I find that although clustered errors are slightly higher than robust standard errors, the estimated coefficients for the interaction terms are still significant and do not change in magnitude. In additions, the *F*-tests are almost unaffected.

To account for the generated regressor problem, I use a bootstrap program which addresses the generated regressor problem by introducing sampling variation into target leverage (Guan (2003), and Lockhart (2009)). The process has six steps namely (1) drawing the bootstrap samples, (2) running the first-stage regression for the target leverage model, (3) calculating the predicted target leverage and the generated regressor, (4) fitting the logistic model using the generated regressor, (5) repeating 1-4 (I choose 200 times), and (6) computing the standard errors from the sampling distribution of the estimates. I find that the main findings for models (3.5) and (3.7) do not change.

Table 3.13: Firms' Financing Choices Conditional on Deviations from Target Leverage Using the Multinomial Logistic Method

This table presents the multinomial logistic regression results for firms' financing choices conditional on deviations from target leverage, as modeled by Equation (3.10) where the probability of a financing choice is: $\text{Prob}\,(Y = m) = \dfrac{e^{n_{it}}}{1+\sum_{1}^{m} e^{n_{it}}}$ for m = 1 (debt issue), 2 (equity issue), 3 (debt retirement), 4 (equity repurchase), and 5 (the base case i.e., firm-years without any financing activities). Firms are defined as issuing (retiring/repurchasing) a security when the net amount issued (retired/repurchased) divided by the book value of total assets is greater than or equal to 5%. Cases when firms issue both debt and equity or both retire debt and repurchase equity in a given year are omitted. n_{it} is defined as:

$$n_{it} = \delta_0 + \delta_1 AbsDev_{it-1} D^a_{it-1} + \delta_2 AbsDev_{it-1} D^b_{it-1} + \delta_3 PROF_{it-1} + \delta_4 GO_{it-1} + \delta_5 SPP_{it-1} + \delta_6 AT_{it-1} + \delta_7 FS_{it-1} + \delta_8 NDS_{it-1} + \chi_{it},$$

where target leverage is estimated by Equation (3.3). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. D^a_{it-1} (D^b_{it-1}) is a dummy variable equal to 1 if market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. See Table 3.1 for the definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 30,584 firm-years with issues and retirements/repurchases (18,882 issues and 11,702 retirements/repurchases) in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *z*-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. Pseudo R^2 is calculated as [1-(log-likelihood)]/(log-likelihood) when the slopes are restricted to be 0.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A - Debt issues										
$AbsDev_{it-1}.D^a_{it-1}$	-3.436*	(-2.11)	0.339	(0.26)	-2.728**	(-3.54)	-2.384*	(-2.37)	-0.761	(-1.73)
$AbsDev_{it-1}.D^b_{it-1}$	7.584**	(7.06)	5.814**	(6.58)	5.900**	(13.39)	5.910**	(9.40)	6.169**	(17.89)
$PROF_{it-1}$	-1.116	(-1.37)	1.682*	(2.12)	-0.532	(-0.84)	0.727	(1.88)	0.216	(0.97)
GO_{it-1}	0.351**	(2.57)	0.372*	(2.46)	0.646**	(10.39)	0.220**	(3.42)	0.108*	(2.55)
SPP_{it-1}	0.101	(0.71)	-0.116	(-1.68)	-0.360**	(-6.18)	-0.062	(-1.08)	-0.039	(-1.77)
AT_{it-1}	0.680**	(1.96)	0.185	(0.51)	0.843**	(4.43)	0.667**	(4.20)	0.695**	(6.36)
FS_{it-1}	0.025	(0.90)	-0.032	(-1.01)	-0.101**	(-5.23)	0.028	(1.38)	-0.013	(-1.07)
NDS_{it-1}	1.835	(1.02)	0.676	(0.38)	6.651**	(4.98)	2.903**	(2.64)	-0.507	(-0.59)
Panel B - Equity issues										
$AbsDev_{it-1}.D^a_{it-1}$	-0.809	(-0.66)	-2.305*	(-1.98)	-0.507	(-0.79)	-0.963	(-1.55)	-2.385**	(-7.14)
$AbsDev_{it-1}.D^b_{it-1}$	5.061**	(5.06)	1.667	(1.84)	2.566**	(6.14)	3.348**	(6.35)	3.573**	(12.20)
$PROF_{it-1}$	0.694	(1.03)	2.432**	(3.73)	13.773**	(18.88)	0.235	(0.97)	1.274**	(9.10)
GO_{it-1}	0.799**	(7.57)	0.864**	(6.73)	0.785**	(12.41)	0.563**	(11.96)	0.527**	(20.13)
SPP_{it-1}	0.417**	(2.79)	0.395**	(3.30)	0.437**	(5.51)	0.172**	(2.84)	-0.027	(-1.00)
AT_{it-1}	-0.897**	(-2.72)	-1.939**	(-6.02)	-1.112**	(-6.82)	-0.176	(-1.54)	-0.427**	(-5.49)
FS_{it-1}	-0.113**	(-5.03)	-0.161**	(-5.62)	-0.044**	(-2.82)	-0.136**	(-9.31)	-0.163**	(-19.23)
NDS_{it-1}	2.167	(1.46)	3.642**	(2.60)	5.897**	(5.00)	0.165	(0.20)	3.136**	(5.96)

Table 3.13 – Cont.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel C - Debt retirements										
$AbsDev_{it-1}.D^a_{it-1}$	10.343**	(11.07)	10.255**	(11.34)	10.921**	(29.13)	9.446**	(16.30)	6.923**	(24.36)
$AbsDev_{it-1}.D^b_{it-1}$	-2.065	(-1.23)	1.118	(0.86)	1.944**	(4.01)	-2.030*	(-2.12)	-0.112	(-0.25)
$PROF_{it-1}$	-1.326*	(-2.09)	0.405	(0.71)	-2.469**	(-4.15)	-0.063	(-0.22)	-0.275*	(-1.96)
GO_{it-1}	0.524**	(5.16)	0.692**	(5.55)	0.841**	(15.39)	0.495**	(10.12)	0.394**	(14.61)
SPP_{it-1}	0.218*	(2.55)	0.096	(0.81)	0.294**	(4.51)	-0.035	(-0.73)	0.027	(0.93)
AT_{it-1}	0.481	(1.40)	-0.333	(-0.98)	0.805**	(5.70)	-0.182	(-1.25)	-0.229*	(-2.39)
FS_{it-1}	-0.109**	(-3.88)	-0.204**	(-5.80)	-0.055**	(-3.84)	-0.030	(-1.63)	-0.144**	(-13.17)
NDS_{it-1}	4.714**	(3.49)	4.473**	(3.27)	1.011	(0.92)	5.199**	(5.83)	5.370**	(9.68)
Panel D - Equity repurchases										
$AbsDev_{it-1}.D^a_{it-1}$	-3.110	(-1.91)	-0.111	(-0.09)	-0.850	(-1.23)	0.524	(0.77)	0.210	(0.60)
$AbsDev_{it-1}.D^b_{it-1}$	5.696**	(4.56)	4.183**	(4.00)	1.668**	(2.64)	5.345**	(9.39)	4.299**	(13.25)
$PROF_{it-1}$	-5.225**	(-8.00)	-1.984**	(-3.79)	-10.621**	(-13.19)	-1.417**	(-5.74)	-1.783**	(-14.08)
GO_{it-1}	0.257*	(2.10)	0.272	(1.61)	0.695**	(9.31)	0.382**	(7.48)	0.294**	(10.59)
SPP_{it-1}	-0.347**	(-4.14)	-0.193*	(-2.36)	-0.534**	(-8.78)	-0.258**	(-6.07)	-0.078**	(-3.95)
AT_{it-1}	-0.523	(-1.18)	-1.951**	(-4.78)	-0.177	(-0.83)	-0.723**	(-5.21)	-1.041**	(-10.51)
FS_{it-1}	-0.173**	(-5.22)	-0.263**	(-6.55)	-0.210**	(-9.36)	-0.107**	(-5.92)	-0.212**	(-20.23)
NDS_{it-1}	-0.975	(-0.56)	1.692	(1.13)	-0.598	(-0.35)	3.685**	(4.48)	2.715**	(4.76)
Pseudo R^2	0.11		0.12		0.12		0.09		0.10	
Observations	3,487		2,878		19,951		9,995		30,987	

Table 3.14: Firms' Financing Decisions Conditional on Deviations from Target Leverage and Financing Gaps Using the Multinomial Logistic Method

This table presents the multinomial logistic regression results for firms' financing choices conditional on deviations from target leverage and financing gaps, as modeled by Equation (3.12) where the probability of a financing choice is: $\text{Prob}\,(Y = m) = \dfrac{e^{r_i}}{1 + \sum_1^m e^{r_i}}$ for m = 1 (debt issue), 2 (equity issue), 3 (debt retirement), 4 (equity repurchase), and 5 (the base case i.e., firm-years without any financing activities). Firms are defined as issuing (retiring/repurchasing) a security when the net amount issued (retired/repurchased) divided by the book value of total assets is greater than or equal to 5%. Cases when firms issue both debt and equity or both retire debt and repurchase equity in a given year are omitted. r_{it} is defined as:

$$r_{it} = \theta_0 + (\theta_1 D^s_{it} + \theta_2 D^d_{it}) AbsDev_{it-1} D^a_{it-1} + (\theta_3 D^s_{it} + \theta_4 D^d_{it}) AbsDev_{it-1} D^b_{it-1} + \theta_5 PROF_{it-1} + \theta_6 GO_{it-1} + \theta_7 SPP_{it-1} + \theta_8 AT_{it-1} + \theta_9 FS_{it-1} + \theta_{10} NDS_{it-1} + \varsigma_{it},$$

where target leverage is estimated by Equation (3.3). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. D^a_{it-1} (D^b_{it-1}) is a dummy variable equal to 1 if market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. D^s_{it} (D^d_{it}) is a dummy variable equal to 1 if financing gap is negative (positive) and 0 otherwise. See Table 3.1 for the definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 30,584 firm-years with issues and retirements/repurchases (18,882 issues and 11,702 retirements/repurchases) in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *z*-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. Pseudo R^2 is calculated as [1-(log-likelihood)]/(log-likelihood) when the slopes are restricted to be 0.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A - Debt issues										
$AbsDev_{it-1}.D^a_{it-1}D^s_{it}$	-25.802**	(-3.74)	-20.819**	(-3.40)	-41.673**	(-7.09)	-27.619**	(-4.78)	-15.268**	(-9.54)
$AbsDev_{it-1}.D^a_{it-1}D^d_{it}$	1.708	(1.18)	4.991**	(3.90)	5.446**	(7.58)	4.248**	(4.45)	3.773**	(8.39)
$AbsDev_{it-1}.D^b_{it-1}D^s_{it}$	-3.981	(-1.41)	-7.508*	(-2.46)	-22.557**	(-5.49)	-10.968**	(-4.23)	-7.079**	(-6.10)
$AbsDev_{it-1}.D^b_{it-1}D^d_{it}$	11.534**	(8.62)	7.780**	(7.41)	9.701**	(15.64)	8.782**	(11.00)	10.303**	(21.18)
$PROF_{it-1}$	-0.942	(-1.14)	1.898*	(2.28)	1.087	(1.63)	1.197**	(2.91)	0.674**	(2.83)
GO_{it-1}	0.323**	(2.34)	0.332*	(2.16)	0.513**	(8.02)	0.145*	(2.14)	0.057	(1.28)
SPP_{it-1}	0.150	(1.13)	-0.091	(-1.09)	-0.295**	(-4.51)	-0.045	(-0.75)	-0.031	(-1.30)
AT_{it-1}	0.538	(1.54)	0.250	(0.69)	1.058**	(5.41)	0.523**	(3.27)	0.528**	(4.80)
FS_{it-1}	0.020	(0.70)	-0.037	(-1.15)	-0.070**	(-3.56)	0.053*	(2.54)	0.004	(0.32)
NDS_{it-1}	2.048	(1.14)	1.084	(0.62)	5.873**	(4.24)	3.861**	(3.52)	0.362	(0.42)

Table 3.14 – Cont.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel B - Equity issues										
$AbsDev_{it-1}.D^a_{it-1}D^s_{it}$	-4.558*	(-2.40)	-9.156**	(-4.84)	-3.951**	(-4.65)	-7.676**	(-7.43)	-7.010**	(-12.25)
$AbsDev_{it-1}.D^a_{it-1}D^d_{it}$	2.083	(1.62)	1.952	(1.48)	5.161**	(6.69)	4.211**	(5.33)	1.534**	(3.87)
$AbsDev_{it-1}.D^b_{it-1}D^s_{it}$	-0.120	(-0.09)	-5.937**	(-3.65)	-0.319	(-0.58)	-2.286**	(-2.80)	-1.420**	(-3.54)
$AbsDev_{it-1}.D^b_{it-1}D^d_{it}$	8.758**	(6.91)	4.018**	(3.86)	5.790**	(10.34)	5.987**	(8.53)	7.253**	(16.53)
$PROF_{it-1}$	0.764	(1.12)	2.614**	(3.94)	14.257**	(19.47)	0.411	(1.72)	1.450**	(10.40)
GO_{it-1}	0.787**	(7.39)	0.847**	(6.58)	0.749**	(11.81)	0.537**	(11.56)	0.512**	(19.70)
SPP_{it-1}	0.427**	(2.81)	0.396**	(3.19)	0.455**	(5.74)	0.174**	(2.88)	-0.024	(-0.88)
AT_{it-1}	-0.945**	(-2.85)	-1.869**	(-5.83)	-1.021**	(-6.29)	-0.237*	(-2.06)	-0.493**	(-6.28)
FS_{it-1}	-0.116**	(-5.14)	-0.159**	(-5.53)	-0.034*	(-2.19)	-0.124**	(-8.33)	-0.154**	(-18.04)
NDS_{it-1}	2.320	(1.54)	3.784**	(2.74)	5.497**	(4.66)	0.595	(0.72)	3.431**	(6.42)
Panel C - Debt retirements										
$AbsDev_{it-1}.D^a_{it-1}D^s_{it}$	12.053**	(10.45)	11.797**	(10.53)	11.790**	(28.61)	10.314**	(15.11)	7.800**	(23.56)
$AbsDev_{it-1}.D^a_{it-1}D^d_{it}$	7.428**	(6.54)	7.898**	(6.28)	0.535	(0.39)	7.379**	(8.49)	4.813**	(11.17)
$AbsDev_{it-1}.D^b_{it-1}D^s_{it}$	1.940	(1.32)	4.150**	(3.25)	3.953**	(8.23)	2.366**	(2.87)	1.776**	(4.33)
$AbsDev_{it-1}.D^b_{it-1}D^d_{it}$	-17.586**	(-3.26)	-5.353	(-1.45)	-14.027**	(-6.17)	-15.179**	(-4.77)	-4.671**	(-4.66)
$PROF_{it-1}$	-1.609*	(-2.51)	0.333	(0.58)	-3.513**	(-5.57)	-0.166	(-0.60)	-0.333*	(-2.38)
GO_{it-1}	0.554**	(5.38)	0.710**	(5.69)	0.917**	(16.12)	0.489**	(10.25)	0.388**	(14.53)
SPP_{it-1}	0.200*	(2.38)	0.097	(0.58)	0.291**	(4.17)	-0.024	(-0.48)	0.023	(0.78)
AT_{it-1}	0.538	(1.53)	-0.452	(-1.30)	0.690**	(4.73)	-0.150	(-1.00)	-0.205*	(-2.09)
FS_{it-1}	-0.107**	(-3.81)	-0.216**	(-5.95)	-0.071**	(-4.76)	-0.041*	(-2.25)	-0.150**	(-13.72)
NDS_{it-1}	4.598**	(3.31)	4.040**	(2.90)	1.418	(1.26)	5.269**	(5.79)	5.359**	(9.37)
Panel D - Equity repurchases										
$AbsDev_{it-1}.D^a_{it-1}D^s_{it}$	-1.133	(-0.62)	-1.443	(-0.86)	-3.022**	(-3.50)	-1.298	(-1.45)	-0.813	(-1.83)
$AbsDev_{it-1}.D^a_{it-1}D^d_{it}$	-5.514**	(-2.74)	1.732	(1.00)	2.244*	(2.35)	3.122**	(3.35)	1.785**	(3.74)
$AbsDev_{it-1}.D^b_{it-1}D^s_{it}$	2.791	(1.77)	3.692**	(2.95)	-0.820	(-0.81)	1.992*	(2.55)	1.105**	(2.73)
$AbsDev_{it-1}.D^b_{it-1}D^d_{it}$	8.716**	(5.50)	4.750**	(3.34)	4.136**	(5.14)	7.596**	(10.10)	7.432**	(15.71)
$PROF_{it-1}$	-5.292**	(-8.04)	-1.940**	(-3.67)	-10.128**	(-12.48)	-1.281**	(-5.28)	-1.643**	(-13.18)
GO_{it-1}	0.254*	(2.06)	0.267	(1.57)	0.652**	(8.62)	0.362**	(7.18)	0.283**	(10.26)
SPP_{it-1}	-0.353**	(-4.30)	-0.191*	(-2.09)	-0.532**	(-8.65)	-0.254**	(-5.96)	-0.077**	(-3.89)
AT_{it-1}	-0.536	(-1.22)	-1.921**	(-4.70)	-0.122	(-0.57)	-0.755**	(-5.44)	-1.094**	(-10.98)
FS_{it-1}	-0.174**	(-5.25)	-0.268**	(-6.60)	-0.201**	(-8.97)	-0.101**	(-5.63)	-0.207**	(-19.78)
NDS_{it-1}	-0.969	(-0.55)	1.682	(1.13)	-0.819	(-0.47)	3.922**	(4.73)	2.892**	(5.00)
Pseudo R^2	0.13		0.16		0.16		0.12		0.12	
Observations	3,487		2,878		19,951		9,995		30,987	

Table 3.15: Firms' Choices of Security Issues Conditional on Debt Capacities

This table presents the logistic regression results for firms' choices of security issues conditional on debt capacities, as modeled by Equation (3.13) where the probability of debt issues is:

$$\text{Prob}\,(S_{it}=1|f_{it})=\frac{e^{f_t}}{1+e^{f_t}}.$$

Firms are defined as issuing a security when the net amount issued divided by the book value of total assets is greater than or equal to 5%. Cases when firms issue both debt and equity in a given year are omitted. f_{it} is defined as:

$$f_{it}=\upsilon_0+\upsilon_1 AbsDev_{it-1}D^a_{it-1}D^s_{it}+(\upsilon_2 D^{OL}_{it-1}+\upsilon_3 D^{OS}_{it-1})AbsDev_{it-1}D^a_{it-1}D^d_{it}+\upsilon_4 AbsDev_{it-1}D^b_{it-1}D^s_{it}+\upsilon_5 AbsDev_{it-1}D^b_{it-1}D^d_{it}$$
$$+\upsilon_6 PROF_{it-1}+\upsilon_7 GO_{it-1}+\upsilon_8 SPP_{it-1}+\upsilon_9 AT_{it-1}+\upsilon_{10} FS_{it-1}+\upsilon_{11} NDS_{it-1}+\zeta_{it},$$

where target leverage is estimated by Equation (3.3). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. D^a_{it-1} (D^b_{it-1}) is a dummy variable equal to 1 if market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. D^s_{it} (D^d_{it}) is a dummy variable equal to 1 if financing gap is negative (positive) and 0 otherwise. D^{OL}_{it-1} (D^{OS}_{it-1}) is a dummy variable equal to 1 if deviations from target leverage are greater than or equal to (smaller than) the median level for the over-levered group and 0 otherwise. See Table 3.1 the for definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 18,882 issues by firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *z*-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. Pseudo R^2 is calculated as [1-(log-likelihood)]/(log-likelihood) when the slopes are restricted to be 0. Columns (1), (3), (5), (7), and (9) report the estimated coefficients and columns (2), (4), (6), (8), and (10) report their marginal effects. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$AbsDev_{it-1}.D^a_{it-1}D^s_{it}$	-15.419**	-3.642**	-9.902	-2.248	-25.654**	-4.766**	-16.999**	-2.946**	-7.126**	-0.970**
	(-2.61)	(-2.65)	(-1.75)	(-1.77)	(-6.15)	(-6.69)	(-3.19)	(-3.32)	(-5.57)	(-5.75)
$AbsDev_{it-1}.D^a_{it-1}D^d_{it}\ D^{OL}_{it-1}$ (i)	1.502	0.355	5.321**	1.208*	4.428**	0.823**	2.991*	0.518*	4.828**	0.657**
	(0.70)	(0.70)	(2.60)	(2.56)	(3.23)	(3.14)	(2.32)	(2.28)	(7.52)	(6.79)
$AbsDev_{it-1}.D^a_{it-1}D^d_{it}\ D^{OS}_{it-1}$ (ii)	7.654	1.808	10.799	2.452	18.054**	3.354**	10.981*	1.903*	14.106**	1.920**
	(1.08)	(1.08)	(1.45)	(1.45)	(4.36)	(4.20)	(2.45)	(2.43)	(5.52)	(5.33)
$AbsDev_{it-1}.D^b_{it-1}D^s_{it}$	-4.023	-0.950	-0.760	-0.173	-14.388**	-2.673**	-7.640**	-1.324**	-4.863**	-0.662**
	(-1.58)	(-1.58)	(-0.26)	(-0.26)	(-4.11)	(-4.40)	(-3.45)	(-3.51)	(-4.64)	(-4.72)
$AbsDev_{it-1}.D^b_{it-1}D^d_{it}$	10.870**	2.567**	10.875**	2.469**	10.236**	1.902**	10.007**	1.734**	9.350**	1.272**
	(5.24)	(5.11)	(5.24)	(5.08)	(10.01)	(9.01)	(9.10)	(8.35)	(17.22)	(13.76)
$PROF_{it-1}$	-1.640	-0.387	-0.841	-0.191	-12.906**	-2.398**	0.467	0.081	-1.104**	-0.150**
	(-1.85)	(-1.84)	(-0.93)	(-0.93)	(-11.32)	(-11.10)	(1.60)	(1.62)	(-6.41)	(-5.81)
GO_{it-1}	-0.490**	-0.116**	-0.591**	-0.134**	-0.366**	-0.068**	-0.459**	-0.080**	-0.574**	-0.078**
	(-3.63)	(-3.73)	(-3.44)	(-3.63)	(-4.58)	(-4.81)	(-6.59)	(-7.59)	(-11.00)	(-17.18)

SPP_{it-1}	-0.179	-0.042	-0.655**	-0.149**	-0.806**	-0.150**	-0.250**	-0.043**	-0.005	-0.001
	(-0.98)	(-0.98)	(-3.16)	(-3.12)	(-6.31)	(-6.27)	(-3.08)	(-3.06)	(-0.26)	(-0.26)
AT_{it-1}	1.993**	0.471**	2.356**	0.535**	2.732**	0.508**	1.129**	0.196**	1.413**	0.192**
	(3.57)	(3.54)	(4.46)	(4.42)	(9.42)	(9.32)	(6.26)	(6.09)	(10.87)	(9.72)
FS_{it-1}	0.163**	0.038**	0.150**	0.034**	-0.032	-0.006	0.206**	0.036**	0.211**	0.029**
	(4.30)	(4.31)	(3.46)	(3.43)	(-1.24)	(-1.23)	(8.21)	(8.25)	(14.94)	(12.97)
NDS_{it-1}	-0.689	-0.163	-3.731	-0.847	-1.093	-0.203	3.687**	0.639**	-2.817**	-0.383**
	(-0.32)	(-0.32)	(-1.51)	(-1.51)	(-0.56)	(-0.56)	(3.00)	(2.99)	(-2.98)	(-2.94)
Pseudo R^2	0.16		0.20		0.29		0.18		0.20	
Correct classification	0.73		0.73		0.80		0.76		0.79	
F-test [(i) = (ii)]	0.37		0.45		0.00		0.07		0.00	
Equity repurchases	570		515		2,601		2,053		7,630	
Debt retirements	395		330		1,352		841		2,595	
Observations	965		845		3,953		2,894		10,225	

Table 3.16: Firms' Choices of Security Retirements/Repurchases Conditional on Debt Capacities

This table presents the logistic regression results for firms' choices of security retirements/repurchases conditional on debt capacities, as modeled by Equation (3.14) where the probability of debt retirements is:

$$\text{Prob}\,(S_{it} = 1 | f_{it}) = \frac{e^{f_{it}}}{1 + e^{f_{it}}}.$$

Firms are defined as retiring/repurchasing a security when the net amount retired/repurchased divided by the book value of total assets is greater than or equal to 5%. Cases when firms both retire debt and repurchase equity in a given year are omitted. f_{it} is defined as:

$$f_{it} = \upsilon_0 + \upsilon_1 AbsDev_{it-1} D^a_{it-1} D^s_{it} + \upsilon_2 AbsDev_{it-1} D^a_{it-1} D^d_{it} + (\upsilon_3 D^{UL}_{it-1} + \upsilon_4 D^{US}_{it-1}) AbsDev_{it-1} D^b_{it-1} D^s_{it} + \upsilon_5 AbsDev_{it-1} D^b_{it-1} D^d_{it}$$
$$+ \upsilon_6 PROF_{it-1} + \upsilon_7 GO_{it-1} + \upsilon_8 SPP_{it-1} + \upsilon_9 AT_{it-1} + \upsilon_{10} FS_{it-1} + \upsilon_{11} NDS_{it-1} + \zeta_{it},$$

where target leverage is estimated by Equation (3.14). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. D^a_{it-1} (D^b_{it-1}) is a dummy variable equal to 1 if market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. D^s_{it} (D^d_{it}) is a dummy variable equal to 1 if financing gap is negative (positive) and 0 otherwise. Dev^{UL}_{it-1} (Dev^{US}_{it-1}) is a dummy variable equal to 1 if deviations from targets are greater than or equal to (smaller than) the median level for the under-levered group and 0 otherwise. See Table 3.1 for the definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 11,702 retirements/repurchases by firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *z*-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. Pseudo R^2 is calculated as [1-(log-likelihood)]/(log-likelihood) when the slopes are restricted to be 0. Columns (1), (3), (5), (7), and (9) report the estimated coefficients and columns (2), (4), (6), (8), and (10) report their marginal effects. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$AbsDev_{it-1}.D^a_{it-1}D^s_{it}$	13.014**	3.230**	14.035**	3.397**	13.896**	2.627**	11.694**	1.641**	9.486**	1.481**
	(4.44)	(4.38)	(5.73)	(5.45)	(11.88)	(13.75)	(8.57)	(3.51)	(14.23)	(11.37)
$AbsDev_{it-1}.D^a_{it-1}D^d_{it}$	10.287**	2.553**	6.615*	1.601*	-8.881**	-1.679**	-1.444	-0.203	0.654	0.102
	(3.43)	(3.39)	(2.26)	(2.25)	(-2.92)	(-2.84)	(-0.69)	(-0.70)	(0.78)	(0.77)
$AbsDev_{it-1}.D^b_{it-1}D^s_{it}\ D^{UL}_{it-1}$ (i)	-1.119	-0.278	2.868	0.694	3.593**	0.679**	-0.260	-0.037	-0.647	-0.101
	(-0.40)	(-0.40)	(1.31)	(1.31)	(2.97)	(3.02)	(-0.17)	(-0.18)	(-0.80)	(-0.80)
$AbsDev_{it-1}.D^b_{it-1}D^s_{it}\ D^{US}_{it-1}$ (ii)	10.044	2.493	15.804	3.825	7.834	1.481	0.338	0.047	1.880	0.294
	(0.94)	(0.94)	(1.54)	(1.53)	(1.45)	(1.47)	(0.05)	(0.05)	(0.53)	(0.53)
$AbsDev_{it-1}.D^b_{it-1}D^d_{it}$	-26.911*	-6.679*	-3.042	-0.736	-35.010**	-6.617**	-54.707*	-7.678**	-13.590**	-2.122**
	(-2.12)	(-2.17)	(-0.72)	(-0.72)	(-3.48)	(-3.25)	(-2.30)	(-4.36)	(-5.50)	(-5.84)
$PROF_{it-1}$	7.037**	1.747**	4.350**	1.053**	7.522**	1.422**	3.845**	0.540**	2.621**	0.409**
	(5.38)	(5.47)	(4.43)	(4.51)	(5.56)	(5.51)	(4.65)	(3.66)	(6.52)	(7.51)
GO_{it-1}	0.086	0.021	0.000	0.000	-0.066	-0.012	0.008	0.001	-0.173**	-0.027**
	(0.44)	(0.44)	(0.00)	(0.00)	(-0.59)	(-0.59)	(0.12)	(0.12)	(-3.96)	(-4.30)

SPP_{it-1}	0.384**	0.095**	0.138	0.033	0.628**	0.119**	0.236**	0.033*	0.284**	0.044**
	(2.89)	(2.89)	(1.07)	(1.08)	(5.85)	(5.63)	(3.32)	(2.56)	(4.77)	(4.94)
AT_{it-1}	1.483*	0.368*	2.628**	0.636**	1.081**	0.204**	0.777**	0.109*	1.016**	0.159**
	(1.98)	(1.97)	(4.19)	(4.15)	(3.61)	(3.60)	(2.89)	(2.43)	(5.81)	(5.45)
FS_{it-1}	0.096	0.024	0.138*	0.033*	0.181**	0.034**	0.104**	0.015*	0.126**	0.020**
	(1.84)	(1.84)	(2.20)	(2.20)	(5.67)	(5.64)	(3.20)	(2.45)	(6.97)	(6.47)
NDS_{it-1}	4.725*	1.173*	0.155	0.038	3.221	0.609	1.994	0.280	1.540	0.241
	(1.98)	(1.98)	(0.09)	(0.09)	(1.30)	(1.30)	(1.27)	(1.20)	(1.60)	(1.59)
Pseudo R^2	0.27		0.29		0.23		0.31		0.26	
Correct classification	0.75		0.78		0.79		0.79		0.79	
F-test [(i) = (ii)]	0.28		0.20		0.41		0.92		0.47	
Equity repurchases	282		289		872		1,261		3,976	
Debt retirements	294		236		2,125		652		1,715	
Observations	576		525		2,997		1,913		5,691	

3.6.3. The Impact of Debt Capacities

Firms' debt capacities have been empirically shown to have a significant impact on firms' financing decisions (Agca and Mozumdar (2007), Lemmon and Zender (2010), Leary and Roberts (2010), de Jong et al. (2011), among others). These studies take this factor into account to see which framework (the pecking-order and trade-off theories) can explain firms' financing behaviors better.

de Jong et al. (2011) further show that when debt capacities are considered, the pecking-order and trade-off theories may have conflicting predictions on the financing decisions of two groups of firms: (1) firms that would be considered as being over-levered by the trade-off theory have a financing deficit and (2) firms that would be considered as being under-levered by the trade-off theory face a financing surplus. For the first group, the trade-off theory suggests these firms should avoid issuing new debt to avoid potentially high costs of financial distress. In contrast, the pecking-order view argues that these firms should still issue debt to offset the deficit to avoid higher costs of equity financing. For the second group, the former theory predicts that these firms with a financing surplus may stand a lower probability of retiring debt to avoid further deviations, which is contrary to the prediction of the financing hierarchy view that they should retire debt to save their debt capacities and avoid high costs of re-issuing equity.

When examining the impact of firms' debt capacities on their financing decisions, a key issue would be the estimation of these capacities. Previous studies have employed several different approaches to estimate these. Leary and Roberts (2010), for example, specify firms' debt capacities as the function of their four major fundamentals consisting of size, growth opportunities, profitability, and asset tangibility.[32] de Jong et al. (2011) define firms' debt capacities as the marginal value of their debt ratios that

[32] In an unreported robustness check, I follow this definition and obtain qualitatively similar results for the issue equation. The results for the retirement/repurchase equation, however, are mixed.

would increase the probability of obtaining a speculative grade to 0.5.[33] This approach effectively captures the idea of the pecking-order view i.e., ‘‘if costs of financial distress are ignored, the firm will finance real investment by issuing the safest security it can... In practice, this means that firms which can issue investment-grade debt will do so rather than issue equity.” (p. 225, Shyam-Sunder and Myers, (1999)). It, however, requires data on firms’ credit ratings which are not available in *Datastream Worldscope*.

In this last robustness check, I examine how firms’ choices of security issues/retirements (repurchases) may vary contingent on the relative position of their actual leverage to their debt capacities which are proxied by target leverage. To see how debt capacities may influence the types of securities over-levered firms with a financing deficit may issue, I develop the following model:

(3.13)
$$\text{Prob}\ (S_{it} = 1 | f_{it}) = \frac{e^{f_{it}}}{1+e^{f_{it}}},$$

where
$$f_{it} = \upsilon_0 + \upsilon_1 AbsDev_{it-1} D^a_{it-1} D^s_{it} + (\upsilon_2 D^{OL}_{it-1} + \upsilon_3 D^{OS}_{it-1}) AbsDev_{it-1} D^a_{it-1} D^d_{it}$$

$$+ \upsilon_4 AbsDev_{it-1} D^b_{it-1} D^s_{it} + \upsilon_5 AbsDev_{it-1} D^b_{it-1} D^d_{it}$$

$$+ \upsilon_6 PROF_{it-1} + \upsilon_7 GO_{it-1} + \upsilon_8 SPP_{it-1} + \upsilon_9 AT_{it-1} + \upsilon_{10} FS_{it-1} + \upsilon_{11} NDS_{it-1} + \zeta_{it}.$$

S_{it} is a binary dependent variable that is equal to 1 if firms issue debt and 0 if they issue equity. D^{OL}_{it-1} (D^{OS}_{it-1}) is a dummy variable equal to 1 if firms’ deviations from target leverage are greater than or equal to (smaller than) the median level for the over-levered group and 0 otherwise. D^{OL}_{it-1} indicates that firms’ actual leverage exceeds their

[33] Although both de Jong et al. (2011) and I take into account the role of firms’ debt capacities to identify situations in which the trade-off and pecking-order theories may have conflicting predictions on their financing decisions, our approaches are different. de Jong et al. look at firms’ actual financing decisions and examine their features (e.g., deviations from target leverage and financing gaps) conditional on these. I, however, use these features to predict firms’ financing choices i.e., what they will do contingent on deviations from targets in the last and financing gaps in the current accounting periods.

debt capacities by large amounts (large over-capacity deviations), as contrary to D^{OS}_{it-1} (small over-capacity deviations). Note that Equation (3.13) is an issue equation. The financing behaviors of firms that would be considered as being over-levered by the trade-off theory follow the trade-off theory if they are less likely to issue debt even when facing a financing deficit to avoid potentially high costs of financial distress i.e., both υ_2 and υ_3 are negative. In contrast, their financing behaviors can be better explained by the pecking-order view if they are still likely to issue debt to offset the deficit and the probability of issuing debt is relatively lower in the presence of large over-capacity deviations since firms with large over-capacity deviations are likely to have less ability to obtain additional debt i.e., $0 < \upsilon_2 < \upsilon_3$.

Next, to investigate the impact of debt capacities on the types of securities firms that would be considered as being under-levered by the trade-off theory with a financing surplus are likely to retire/repurchase, I develop the following retirement/repurchase model:[34]

(3.14)
$$\text{Prob } (S_{it} = 1 | f_{it}) = \frac{e^{f_{it}}}{1 + e^{f_{it}}},$$

where
$$f_{it} = \upsilon_0 + \upsilon_1 AbsDev_{it-1} D^a_{it-1} D^s_{it} + \upsilon_2 AbsDev_{it-1} D^a_{it-1} D^d_{it}$$
$$+(\upsilon_3 D^{UL}_{it-1} + \upsilon_4 D^{US}_{it-1}) AbsDev_{it-1} D^b_{it-1} D^s_{it} + \upsilon_5 AbsDev_{it-1} D^b_{it-1} D^d_{it}$$
$$+\upsilon_6 PROF_{it-1} + \upsilon_7 GO_{it-1} + \upsilon_8 SPP_{it-1} + \upsilon_9 AT_{it-1} + \upsilon_{10} FS_{it-1} + \upsilon_{11} NDS_{it-1} + \zeta_{it}.$$

[34] I also investigate the impact of the size mismatch between firms' deviations from target leverage and financing gaps on their financing decisions (Table B5 and Table B6 in Appendix B) and find that firms that would be considered as being over-levered (under-levered) by the trade-off theory with a financing deficit (surplus) are more likely to issue (retire) debt, especially when their financing gaps exceed deviations from target leverage, which fits nicely with the debt-capacity argument of the financing hierarchy view.

S_{it} is equal to 1 if firms retire debt and 0 if they repurchase equity. D_{it-1}^{UL} (D_{it-1}^{US}) is a dummy variable equal to 1 if firms' deviations from target leverage are greater than or equal to (smaller than) the median level for the under-levered group and 0 otherwise. D_{it-1}^{UL} indicates firms' debt capacities exceed their actual leverage by large amounts (large unused debt capacities), as contrary to D_{it-1}^{US} (small unused debt capacities). As suggested by the trade-off theory, firms that would be considered as being under-levered by the trade-off theory with a financing surplus are less likely to retire debt to avoid further deviations from targets i.e., both υ_3 and υ_4 are negative. The pecking-order view, however, argues that these firms should use their surplus funds to retire debt to save their debt capacities and avoid high costs of re-issuing equity, especially when their unused debt capacities are small i.e., $0 < \upsilon_3 < \upsilon_4$.

In support of the debt-capacity argument of the pecking-order theory, the results in row (i) and row (ii) of Table 3.15 show that firms that would be considered as being over-levered by the trade-off theory (except for French and German firms) are still likely to issue debt when facing a financing deficit, especially when their over-capacity deviations are small (row (ii)) since the probability of issuing debt in this case is significantly higher than that when their over-capacity deviations are large (row (i)) (with the exception of UK firms where the difference is only marginally significant), as indicated by the *F*-tests and the magnitude of the coefficients on the interaction terms.

Although most of the coefficients for the interaction terms between firms' deviations from target leverage, financing gaps, and the magnitude of unused debt capacities in the retirement/repurchase equation (Equation (3.14)) reported in Table 3.16 (row (i) and row (ii)) are statistically insignificant, they carry a negative sign among firms with large unused debt capacities (row (i)) (except for German and Japanese firms) but a positive sign among firms with small unused debt capacities (row (ii)) (across all the sample countries). Intuitively, this finding would suggest that firms that would be considered as being under-levered by the trade-off theory with a financing surplus are less likely to retire debt when they still have a lot of unused debt capacities but more likely to do so when their unused debt capacities are small, which to some extent is also consistent with the pecking-order theory.

3.7. Conclusions

In this chapter, I provide empirical evidence that firms' choices of securities may be jointly shaped by the relevant costs proposed by both the pecking-order and trade-off theories.[35] My study hence supports Myers (2001) and Byoun (2008) that it is necessary to consider these two theoretical frameworks as "close mates" when examining firms' financing behaviors. However, more importantly, I show that even when costs of adverse selection suggested by the pecking-order theory do matter, firms still have target leverage and attempt to adjust toward it over time. I also provide evidence on why over-levered firms and over-levered firms with a financing deficit may adjust toward their target leverage faster than the other groups of firms, as documented in Chapter 2.

My data support the hypotheses on firms' choices of securities to be issued/ retired (repurchased). Contrary to equity issuers and repurchasers, debt issuers and retirers tend to be those which have better access to the debt market and experience large deviations from target leverage. These findings are consistent with Hovakimian et al. (2001) and Hovakimian (2004) that firms may exhibit their target adjustments more prominently through their debt financing decisions, especially debt retirement ones.

[35] There is also some evidence in support of the market timing hypothesis i.e., the impact of share price performance on firms' financing decisions.

In addition, I identify situations where the pecking-order and trade-off views may have either similar or contradictory predictions on firms' financing decisions, with the latter cases usually leading to mixed and weak evidence. In particular, in line with both theories, I find strong evidence that firms that would be considered as being over-levered by the trade-off theory with a financing surplus are less likely to issue debt but more likely to retire it. Firms that would be considered as being under-levered by the trade-off theory with a financing deficit, however, are more likely to issue debt but less likely to retire it.

In cases when the pecking-order and trade-off theories have contradictory predictions, there tends to be mixed and/or weak evidence that on balance seems to be in relatively more favor of the pecking-order theory. Specifically, there is some evidence that firms that would be considered as being over-levered by the trade-off theory with a financing deficit are more likely to issue debt but less likely to retire it. On the contrary, firms that would be considered as being over-levered by the trade-off theory with a financing surplus, however, are less likely to issue debt but more likely to retire it.

I also investigate the joint impact of firms' deviations from targets and financing gaps on their issue (retirement/repurchase) size and show findings with patterns similar to those of the logistic models. Firms that would be considered as being over- levered (under-levered) by the trade-off theory with a financing surplus (deficit) issue less (more) but retire more (less) debt, behaviors in support of both the pecking-order and trade-off theories. There is, however, mixed and/or weak evidence which on average tends to be more in line with the former view among firms that would be considered as being over-levered (under-levered) by the trade-off theory with a financing deficit (surplus).

Considering the impact of firms' debt capacities on their financing decisions, I find that firms that would be considered as being over-levered by the trade-off theory with a financing deficit and small over-capacity deviations are more likely to issue debt while firms that would be considered as being under-levered by the trade-off theory with a financing surplus and small unused debt capacities are more likely to retire it. These findings support the debt-capacity argument of the pecking-order theory and confirm the relevance of taking firms' debt capacities into consideration when examining their financing behaviors (Leary and Roberts (2010), and de Jong et al. (2011)).

So far, in Chapter 2 and Chapter 3, I have discussed several complex aspects of firms' financing processes i.e., their leverage policies. In the next chapter, I am going to shed light on another aspect of their financing processes i.e., their cash holdings policies.

Appendix B

Table B1: Firms' Choices of Security Issues Conditional on Deviations from Target Leverage Using Book Leverage

This table presents the logistic regression results for firms' choices of security issues conditional on deviations from target leverage using the book leverage measure, as modeled by Equation (3.5) where the probability of debt issues is:

$$\text{Prob}\,(S_{it} = 1 | I_{it}) = \frac{e^{I_{it}}}{1+e^{I_{it}}}.$$

Firms are defined as issuing a security when the net amount issued divided by the book value of total assets is greater than or equal to 5%. Cases when firms issue both debt and equity in a given year are omitted. I_{it} is defined as:

$$I_{it} = \alpha_0 + \alpha_1 AbsDev_{it-1} D^a_{it-1} + \alpha_2 AbsDev_{it-1} D^b_{it-1} + \alpha_3 PROF_{it-1} + \alpha_4 GO_{it-1} + \alpha_5 SPP_{it-1} + \alpha_6 AT_{it-1} + \alpha_7 FS_{it-1} + \alpha_8 NDS_{it-1} + \nu_{it},$$

where target leverage is estimated by Equation (3.3). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. D^a_{it-1} (D^b_{it-1}) is a dummy variable equal to 1 if book leverage is higher than or equal to (lower than) target book leverage and 0 otherwise. See Table 3.1 for the definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 18,882 issues by firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *z*-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. Pseudo R^2 is calculated as [1-(log-likelihood)]/(log-likelihood) when the slopes are restricted to be 0. Columns (1), (3), (5), (7), and (9) report the estimated coefficients and columns (2), (4), (6), (8), and (10) report their marginal effects. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$AbsDev_{it-1}.D^a_{it-1}$ (i)	-8.062**	-1.912**	5.650**	1.283**	-3.847*	-0.785*	1.054	0.192	0.054	0.008
	(-2.59)	(-2.60)	(2.78)	(2.78)	(-2.30)	(-2.30)	(0.90)	(0.90)	(0.09)	(0.09)
$AbsDev_{it-1}.D^b_{it-1}$ (ii)	9.918**	2.352**	13.587**	3.086**	8.304**	1.695**	7.298**	1.327**	5.937**	0.833**
	(4.42)	(4.38)	(5.27)	(5.20)	(6.74)	(6.70)	(7.84)	(7.76)	(12.49)	(11.52)
$PROF_{it-1}$	-1.557*	-0.369*	-1.208	-0.274	-15.293**	-3.121**	0.013	0.002	-1.316**	-0.185**
	(-2.06)	(-2.06)	(-1.27)	(-1.27)	(-12.50)	(-12.36)	(0.05)	(0.05)	(-8.12)	(-7.27)
GO_{it-1}	-0.449**	-0.106**	-0.593**	-0.135**	-0.222*	-0.045**	-0.462**	-0.084**	-0.595**	-0.083**
	(-4.49)	(-4.57)	(-3.55)	(-3.73)	(-2.56)	(-2.61)	(-7.09)	(-8.09)	(-12.25)	(-19.38)
SPP_{it-1}	-0.087	-0.021	-0.564**	-0.128**	-0.517**	-0.106**	-0.139*	-0.025*	-0.001	0.000
	(-0.43)	(-0.43)	(-2.69)	(-2.66)	(-4.93)	(-4.93)	(-1.96)	(-1.96)	(-0.04)	(-0.04)
AT_{it-1}	1.980**	0.470**	2.598**	0.590**	2.528**	0.516**	1.174**	0.214**	1.488**	0.209**
	(3.81)	(3.80)	(4.88)	(4.86)	(9.43)	(9.61)	(6.78)	(6.68)	(11.84)	(10.50)
FS_{it-1}	0.208**	0.049**	0.156**	0.035**	-0.068**	-0.014**	0.187**	0.034**	0.190**	0.027**
	(5.50)	(5.49)	(3.62)	(3.59)	(-2.64)	(-2.63)	(7.82)	(7.72)	(13.94)	(12.60)

NDS $_{it-1}$	-0.731	-0.173	-3.232	-0.734	-1.212	-0.247	3.352**	0.609**	-3.980**	-0.558**
	(-0.38)	(-0.38)	(-1.28)	(-1.28)	(-0.65)	(-0.65)	(2.85)	(2.85)	(-4.24)	(-4.16)
Pseudo R^2	0.13		0.18		0.18		0.11		0.15	
Correct classification	0.69		0.71		0.74		0.73		0.75	
F-test [(i) = (ii)]	0.00		0.00		0.00		0.00		0.00	
Equity issues	570		515		2,601		2,053		7,630	
Debt issues	395		330		1,352		841		2,595	
Observations	965		845		3,953		2,894		10,225	

Table B2: Firms' Choices of Security Issues Conditional on Deviations from Targets and Financing Gaps Using Book Leverage

This table presents the logistic regression results for firms' choices of security issues conditional on deviations from target leverage and financing gaps using the book leverage measure, as modeled by Equation (3.7) where the probability of debt issues is:

$$\text{Prob}(S_{it} = 1 | h_{it}) = \frac{e^{h_{it}}}{1 + e^{h_{it}}}.$$

Firms are defined as issuing a security when the net amount issued divided by the book value of total assets is greater than or equal to 5%. Cases when firms issue both debt and equity in a given year are omitted. hit is defined as:

$$h_{it} = \varphi_0 + (\varphi_1 D^s_{it} + \varphi_2 D^d_{it}) AbsDev_{it-1} D^a_{it-1} + (\varphi_3 D^s_{it} + \varphi_4 D^d_{it}) AbsDev_{it-1} D^b_{it-1} + \varphi_5 PROF_{it-1} + \varphi_6 GO_{it-1} + \varphi_7 SPP_{it-1} + \varphi_8 AT_{it-1} + \varphi_9 FS_{it-1} + \varphi_{10} NDS_{it-1} + \eta_{it},$$

where target leverage is estimated by Equation (3.3). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. D^a_{it-1} (D^b_{it-1}) is a dummy variable equal to 1 if book leverage is higher than or equal to (lower than) target book leverage and 0 otherwise. D^s_{it} (D^d_{it}) is a dummy variable equal to 1 if financing gap is negative (positive) and 0 otherwise. See Table 3.1 for the definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 18,882 issues by firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *z*-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. Pseudo R^2 is calculated as [1-(log-likelihood)]/(log-likelihood) when the slopes are restricted to be 0. Columns (1), (3), (5), (7), and (9) report the estimated coefficients and columns (2), (4), (6), (8), and (10) report their marginal effects. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$AbsDev_{it-1}.D^a_{it-1}D^s_{it}$ (i)	-27.351**	-6.421**	-6.900	-1.567	-45.758**	-8.499**	-24.646**	-4.127**	-11.650**	-1.538**
	(-2.96)	(-3.03)	(-0.71)	(-0.71)	(-5.78)	(-6.42)	(-3.52)	(-3.77)	(-5.16)	(-5.33)
$AbsDev_{it-1}.D^a_{it-1}D^d_{it}$ (ii)	-1.986	-0.466	11.459**	2.602**	5.530*	1.027*	4.998**	0.837**	3.362**	0.444**
	(-0.64)	(-0.65)	(3.12)	(3.08)	(2.54)	(2.50)	(3.57)	(3.50)	(5.50)	(5.42)
$AbsDev_{it-1}.D^b_{it-1}D^s_{it}$ (iii)	-2.146	-0.504	4.217	0.957	-16.859**	-3.132**	-14.282**	-2.392**	-5.867**	-0.774**
	(-0.58)	(-0.58)	(1.29)	(1.28)	(-3.69)	(-3.85)	(-3.86)	(-4.00)	(-4.49)	(-4.52)
$AbsDev_{it-1}.D^b_{it-1}D^d_{it}$ (iv)	16.118**	3.784**	16.662**	3.783**	16.385**	3.043**	10.375**	1.737**	9.923**	1.310**
	(5.06)	(4.98)	(4.79)	(4.64)	(8.64)	(7.91)	(8.51)	(7.80)	(16.75)	(14.53)
$PROF_{it-1}$	-1.408*	-0.331*	-0.846	-0.192	-13.150**	-2.443**	0.428	0.072	-0.957**	-0.126**
	(-2.03)	(-2.03)	(-0.90)	(-0.89)	(-10.47)	(-9.95)	(1.48)	(1.50)	(-5.40)	(-4.96)
GO_{it-1}	-0.533**	-0.125**	-0.597**	-0.136**	-0.371**	-0.069**	-0.499**	-0.084**	-0.630**	-0.083**
	(-5.10)	(-5.21)	(-3.58)	(-3.76)	(-4.04)	(-4.24)	(-7.29)	(-8.45)	(-12.28)	(-20.67)
SPP_{it-1}	-0.126	-0.030	-0.567**	-0.129**	-0.585**	-0.109**	-0.182*	-0.030*	0.001	0.000
	(-0.87)	(-0.87)	(-2.89)	(-2.85)	(-5.29)	(-5.29)	(-2.35)	(-2.34)	(0.04)	(0.04)
AT_{it-1}	1.910**	0.448**	2.599**	0.590**	2.850**	0.529**	1.152**	0.193**	1.458**	0.192**
	(3.57)	(3.56)	(4.82)	(4.79)	(9.80)	(9.74)	(6.46)	(6.25)	(11.31)	(9.91)

FS_{it-1}	0.194**	0.045**	0.162**	0.037**	-0.025	-0.005	0.204**	0.034**	0.207**	0.027**
	(5.04)	(5.05)	(3.73)	(3.68)	(-0.92)	(-0.91)	(8.17)	(8.16)	(14.77)	(12.85)
NDS_{it-1}	-0.848	-0.199	-3.155	-0.716	-1.218	-0.226	3.585**	0.600**	-3.227**	-0.426**
	(-0.43)	(-0.43)	(-1.24)	(-1.24)	(-0.60)	(-0.60)	(2.92)	(2.91)	(-3.32)	(-3.27)
Pseudo R^2	0.17		0.20		0.27		0.18		0.19	
Correct classification	0.73		0.72		0.79		0.75		0.78	
F-test [(i) = (ii)]	0.01		0.05		0.00		0.00		0.00	
F-test [(iii) = (iv)]	0.00		0.00		0.00		0.00		0.00	
F-test [(i) = (iii)]	0.01		0.24		0.00		0.16		0.00	
F-test [(ii) = (iv)]	0.00		0.19		0.00		0.00		0.00	
Equity issues	570		515		2,601		2,053		7,630	
Debt issues	395		330		1,352		841		2,595	
Observations	965		845		3,953		2,894		10,225	

Table B3: Firms' Choices of Security Retirements/Repurchases Conditional on Deviations from Target Leverage Using Book Leverage

This table presents the logistic regression results for firms' choices of security retirements/repurchases conditional on deviations from target leverage using the book leverage measure, as modeled by Equation (3.5) where the probability of debt retirements is:

$$\text{Prob}\,(S_{it} = 1 | I_{it}) = \frac{e^{I_{it}}}{1+e^{I_{it}}}.$$

Firms are defined as retiring/repurchasing a security when the net amount retired/repurchased divided by the book value of total assets is greater than or equal to 5%. Cases when firms both retire debt and repurchase equity in a given year are omitted. I_{it} is defined as:

$$I_{it} = \alpha_0 + \alpha_1 AbsDev_{it-1} D^a_{it-1} + \alpha_2 AbsDev_{it-1} D^b_{it-1} + \alpha_3 PROF_{it-1} + \alpha_4 GO_{it-1} + \alpha_5 SPP_{it-1} + \alpha_6 AT_{it-1} + \alpha_7 FS_{it-1} + \alpha_8 NDS_{it-1} + v_{it},$$

where target leverage is estimated by Equation (3.3). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. D^a_{it-1} (D^b_{it-1}) is a dummy variable equal to 1 if book leverage is higher than or equal to (lower than) target book leverage and 0 otherwise. D^s_{it} (D^d_{it}) is a dummy variable equal to 1 if financing gap is negative (positive) and 0 otherwise. See Table 3.1 for definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 11,702 retirements/repurchases by firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *z*-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. Pseudo R^2 is calculated as [1-(log-likelihood)]/(log-likelihood) when the slopes are restricted to be 0. Columns (1), (3), (5), (7), and (9) report the estimated coefficients and columns (2), (4), (6), (8), and (10) report their marginal effects. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$AbsDev_{it-1}.D^a_{it-1}$ (i)	17.951**	4.485**	18.096**	4.354**	26.335**	4.617**	18.842**	3.526**	12.768**	1.779**
	(2.74)	(2.72)	(4.95)	(4.68)	(12.35)	(15.30)	(10.64)	(8.61)	(15.48)	(11.19)
$AbsDev_{it-1}.D^b_{it-1}$ (ii)	-11.245*	-2.809*	-2.671	-0.643	-3.266*	-0.572*	-8.074**	-1.511**	-8.677**	-1.209**
	(-2.35)	(-2.36)	(-0.92)	(-0.92)	(-2.03)	(-2.00)	(-3.26)	(-3.39)	(-7.74)	(-7.65)
$PROF_{it-1}$	7.410**	1.851**	4.457**	1.073**	11.106**	1.947**	4.405**	0.824**	3.541**	0.493**
	(5.18)	(5.18)	(3.89)	(4.07)	(8.15)	(8.01)	(5.39)	(6.36)	(7.87)	(10.32)
GO_{it-1}	-0.391	-0.098	-0.314	-0.076	-0.387**	-0.068**	-0.114	-0.021	-0.432**	-0.060**
	(-1.91)	(-1.92)	(-1.63)	(-1.65)	(-4.05)	(-3.99)	(-0.99)	(-1.01)	(-6.11)	(-7.83)
SPP_{it-1}	0.112	0.028	0.109	0.026	0.505**	0.089**	0.044	0.008	0.157**	0.022**
	(1.27)	(1.27)	(0.70)	(0.71)	(5.52)	(5.52)	(0.83)	(0.83)	(3.23)	(3.27)
AT_{it-1}	1.117	0.279	2.613**	0.629**	1.406**	0.247**	0.969**	0.181**	0.806**	0.112**
	(1.47)	(1.48)	(3.94)	(3.91)	(4.78)	(4.77)	(3.44)	(3.33)	(4.59)	(4.25)
FS_{it-1}	0.124*	0.031*	0.173**	0.042**	0.162**	0.028**	0.161**	0.030**	0.138**	0.019**
	(2.53)	(2.53)	(2.77)	(2.76)	(5.23)	(5.19)	(4.92)	(4.70)	(7.56)	(6.68)

NDS_{it-1}	5.396	1.348	0.436	0.105	1.767	0.310	1.660	0.311	1.564	0.218
	(1.75)	(1.74)	(0.21)	(0.21)	(0.68)	(0.68)	(1.04)	(1.04)	(1.52)	(1.52)
Pseudo R^2	0.26		0.30		0.20		0.29		0.28	
Correct classification	0.76		0.76		0.77		0.78		0.79	
F-test [(i) = (ii)]	0.00		0.00		0.00		0.00		0.00	
Equity repurchases	282		289		872		1,261		3,976	
Debt retirements	294		236		2,125		652		1,715	
Observations	576		525		2,997		1,913		5,691	

Table B4: Firms' Choices of Security Retirements/Repurchases Conditional on Deviations from Target Leverage and Financing Gaps Using Book Leverage

This table presents the logistic regression results for firms' choices of security issues conditional on deviations from target leverage using the book leverage measure, as modeled by Equation (3.7) where the probability of debt retirements is:

$$\text{Prob}\,(S_{it} = 1 \mid h_{it}) = \frac{e^{h_{it}}}{1 + e^{h_{it}}}.$$

Firms are defined as retiring/repurchasing a security when the net amount repurchased/retired divided by total assets is greater than or equal to 5%. Cases when firms both retire debt and repurchase equity in a given year are omitted. h_{it} is defined as:

$$h_{it} = \varphi_0 + (\varphi_1 D^s_{it} + \varphi_2 D^d_{it}) AbsDev_{it-1} D^a_{it-1} + (\varphi_3 D^s_{it} + \varphi_4 D^d_{it}) AbsDev_{it-1} D^b_{it-1} + \varphi_5 PROF_{it-1} + \varphi_6 GO_{it-1} + \varphi_7 SPP_{it-1} + \varphi_8 AT_{it-1} + \varphi_9 FS_{it-1} + \varphi_{10} NDS_{it-1} + \eta_{it},$$

where target leverage is estimated by Equation (3.3). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. D^a_{it-1} (D^b_{it-1}) is a dummy variable equal to 1 if book leverage is higher than or equal to (lower than) target book leverage and 0 otherwise. D^s_{it} (D^d_{it}) is a dummy variable equal to 1 if financing gap is negative (positive) and 0 otherwise. See Table 3.1 for the definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 11,702 retirements/repurchases by firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *z*-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. Pseudo R^2 is calculated as [1-(log-likelihood)]/(log-likelihood) when the slopes are restricted to be 0. Columns (1), (3), (5), (7), and (9) report the estimated coefficients and columns (2), (4), (6), (8), and (10) report their marginal effects. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$AbsDev_{it-1}.D^a_{it-1}D^s_{it}$ (i)	16.484*	3.907*	24.827**	6.044**	32.785**	5.665**	24.836**	2.152*	16.892**	2.288**
	(2.35)	(2.24)	(5.28)	(4.98)	(11.55)	(15.98)	(9.22)	(1.98)	(13.58)	(8.95)
$AbsDev_{it-1}.D^a_{it-1}D^d_{it}$ (ii)	17.173*	4.071*	10.083**	2.455**	-3.163	-0.547	1.467	0.127	5.730**	0.776**
	(2.50)	(2.40)	(3.42)	(3.43)	(-0.85)	(-0.84)	(0.59)	(0.55)	(5.82)	(5.30)
$AbsDev_{it-1}.D^b_{it-1}D^s_{it}$ (iii)	-4.039	-0.957	1.427	0.348	2.286	0.395	-2.036	-0.176	-3.480**	-0.471**
	(-0.95)	(-0.96)	(0.45)	(0.45)	(1.21)	(1.24)	(-0.95)	(-0.93)	(-3.32)	(-3.39)
$AbsDev_{it-1}.D^b_{it-1}D^d_{it}$ (iv)	-73.452**	-17.412**	-5.713	-1.391	-63.944**	-11.050*	-116.612**	-10.102**	-22.550**	-3.055**
	(-3.64)	(-4.22)	(-0.98)	(-0.98)	(-2.72)	(-2.45)	(-2.65)	(-8.49)	(-6.01)	(-6.95)
$PROF_{it-1}$	7.511**	1.780**	4.488**	1.093**	8.949**	1.546**	3.304**	0.286	2.732**	0.370**
	(5.56)	(5.35)	(4.11)	(4.25)	(6.10)	(5.92)	(3.78)	(1.90)	(6.34)	(7.38)
GO_{it-1}	-0.368	-0.087	-0.314	-0.076	-0.361**	-0.062**	-0.073	-0.006	-0.371**	-0.050**
	(-1.81)	(-1.83)	(-1.75)	(-1.77)	(-3.75)	(-3.60)	(-0.64)	(-0.62)	(-5.17)	(-6.24)
SPP_{it-1}	0.103	0.024	0.069	0.017	0.477**	0.082**	0.095	0.008	0.167**	0.023**
	(1.21)	(1.20)	(0.68)	(0.69)	(4.62)	(4.24)	(1.65)	(1.32)	(3.11)	(3.15)

AT_{it-1}	1.183	0.280	2.482**	0.604**	1.350**	0.233**	0.952**	0.082	0.924**	0.125**
	(1.50)	(1.49)	(3.72)	(3.71)	(4.40)	(4.37)	(3.27)	(1.74)	(5.07)	(4.56)
FS_{it-1}	0.134**	0.032**	0.168**	0.041**	0.146**	0.025**	0.139**	0.012	0.134**	0.018**
	(2.67)	(2.69)	(2.70)	(2.69)	(4.48)	(4.29)	(3.99)	(1.81)	(7.26)	(6.34)
NDS_{it-1}	6.218*	1.474*	0.130	0.032	2.222	0.384	1.116	0.097	1.416	0.192
	(2.27)	(2.24)	(0.07)	(0.07)	(0.82)	(0.82)	(0.71)	(0.66)	(1.37)	(1.38)
Pseudo R^2	0.30		0.32		0.27		0.37		0.31	
Correct classification	0.76		0.79		0.79		0.83		0.80	
F-test [(i) = (ii)]	0.92		0.00		0.00		0.00		0.00	
F-test [(iii) = (iv)]	0.00		0.23		0.00		0.01		0.00	
F-test [(i) = (iii)]	0.00		0.00		0.00		0.00		0.00	
F-test [(ii) = (iv)]	0.00		0.01		0.01		0.01		0.00	
Equity repurchases	282		289		872		1,261		3,976	
Debt retirements	294		236		2,125		652		1,715	
Observations	576		525		2,997		1,913		5,691	

Table B5: Firms' Choices of Security Issues Conditional on the Size Mismatch between Deviations from Target Leverage and Financing Gaps

This table presents the logistic regression results for firms' choices of security issues conditional on the size mismatch between deviations from target leverage and financing gaps. The probability of debt issues is:

$$\text{Prob}\,(S_{it} = 1 | g_{it}) = \frac{e^{g_{it}}}{1 + e^{g_{it}}}.$$

Firms are defined as issuing a security when the net amount issued divided by the book value of total assets is greater than or equal to 5%. Cases when firms issue both debt and equity in a given year are omitted. g_{it} is defined as:

$$g_{it} = \pi_0 + (\pi_1 DIF_{it}^{Dev} + \pi_2 DIF_{it}^{Gap})AbsDev_{it-1}D_{it-1}^{a}D_{it}^{s} + (\pi_3 DIF_{it}^{Dev} + \pi_4 DIF_{it}^{Gap})AbsDev_{it-1}D_{it-1}^{a}D_{it}^{d} + (\pi_5 DIF_{it}^{Dev} + \pi_6 DIF_{it}^{Gap})AbsDev_{it-1}D_{it-1}^{b}D_{it}^{s}$$

$$+(\pi_7 DIF_{it}^{Dev} + \pi_8 DIF_{it}^{Gap})AbsDev_{it-1}D_{it-1}^{b}D_{it}^{d} + \pi_9 PROF_{it-1} + \pi_{10} GO_{it-1} + \pi_{11} SPP_{it-1} + \pi_{12} AT_{it-1} + \pi_{13} FS_{it-1} + \pi_{14} NDS_{it-1} + \kappa_{it},$$

where target leverage is estimated by Equation (3.3). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. D^a_{it-1} (D^b_{it-1}) is a dummy variable equal to 1 if market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. D^s_{it} (D^d_{it}) is a dummy variable equal to 1 if financing gap is negative (positive) and 0 otherwise. DIF^{Dev}_{it} (DIF^{Gap}_{it}) is a dummy variable equal to 1 if the absolute value of deviations from target leverage (financing gaps) is greater than that of financing gaps (deviations from target leverage) and 0 otherwise. See Table 3.1 for the definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 18,882 issues by firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *z*-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. Pseudo R^2 is calculated as [1-(log-likelihood)]/(log-likelihood) when the slopes are restricted to be 0. Columns (1), (3), (5), (7), and (9) report the estimated coefficients and columns (2), (4), (6), (8), and (10) report their marginal effects. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$AbsDev_{it-1}.D^a_{it-1}D^s_{it}DIF^{Dev}_{it}$ (i)	-10.732*	-2.576*	-6.384	-1.498	-19.617**	-3.883**	-14.294**	-2.470**	-5.386**	-0.747**
	(-2.25)	(-2.27)	(-1.23)	(-1.23)	(-5.12)	(-5.44)	(-2.80)	(-2.89)	(-4.39)	(-4.49)
$AbsDev_{it-1}.D^a_{it-1}D^s_{it}DIF^{Gap}_{it}$ (ii)	-70.134	-16.835	7.182	1.686	-19.023*	-3.765*	-18.666	-3.226	-1.072	-0.149
	(-1.85)	(-1.86)	(0.46)	(0.46)	(-2.24)	(-2.26)	(-1.26)	(-1.27)	(-0.24)	(-0.24)
$AbsDev_{it-1}.D^a_{it-1}D^d_{it}DIF^{Dev}_{it}$ (iii)	1.931	0.464	6.455**	1.515**	4.568**	0.904**	2.676*	0.462	4.570**	0.634**
	(0.83)	(0.83)	(2.90)	(2.84)	(3.37)	(3.26)	(1.97)	(1.94)	(7.26)	(6.67)
$AbsDev_{it-1}.D^a_{it-1}D^d_{it}DIF^{Gap}_{it}$ (iv)	9.689	2.326	21.497*	5.045*	33.728**	6.676**	18.375**	3.175**	27.688**	3.840**
	(1.56)	(1.55)	(2.13)	(2.10)	(6.12)	(5.75)	(3.77)	(3.69)	(10.62)	(9.58)
$AbsDev_{it-1}.D^b_{it-1}D^s_{it}DIF^{Dev}_{it}$ (v)	-2.202	-0.529	2.876	0.675	-9.940**	-1.968**	-6.919**	-1.196**	-3.760**	-0.521**
	(-0.97)	(-0.97)	(0.98)	(0.97)	(-3.28)	(-3.43)	(-3.07)	(-3.12)	(-3.61)	(-3.67)
$AbsDev_{it-1}.D^b_{it-1}D^s_{it}DIF^{Gap}_{it}$ (vi)	-18.800	-4.513	4.839	1.136	-11.153	-2.208	4.292	0.742	2.896	0.402
	(-1.06)	(-1.06)	(0.28)	(0.28)	(-1.01)	(-1.01)	(0.65)	(0.65)	(1.01)	(1.01)

$AbsDev_{it-1}.D^{b}_{it-1}D^{d}_{it}DIF^{Dev}_{it}$ (vii)	8.015**	1.924**	8.706**	2.043**	9.038**	1.789**	7.336**	1.268**	7.532**	1.045**
	(4.57)	(4.50)	(4.52)	(4.38)	(9.48)	(8.69)	(7.38)	(6.90)	(14.66)	(12.43)
$AbsDev_{it-1}.D^{b}_{it-1}D^{d}_{it}DIF^{Gap}_{it}$ (viii)	46.024**	11.048**	52.200**	12.252**	43.732**	8.656**	24.956**	4.312**	28.480**	3.950**
	(5.10)	(4.87)	(6.51)	(5.90)	(8.16)	(7.24)	(8.59)	(7.80)	(15.10)	(12.96)
$PROF_{it-1}$	-1.486	-0.357	0.160	0.038	-10.997**	-2.177**	1.092**	0.189**	-0.555**	-0.077**
	(-1.71)	(-1.70)	(0.17)	(0.17)	(-9.32)	(-9.07)	(2.83)	(2.92)	(-2.73)	(-2.63)
GO_{it-1}	-0.449**	-0.108**	-0.536**	-0.126**	-0.288**	-0.057**	-0.455**	-0.079**	-0.521**	-0.072**
	(-3.16)	(-3.23)	(-2.77)	(-2.90)	(-3.42)	(-3.55)	(-6.06)	(-7.04)	(-10.29)	(-14.98)
SPP_{it-1}	-0.146	-0.035	-0.842**	-0.198**	-0.780**	-0.154**	-0.232**	-0.040**	0.003	$4*10^{-4}$
	(-0.88)	(-0.88)	(-3.84)	(-3.75)	(-6.31)	(-6.34)	(-2.99)	(-2.98)	(0.16)	(0.16)
AT_{it-1}	1.843**	0.442**	2.629**	0.617**	2.760**	0.546**	1.043**	0.180**	1.449**	0.201**
	(3.14)	(3.13)	(5.16)	(5.12)	(9.16)	(9.17)	(5.58)	(5.41)	(10.56)	(9.57)
FS_{it-1}	0.181**	0.043**	0.208**	0.049**	0.041	0.008	0.218**	0.038**	0.222**	0.031**
	(4.61)	(4.62)	(4.54)	(4.49)	(1.50)	(1.50)	(8.61)	(8.57)	(15.21)	(13.36)
NDS_{it-1}	-1.007	-0.242	-4.425*	-1.039	-0.803	-0.159	4.187**	0.723**	-2.933**	-0.407**
	(-0.46)	(-0.46)	(-1.96)	(-1.94)	(-0.38)	(-0.38)	(3.27)	(3.25)	(-2.69)	(-2.66)
Pseudo R^2	0.21		0.28		0.35		0.21		0.25	
Correct classification	0.74		0.77		0.83		0.78		0.81	
F-test [(i) = (ii)]	0.12		0.39		0.95		0.78		0.33	
F-test [(iii) = (iv)]	0.21		0.12		0.00		0.00		0.00	
F-test [(v) = (vi)]	0.35		0.91		0.91		0.10		0.03	
F-test [(vii) = (viii)]	0.00		0.00		0.00		0.00		0.00	
Equity repurchases	570		515		2,601		2,053		7,630	
Debt retirements	395		330		1,352		841		2,595	
Observations	965		845		3,953		2,894		10,225	

Table B6: Firms' Choices of Security Retirements/Repurchases Conditional on the Size Mismatch between Deviations from Target Leverage and Financing Gaps

This table presents the logistic regression results for firms' choices of security retirements/repurchases conditional on the size mismatch between deviations from target leverage and financing gaps. The probability of debt retirements is:

$$\text{Prob}\,(S_{it} = 1 | g_{it}) = \frac{e^{g_{it}}}{1+e^{g_{it}}}.$$

Firms are defined as retiring/repurchasing a security when the net amount retired/repurchased divided by total assets is greater than or equal to 5%. Cases when firms both retire debt and repurchase equity in a given year are omitted. g_{it} is defined as:

$$g_{it} = \pi_0 + (\pi_1 DIF_{it}^{Dev} + \pi_2 DIF_{it}^{Gap})AbsDev_{it-1}D_{it-1}^{a}D_{it}^{s} + (\pi_3 DIF_{it}^{Dev} + \pi_4 DIF_{it}^{Gap})AbsDev_{it-1}D_{it-1}^{a}D_{it}^{d} + (\pi_5 DIF_{it}^{Dev} + \pi_6 DIF_{it}^{Gap})AbsDev_{it-1}D_{it-1}^{b}D_{it}^{s}$$
$$+(\pi_7 DIF_{it}^{Dev} + \pi_8 DIF_{it}^{Gap})AbsDev_{it-1}D_{it-1}^{b}D_{it}^{d} + \pi_9 PROF_{it-1} + \pi_{10} GO_{it-1} + \pi_{11} SPP_{it-1} + \pi_{12} AT_{it-1} + \pi_{13} FS_{it-1} + \pi_{14} NDS_{it-1} + \kappa_{it},$$

where target leverage is estimated by Equation (3.3). $AbsDev_{it-1}$ is the absolute value of the difference between target and actual leverage. D^{a}_{it-1} (D^{b}_{it-1}) is a dummy variable equal to 1 if market leverage is higher than or equal to (lower than) target leverage and 0 otherwise. D^{s}_{it} (D^{d}_{it}) is a dummy variable equal to 1 if financing gap is negative (positive) and 0 otherwise. DIF^{Dev}_{it} (DIF^{Gap}_{it}) is a dummy variable equal to 1 if the absolute value of deviations from target leverage (financing gaps) is greater than that of financing gaps (deviations from target leverage) and 0 otherwise. See Table 3.1 for the definitions of profitability ($PROF_{it-1}$), growth opportunities (GO_{it-1}), share price performance (SPP_{it-1}), asset tangibility (AT_{it-1}), firm size (FS_{it-1}), and non-debt tax shields (NDS_{it-1}). My sample includes 11,702 retirements/repurchases by firms in France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *z*-statistics. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively. Pseudo R^2 is calculated as [1-(log-likelihood)]/(log-likelihood) when the slopes are restricted to be 0. Columns (1), (3), (5), (7), and (9) report the estimated coefficients and columns (2), (4), (6), (8), and (10) report their marginal effects. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients for each pair of scenarios are equal.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$AbsDev_{it-1}.D^{a}_{it-1}D^{s}_{it}DIF^{Dev}_{it}$ (i)	11.128**	2.368**	11.469**	2.750**	12.120**	1.618**	10.068**	1.631**	8.798**	1.471**
	(3.97)	(3.26)	(5.63)	(5.57)	(11.85)	(11.35)	(8.67)	(4.47)	(14.78)	(11.68)
$AbsDev_{it-1}.D^{a}_{it-1}D^{s}_{it}DIF^{Gap}_{it}$ (ii)	25.780**	5.487**	39.618**	9.498**	48.678**	6.496**	39.645**	6.423**	38.710**	6.470**
	(3.83)	(3.10)	(5.68)	(5.44)	(11.87)	(24.98)	(8.04)	(4.27)	(9.71)	(8.00)
$AbsDev_{it-1}.D^{a}_{it-1}D^{d}_{it}DIF^{Dev}_{it}$ (iii)	9.524**	2.027**	8.702*	2.086*	-3.879	-0.518	0.727	0.118	1.985*	0.332*
	(3.27)	(2.81)	(2.46)	(2.45)	(-1.55)	(-1.49)	(0.36)	(0.36)	(2.28)	(2.24)
$AbsDev_{it-1}.D^{a}_{it-1}D^{d}_{it}DIF^{Gap}_{it}$ (iv)	26.838**	5.712**	13.020*	3.122*	-6.377	-0.851	9.747*	1.579*	8.113**	1.356**
	(3.27)	(2.93)	(2.12)	(2.12)	(-0.58)	(-0.58)	(2.20)	(2.01)	(3.45)	(3.38)
$AbsDev_{it-1}.D^{b}_{it-1}D^{s}_{it}DIF^{Dev}_{it}$ (v)	-1.903	-0.405	2.072	0.497	4.891**	0.653**	0.277	0.045	-0.176	-0.029
	(-0.59)	(-0.59)	(0.84)	(0.84)	(3.85)	(4.08)	(0.15)	(0.15)	(-0.19)	(-0.19)
$AbsDev_{it-1}.D^{b}_{it-1}D^{s}_{it}DIF^{Gap}_{it}$ (vi)	7.964	1.695	30.526**	7.319**	32.866**	4.386**	11.997*	1.944*	12.913**	2.158**
	(1.65)	(1.57)	(3.47)	(3.43)	(4.30)	(4.81)	(2.55)	(2.21)	(5.49)	(5.14)

$AbsDev_{it-1}.D^b_{it-1}D^d_{it}DIF^{Dev}_{it}$ (vii)	-21.406*	-4.556*	-2.051	-0.492	-24.950**	-3.330**	-39.498*	-6.399**	-11.638**	-1.945**
	(-2.14)	(-2.22)	(-0.46)	(-0.46)	(-3.16)	(-2.86)	(-2.03)	(-2.80)	(-4.15)	(-4.36)
$AbsDev_{it-1}.D^b_{it-1}D^d_{it}DIF^{Gap}_{it}$ (viii)	-519.335*	-110.524**	4.332	1.039	-23.584	-3.147	-63.120	-10.226	-3.154	-0.527
	(-2.37)	(-3.31)	(0.56)	(0.56)	(-0.92)	(-0.90)	(-1.35)	(-1.41)	(-1.07)	(-1.08)
$PROF_{it-1}$	7.224**	1.537**	6.280**	1.506**	6.646**	0.887**	4.223**	0.684**	2.442**	0.408**
	(4.96)	(4.36)	(5.20)	(5.32)	(4.92)	(4.65)	(4.53)	(4.29)	(6.03)	(6.85)
GO_{it-1}	0.212	0.045	0.002	0.000	0.131	0.017	0.082	0.013	-0.106**	-0.018**
	(1.08)	(1.06)	(0.01)	(0.01)	(1.10)	(1.10)	(1.61)	(1.57)	(-2.73)	(-2.87)
SPP_{it-1}	0.333**	0.071*	0.171	0.041	0.578**	0.077**	0.257**	0.042**	0.283**	0.047**
	(2.59)	(2.41)	(1.10)	(1.11)	(4.91)	(4.48)	(3.31)	(2.87)	(5.00)	(5.14)
AT_{it-1}	1.720*	0.366*	2.755**	0.661**	1.213**	0.162**	0.640*	0.104*	1.009**	0.169**
	(2.22)	(2.13)	(4.04)	(4.03)	(3.89)	(3.73)	(2.31)	(2.17)	(5.52)	(5.22)
FS_{it-1}	0.099	0.021	0.171*	0.041*	0.188**	0.025**	0.122**	0.020**	0.144**	0.024**
	(1.88)	(1.87)	(2.57)	(2.55)	(5.82)	(5.36)	(3.69)	(2.97)	(7.63)	(7.06)
NDS_{it-1}	3.858	0.821	0.006	0.001	4.755	0.635	2.761	0.447	1.427	0.238
	(1.47)	(1.46)	(0.00)	(0.00)	(1.83)	(1.82)	(1.76)	(1.69)	(1.47)	(1.47)
Pseudo R^2	0.30		0.37		0.31		0.37		0.32	
Correct classification	0.77		0.81		0.82		0.81		0.81	
F-test [(i) = (ii)]	0.02		0.00		0.00		0.00		0.00	
F-test [(iii) = (iv)]	0.03		0.52		0.82		0.05		0.01	
F-test [(v) = (vi)]	0.06		0.00		0.00		0.01		0.00	
F-test [(vii) = (viii)]	0.02		0.45		0.96		0.63		0.03	
Equity repurchases	282		289		872		1,261		3,976	
Debt retirements	294		236		2,125		652		1,715	
Observations	576		525		2,997		1,913		5,691	

Chapter 4: Mechanisms of Adjustments toward Target Cash Holdings - International Evidence

4.1. Introduction

Firms' cash holdings behaviors can be examined using frameworks largely similar to those employed by studies on corporate capital structure such as the pecking-order and trade-off theories and the market timing hypothesis (Kim, Mauer, and Sherman (1998); Opler, Pinkowitz, Stulz, and Williamson (1999); Dittmar and Duchin (2010), among others).[36] For example, following the pecking-order theory of corporate capital structure, the financing hierarchy view argues that firms have no optimal levels of cash holdings (Myers and Majluf (1984)). Their preference to finance investment opportunities with internal funds as information asymmetries may make external financing become expensive suggests a negative relation between their cash balances and investment opportunities.

The optimal cash holdings view (Opler et al. (1999), Ozkan and Ozkan (2004), Dittmar and Duchin (2010), and Venkiteshwaran (2011)), however, holds that firms derive their target cash holdings through balancing between the marginal benefits of cash (e.g., the avoidance of costs of transaction, adverse selection, and agency of external financing and a better ability to undertake investment opportunities) and its marginal costs (e.g., opportunity costs of holding low-return assets and the increase in

[36] There is also a strand of the literature that looks at firms' cash holdings in the context of their corporate life-cycle (e.g., Dittmar and Duchin (2011)). In their 2010 version, Dittmar and Duchin examine firms' asymmetric adjustments toward their target cash holdings in the presence of financial constraints and costs of external financing. However, in their 2011 version, they focus on how firms' dynamics of cash may vary during their life-cycle.

marginal tax rates and agency costs of managerial discretion) and actively adjust toward these over time. In line with studies on leverage rebalancing (Leary and Roberts (2005), Strebulaev (2007), among others) that imperfect capital markets or costs of adjustments may prevent firms from undertaking continuous adjustments to rebalance their leverage, Ozkan and Ozkan (2004) empirically find that on average, UK firms may adjust toward their target cash holdings at speeds of from 54 to 60% which are comparable to those reported by Venkiteshwaran (2011) (higher than 50%) but faster than those reported by Opler et al. (1999) (from 33 to 35%) and Dittmar and Duchin (2010) (from 20 to 40%) for US firms.[37]

Although there has been some research on firms' asymmetric adjustments toward target cash holdings i.e., different speeds of adjustments contingent on the position relative to their target cash holdings which are driven by differences in costs of deviations from target cash holdings, costs of adjustments, and the levels of financial constraints (Dittmar and Duchin (2010), and Venkiteshwaran (2011)), little is known about the mechanisms they may undertake to adjust toward their target cash holdings. As far as I am aware, my study is the first attempt in the literature to look at the asymmetry in such mechanisms among firms in major economies. I shed light on why firms' speeds of adjustments may vary contingent on the position relative to their target cash holdings by examining the possible mechanisms they may undertake to adjust toward target cash holdings which include adjustments in three groups of cash flows namely cash flows from financing (*CFF*), cash flows from operating (*CFO*), and cash flows from investing (*CFI*). Contingent on having either below- or above-target cash holdings, firms may undertake different adjustments in these groups of cash flows which may involve different levels of costs, thus leading to different speeds of adjustments.

[37] These differences may be driven by different sample compositions and methods of estimation.

Dittmar and Duchin (2010) show that firms with excess cash may adjust toward their target cash holdings faster due to lower costs of adjustments. In contrast, Venkiteshwaran (2011) finds that cash-deficient firms may adjust more quickly due to higher costs of deviations caused by their financial constraints. In these studies, the presence of financial constraints, costs of adjustments, and costs of deviations from targets is more or less consistent with adjustments in *CFF*. The presence of costs associated with adjustments in *CFO* and *CFI*, however, has received little or almost no attention. This is surprising since firms may adjust toward their targets not only through adjustments in *CFF* but also *CFO* and *CFI*. For example, in addition to distributing some of their excess cash to shareholders (dividend increases or stock repurchases) and retiring a part of their debt, firms with excess cash may increase their net working capital (stocking more inventories, piling up more accounts receivable, and reducing accounts payable) and investments (increasing capital expenditures and acquisitions), mechanisms opposite to those undertaken by cash-deficient firms. My previous two chapters and other studies tend to treat these adjustments as exogenous, independent of firms' cash and leverage management policies. I now explicitly account for these.

There may be certain costs associated with adjustments in *CFO*. A decrease in firms' working capital, for instance, may involve an increase in their accounts payable and/or a reduction in their accounts receivable and inventories. Increasing accounts payable may lead to worsened credit reputation, forgone cash discounts, increased administration costs and prices set by suppliers, late payment penalties, and damaged relationships with suppliers (Wu, Rui, and Wu (2011)). Meanwhile, a reduction in accounts receivable may imply stricter credit terms which then result in declined sales and worsened relationships with customers (Brealey, Myers, and Allen (2010)). Finally, when inventories are reduced not because of better inventory management, firms may be unable to fill up their customers' orders, suggesting high inventory shortage costs.

Similarly, adjustments in *CFI* may incur significant costs. Managers of cash-rich firms are likely to make value-decreasing acquisitions (Harford (1999); and Harford, Mansi, and Maxwell (2008)) as their compensation is usually increased after these (Bliss and Rosen (2001), and Harford and Li (2007)). Costs of adjustments hence may be embodied in a decrease in the value of these firms. When cash-deficient firms have to give up positive *NPV* investments, these costs may be opportunity costs arising from forgone future cash flows generated by these investments, as implied by the pecking-order view.

In addition to the variation in costs of adjustments caused by different mechanisms of adjustments, I argue that the magnitude of firms' deviations from target cash holdings is also likely to asymmetrically influence their adjustments for two reasons. First, the fixed cost component (e.g., fixed costs of debt/equity issues, permanent losses of customers, permanent losses of growth opportunities, among others) associated with cash holdings adjustments may suggest that firms with too much excess cash or a large cash shortage can adjust toward their targets faster due to lower incremental costs when that fixed component can be effectively "shared" with transaction costs that incur when firms offset their large cash holdings imbalances. In contrast, those that are not sufficiently far away from their target cash holdings may not be encouraged to do so.

Second, agency theories would suggest that firms with too much excess cash may face higher costs associated with the free cash flow problem and hence should disgorge some of their cash, implying faster speeds of adjustments. Those with a large cash shortage may also adjust toward their target cash holdings faster for larger costs of deviations from target cash holdings may be in the forms of operational problems and forgone positive *NPV* investments.

Examining relevant costs associated with firms' cash holdings adjustments in France, Germany, Japan, the UK, and the US during the 1980-2007 period, I find that on average firms close out their deviations from targets between 2 and 2.5 years (at speeds of adjustments of 0.393, 0.406, 0.401, 0.462, and 0.484, respectively). Intriguingly, I document clear asymmetry in their adjustments. Firms with above-target cash holdings are likely to experience speeds from 0.487 (French firms) to 0.570 (UK firms), statistically faster than those of firms with below-target cash holdings.

An examination of the possible mechanisms of adjustments undertaken by firms sheds light on why their speeds of adjustments may vary contingent on the position relative to their targets. I show that in addition to adjustments in *CFF*, firms also adjust toward their targets through adjustments in *CFO* and *CFI*. Firms with excess cash holdings are likely to reduce *CFF* and *CFO* and increase *CFI*, mechanisms opposite to those undertaken by firms with below-target cash holdings. The mechanisms undertaken by firms with above-target cash holdings may incur lower costs for three reasons. First, costs associated with debt retirements, equity repurchases, and dividend increases (*CFF*) may be lower than those associated with debt and equity issues and dividend reductions (Leftwich and Zmijewski (1994), Byoun (2008), among others). Second, having to give up investment opportunities (to decrease capital expenditures and acquisitions) (*CFI*) may incur huge opportunity costs associated with permanently forgone future cash flows generated by these. Third, a decrease in *CFO* is less likely to lead to costs associated with operational problems. These together explain why firms with above-target cash holdings may adjust toward their targets faster.

I further document some evidence on the influence of the magnitude of firms' deviations from targets on their target adjustments. Consistent with the "shared" fixed cost argument, firms with large deviations from targets adjust toward their targets faster as they may face lower incremental costs of adjustments. In addition, in support of agency theories, compared with firms with small excess cash holdings, firms with large excessive cash holdings experience faster speeds of adjustments as the free cash flow problem may be more significant for them. Firms with a large cash shortage also adjust more quickly than those with a small cash shortage for they are more likely to suffer from operational problems and have to give up positive *NPV* investments.

I also perform a number of robustness checks to see how firms' cash holdings adjustments may be influenced by their characteristics such as their access to bank lines of credit (proxied by firm size), precautionary motive (proxied by cash flow volatility and dividend payout), financial constraints (proxied by growth opportunities and dividend payout), and corporate life-cycle (proxied by firm age). There is evidence that firms experience faster speeds of adjustments in the presence of less access to bank lines of credit (smaller size), stronger precautionary motive (higher cash flow volatility and lower dividend payout), more financial constraints (more growth opportunities), and lower level of maturity (younger age). However, when these factors are interacted with deviations from targets, their impact tends to become less significant (except for firm age), suggesting deviations from targets may be the major driver of target adjustments.

My study contributes to the current literature on corporate cash holdings in two ways. First, I show international evidence on firms' asymmetric target adjustments. Firms with above-target cash holdings adjust toward their targets faster as their mechanisms of adjustments may involve lower costs. I also examine how the magnitude of firms' deviations from targets may matter and find that large deviations are likely to lead to faster adjustments. Second, I report the asymmetry in firms' mechanisms of adjustments conditional on whether they experience above- or below-target cash holdings. The remaining of the chapter is organized as follows. Section 3.2 presents the empirical models and hypotheses. Section 3.3 discusses the sample. Section 3.4 shows the empirical findings. Section 3.5 reports the robustness checks. Section 3.6 concludes.

4.2. Empirical Models and Methods

4.2.1. A Symmetric Partial Adjustment Model of Cash Holdings

Similar to Chapter 2, I also adopt a two-step estimation procedure in this study. In the first step, I estimate firms' target cash holdings which then will be used to estimate their speeds of adjustments in the second step. Firms' partial adjustments toward target cash holdings within one year can be modeled as:

$$\Delta CH_{it} = \lambda_0 + \lambda_1 CDev_{it} + u_{it}. \tag{4.1}$$

ΔCH_{it} is the difference between firms' cash ratios (cash and cash equivalents scaled by total assets) for the current (CH_{it}) and the last (CH_{it-1}) accounting periods.[38] λ_0 is a constant term and u_{it} is an error component. Within one year, firms partially adjust toward their target cash holdings at a homogenous speed of adjustment (λ_1). The current literature on corporate capital structure suggests that costs of adjustments may prevent firms from undertaking continuous leverage adjustments (Leary and Roberts (2005), Strebulaev (2007), among others). Borrowing that line of argument, the value of λ_1 is expected to be between 0 and 1 with a higher value suggesting a faster speed of adjustment. In addition, the value of λ_1 may be higher among firms in market-oriented economies (the UK and the US) for achieving target cash holdings may be relatively more important for them as their looser relationships with banks may lead to less access to financing sources such as bank loans or lines of credit. $CDev_{it}$ is deviations from target cash holdings and is defined as the difference between firms' target cash holdings for the current accounting period CH^*_{it} and CH_{it-1}. The unobserved CH^*_{it} is a function of firms' major fundamentals, as follows:

[38] I also use other measures of cash holdings suggested by Bates, Kahle, and Stulz (2009)) such as cash to net assets and cash to sales and produce qualitatively similar results (Appendix C).

(4.2) $$CH^{*}_{it} = \hat{\beta}' \mathbf{x}_{it},$$

where $\hat{\beta}'$ is a vector of parameters estimated from a fixed-effects regression of cash holdings on a vector of relevant determinants, $\mathbf{x}_{it}$:

(4.3) $$CH_{it} = \beta' \mathbf{x}_{it} + \varepsilon_{it}.$$

As guided by recent developments in the current literature (Opler et al. (1999), Ozkan and Ozkan (2004), Bates et al. (2009), among others), I include in $\mathbf{x}_{it}$ eight independent variables consisting of growth opportunities, firm size, cash flow volatility, cash flow, capital expenditures, net working capital, research and development expenses, and a dividend dummy to capture whether firms pay dividends or not. ε_{it} is an error component that includes firms' fixed effects and time effects and an *i.i.d.* error term. The firms' fixed effects control for time-invariant unobservable, unique firm and/or industry characteristics that cannot be captured by $\mathbf{x}_{it}$ (see Chapter 2) while the time effects enable us to examine the extent at which the change in firms' cash holdings can be effectively explained by changes in their fundamentals rather than the evolution of time (Bates et al. (2009)). The relations between these eight variables included in $\mathbf{x}_{it}$ and firms' target cash holdings are as follows.

Growth opportunities (GO). The precautionary motive suggests a positive relation between firms' growth opportunities and cash holdings since costs associated with adverse cash flow shocks and financial distress may be more significant among high-growth firms (Opler et al. (1999), and Bates et al. (2009)). Due to more information asymmetries, high-growth firms are more likely to give up positive *NPV* investments in the presence of a cash shortage and costly external financing, thus needing to hold more cash. In contrast, low-growth firms should hold less cash to reduce the free cash flow problem (Jensen (1986)).

Firm size (FS). There may be a negative relation between firms' size and their cash holdings for three reasons. First, the transaction cost motive argument suggests large firms should hold less cash due to the presence of economies of scale i.e., lower transaction costs when their noncash financial assets are converted into cash (Baumol (1952), Miller and Orr (1966), and Mulligan (1997)). Second, as large firm size indicates less financial distress, fewer information asymmetries and hence better access to external capital markets, in the spirit of the precautionary motive argument (Almeida, Campello, and Weisbach (2004)), large firms can hold less cash. Finally, Sufi (2009) shows that large firms are likely to have more access to bank lines of credit - a close alternative to cash holdings, thus having less need to hoard it.

Cash flow volatility (CFV). Consistent with the precautionary motive argument, firms with riskier cash flows should accumulate more cash to cope with potential adverse cash flow shocks in the presence of costly external financing better (Opler et al. (1999), Han and Qiu (2007), and Bates et al. (2009)). This indicates a positive relation between this variable and firms' cash holdings.

Cash flows (CF). Firms with stronger cash flows may have better ability to accumulate more cash, as suggested by the financing hierarchy view. In addition, these firms may be also those with more growth opportunities (Opler et al. (1999), and Bates et al. (2009)). These together suggest a positive relation between cash flows and cash holdings.

Capital expenditures (CAPEX). There are two opposite predictions on the impact of this variable on firms' target cash holdings. On the one hand, in line with the financing hierarchy view, Riddick and Whited (2009) find that firms which are making significant investments in assets may experience a temporary fall in their cash. In addition, when capital expenditures lead to an increase in assets that can serve as collaterals better (e.g., fixed assets) and hence firms' debt capacities, they may have less need to hoard cash. These together suggest that cash holdings may be inversely related to capital expenditures. On the other hand, according to the optimal cash holdings view, it is possible that firms which are making significant capital expenditures may be high-growth ones, thus needing to hold more cash.

Net working capital (NWC). As net working capital includes highly liquid assets that can be considered as close substitutes for cash (e.g., inventories and accounts receivable), firms with a higher level of net working capital are likely to hold less cash (Bates et al. (2009)).

Research and development expenses (R&D). Since these expenses may be considered as a close proxy for growth opportunities and hence costs associated with financial distress and adverse cash flow shocks, the optimal cash holdings view suggests firms which are incurring more research and development expenses should hold more cash. Consistent with this view, Brown and Peterson (2011) show that in the presence of financing frictions, firms tend to depend intensively on cash to smooth their research and development expenses for any adjustments in these expenses usually involve high costs (e.g., wages of highly skilled technology workers). In contrast, the financing hierarchy view suggests a negative relation between such expenses and cash holdings as firms which are incurring large amounts of these may temporarily experience a fall in their cash balances.

Dividend dummies. This variable is defined to be one for firms that pay dividends and zero otherwise. Fazzari, Hubbard, and Peterson (1988) find that financially unconstrained (possibly cash-rich) firms are more likely to pay dividends than financially constrained firms. Almeida et al. (2004) and Bates et al. (2009), however, show that firms that pay dividends are likely to hold less cash for they may be observed by investors as less risky and hence have better access to external capital markets.

4.2.2. Asymmetric Partial Adjustment Models Conditional on Deviations from Target Cash Holdings

To see how deviations from target cash holdings may asymmetrically influence firms' target cash holdings adjustments, I introduce the following asymmetric partial adjustment model to account for the variation in firms' speeds of adjustments by expanding Equation (4.1):[39]

(4.4) $$\Delta CH_{it} = \alpha_0 + \alpha_1 CDev_{it} CH_{it}^{a} + \alpha_2 CDev_{it} CH_{it}^{b} + v_{it},$$

where CH_{it}^{a} (CH_{it}^{b}) indicate that firms have above-target (below-target) cash holdings in the last accounting period and $CDev_{it} = CH_{it}^{*} - CH_{it-1}$. Firms have above- or below-target cash holdings if their cash ratios are higher than or equal to or lower than their target cash holdings levels i.e., $CH_{it-1} \geq CH_{it-1}^{*}$ or $CH_{it-1} < CH_{it-1}^{*}$.[40]

The symmetric partial adjustment model (4.1) explicitly assumes that firms, regardless of having either above- or below-target cash holdings, are likely to experience homogenous speeds of adjustments. However, since it may be less costly for firms to disgorge than to build up cash reserves, firms with above-target cash holdings are likely to adjust faster than those with below-target cash holdings.[41]

I argue that in addition to adjustments in *CFF* which are determined by financial constraints and costs of external financing, firms can also adjust toward their target cash holdings by adjusting *CFO* and *CFI*. Those with above-target cash holdings may reduce

[39] Refer to Chapter 2 to see how this asymmetric model can be mathematically derived.

[40] Note that this definition is different from the one used in Chapter 2 for the leverage adjustment models where firms are defined as being over- or under-levered basing on the difference between their target and actual leverage in the current accounting period i.e., $D_{it} \geq D_{it}^{*}$ or $D_{it} < D_{it}^{*}$.

[41] The underlying reasons why these firms are likely to face lower costs of adjustments will be explained in details latter with respect to adjustments in the three groups of cash flows.

CFF (to retire debt, repurchase equity, and increase dividends) and/or *CFO* (to reduce funds from operations and increase working capital), and/or increase *CFI* (to invest more in capital expenditures and make more acquisitions), mechanisms opposite to those undertaken by firms with below-target cash holdings. I also argue why firms' mechanisms of adjustments may vary contingent on the position relative to their targets together with their implication about costs of adjustments. In what follows I shed light on why these different mechanisms of adjustments may involve different levels of costs.

First, one would expect that it is relatively less costly for firms to retire debt, repurchase equity, and increase dividends than otherwise (Leftwich and Zmijewski (1994), Byoun (2008), among others). Second, as investment opportunities imply potential cash flows generated in the future, opportunity costs may incur when firms have to forgo positive *NPV* investments (to decrease capital expenditures and make fewer acquisitions) due to a cash shortage and costly external financing. Minton and Schrand (1999) find that firms' liquidity constraints may force them to permanently forgo their investments rather than changing their timing.

Third, it may be easier and less costly for firms with above-target cash holdings to reduce *CFO* than for those with below-target cash holdings to increase it. In particular, the former firms can reduce *CFO* by reducing funds from operations and/or increasing working capital (to become less profitable and/or manage working capital less efficiently).[42] An increase in working capital can be achieved by increasing inventories and/or accounts receivable and/or reducing accounts payable. Comparing with a decrease in inventories, an increase in these is less likely to cause any significant

[42] It is possibly easier for firms to become less profitable than otherwise. I find evidence that by magnitude, firms with excess cash holdings on average tend to experience less improvement in their funds from operations than those with below-target cash holdings (with the exception of French and German firms).

impact on their ability to meet customers' demand, thus lowering inventory shortage costs. In addition, while costs of holding inventories can be reasonably measured, it is hard to estimate costs of lost sales associated with an inventory shortage (Chiang and Monahan (2005)). Hence, firms may be unwilling to reduce their inventories to avoid such costs unless they can manage these more effectively. Contrary to a fall in accounts receivable which suggests tightened credit terms, an increase in these may imply firms are extending credit to their customers, thus facilitating sales. Finally, it may be easier for firms to reduce than to increase accounts payable for the reason discussed earlier.

Hypothesis 4.1: Firms with above-target cash holdings may adjust toward their targets faster since their mechanisms of adjustments may involve lower costs.

4.2.3. Asymmetric Partial Adjustment Models Conditional on the Magnitude of Deviations from Target Cash Holdings

The magnitude of firms' deviations from target cash holdings is likely to shape their target adjustments for two reasons. First, considering the magnitude of firms' cash flow realizations, Faulkender et al. (2012) realize that large operating cash flows may encourage firms to adjust toward their target leverage faster as costs of leverage adjustments can be shared with transaction costs that incur when they offset these cash flow imbalances, thus lowering marginal costs of adjustments. That line of argument can be borrowed to explain firms' target cash holdings adjustments contingent on the magnitude of their deviations from target cash holdings. I argue that the presence of the fixed component of costs of adjustments (e.g., fixed costs of debt/equity issues, permanent losses of customers, and permanent losses of growth opportunities) may discourage firms with small deviations to rebalance their cash. Large deviations, however, may indicate lower incremental costs of adjustments (as the fixed cost component can now be effectively "shared") and hence faster speeds of adjustments.

Second, agency theories argue that firms with more free cash are more likely to experience the free cash flow problem (Jensen (1986)), thus having more incentives to reduce cash to mitigate potential costs associated with it. Firms with a large cash shortage, however, are likely to have more pressures to adjust to avoid suffering from operational problems and having to give up positive *NPV* investments. These costs of deviations, however, may be lower for firms with little excess cash (as managers do not have much to squander) or a small cash shortage (as the probability of experiencing operational problems and having to give up positive *NPV* projects is lower).

To examine the impact of the magnitude of firms' deviations from target cash holdings on their target adjustments, I divide both firms with above-target cash holdings and those with below-target cash holdings into two subgroups using the median levels of deviations from targets for each group. My approach here extends that of Dittmar and Duchin (2010) as I take into account whether firms have above- or below-target cash holdings. Firms with large (small) deviations may adjust more quickly (slowly) for different reasons contingent on whether they have above or below-target cash holdings.

$$\Delta CH_{it} = \varphi_0 + (\varphi_1 CDev_{it}^L + \varphi_2 CDev_{it}^S) CDev_{it} CH_{it}^a + (\varphi_3 CDev_{it}^L + \varphi_4 CDev_{it}^S) CDev_{it} CH_{it}^b + \eta_{it}, \tag{4.5}$$

where $CH_{it}^a CDev_{it}^L$ $(CH_{it}^a CDev_{it}^S)$ and $CH_{it}^b CDev_{it}^L$ $(CH_{it}^b CDev_{it}^S)$ indicate whether firms experience above-target cash holdings and the magnitude of the deviations are larger than or equal to (smaller than) the median level for their group or below-target cash holdings and the magnitude of the deviations are larger than or equal to (smaller than) the median level for their group. φ_1 may be greater than φ_2 (φ_3) and φ_3 (φ_2) may be greater than φ_4 for the reasons discussed above.

Hypothesis 4.2: Firms with large deviations from target cash holdings may adjust faster due to higher costs of deviations and lower costs of adjustments.

4.3. Data, Sample Selection and Descriptive Statistics

My sample includes non-financial firms in the G-5 countries for the 1980-2007 period. These firms' accounting data are collected from *Datastream Worldscope*. To run two-step SYS-GMM regressions (refer to Chapter 2 for the discussion of this approach), firms are required to have at least five consecutive annual observations. Those with SIC code I from 6000 to 6999 (financial firms) and from 4900 to 4999 (utility firms) are excluded. To remove outliers, I winsorize all variables of interest at the 0.5% and 99.5% percentiles. Finally, I have a sample with 103,562 firm-year observations. Table 4.1 provides the statistics summary for the variables of interest.

On average, Japanese firms seem to have the highest level of cash, followed by US, French, UK, and German firms. The highest level of cash among Japanese firms is consistent with agency theories (Jensen (1986)) and the empirical evidence of Pinkowitz and Williamson (2001) and Dittmar, Mahrt-Smith, and Servaes (2003) that managers of poorly governed firms tend to accumulate more cash.[43] It may also suggest that Japanese firms do not have many growth opportunities.

Firms in France, Germany, and Japan appear to have slightly higher net debt (the difference between the book value of total debt and cash and cash equivalents scaled by total assets) than those in the UK and the US, which is consistent with previous international evidence (e.g., Rajan and Zingales (1995), and Antoniou et al. (2008)). On average, UK and US firms seem to have relatively more growth opportunities, higher asset tangibility, smaller firm size, higher cash flow volatility, greater capital expenditures, smaller cash flows, and higher research and development expenses. Most of these features are similar to the results reported in previous chapters.

[43] Ando, Christelis, and Miyagawa (2003) show that corporate governance among Japanese firms is overall weak and ineffective.

Table 4.1: Summary Statistics

This table presents the descriptive statistics (mean – MEA, median – MED, and standard deviation – STD) of the variables considered in the chapter. Cash (CH_t) is cash and cash equivalents (WC02001) scaled by the book value of total assets (WC02999). Balance sheet net debt ($BSND_t$) is the difference between the book value of total debt (WC03255) and cash and cash equivalents scaled by the book value of total assets (WC02999). Market leverage (ML_t) is the ratio of the book value of total debt to the sum of the market value of equity (market capitalization (WC08001)) and the book value of total debt. Book leverage (BL_t) is the ratio of total debt to the book value of total assets (WC02999). Growth opportunities (GO_t) are the market-to-book ratio (the market value of total assets scaled by the book value of total assets). Asset tangibility (AT_t) is fixed assets (WC02501) scaled by the book value of total assets (WC02999). Firm size (FS_t) is the natural log of the book value of total assets measured in 1980 US$ value (WC07230). Cash flow volatility (CFV_t) is the absolute value of the difference between the first difference of cash flow (% change) and the average of first differences. Cash flows (CF_t) are operating income before depreciation (WC18198) minus interest expense (WC01251), income taxes (WC01451), and total dividends paid (WC04551) scaled by the book value of total assets (WC02999). Capital expenditures ($CAPEX_t$) are capital expenditures (WC04601) scaled by the book value of total assets (WC02999). Net working capital (NWC_t) is the difference between working capital (WC03151) and cash and cash equivalents scaled by the book value of total assets (WC02999). Research and development ($R\&D_t$) is research and development expenses (WC01201) scaled by total sales (WC01001).

	France			Germany			Japan			UK			US		
	MEA	MED	STD	MEA	MED	STD	MEA	MED	STD	MEA	MED	STD	MEA	MED	STD
CH_t	0.123	0.086	0.116	0.121	0.069	0.143	0.162	0.133	0.116	0.122	0.071	0.151	0.146	0.071	0.185
$BSND_t$	0.109	0.126	0.221	0.088	0.095	0.268	0.091	0.089	0.258	0.054	0.079	0.247	0.087	0.130	0.313
ML_t	0.338	0.314	0.232	0.271	0.225	0.236	0.347	0.315	0.261	0.199	0.155	0.188	0.243	0.181	0.233
BL_t	0.232	0.221	0.150	0.208	0.179	0.178	0.253	0.228	0.195	0.176	0.153	0.153	0.233	0.212	0.190
GO_t	0.925	0.734	0.731	1.028	0.814	0.877	0.901	0.742	0.665	1.316	0.972	1.293	1.684	1.111	1.994
AT_t	0.216	0.193	0.147	0.280	0.254	0.183	0.309	0.295	0.165	0.331	0.296	0.228	0.314	0.267	0.220
FS_t	12.053	11.881	1.974	12.113	11.885	1.959	12.872	12.710	1.547	10.984	10.810	1.988	11.885	11.809	2.061
CFV_t	1.144	0.349	2.056	1.923	0.557	3.521	1.569	0.488	2.777	2.059	0.608	4.003	1.856	0.523	3.819
CF_t	0.063	0.068	0.064	0.059	0.070	0.094	0.041	0.041	0.042	0.035	0.065	0.148	0.031	0.077	0.234
$CAPEX_t$	0.055	0.044	0.047	0.067	0.051	0.061	0.038	0.029	0.035	0.063	0.047	0.060	0.068	0.050	0.066
NWC_t	0.052	0.050	0.159	0.113	0.113	0.193	-0.010	-0.005	0.151	0.034	0.030	0.181	0.108	0.109	0.222
$R\&D_t$	0.009	0.000	0.023	0.015	0.000	0.033	0.013	0.003	0.020	0.016	0.000	0.048	0.053	0.000	0.154
Observations		7,477			5,230			28,035			18,192			44,628	
Firms		688			449			2,960			1,623			4,149	

4.4. Empirical Results

4.4.1. Target Cash Holdings Regression Results

Table 4.2 reports the fixed-effects estimation results for the target cash holdings model (4.3). Overall, these results are consistent with previous empirical evidence (e.g., Opler et al. (1999), Ozkan and Ozkan (2004), Dittmar and Duchin (2010), and Venkiteshwaran (2011)). In particular, in line with the precautionary motive argument and the optimal cash holdings view, firms' cash holdings are positively related to their growth opportunities and research and development expenses (except for French and German firms). The impact of cash flow volatility seems to be negligible. It is only statistically significant among French firms but has an unexpected sign.

In line with both the transaction cost and precautionary motives and the credit line argument, larger firm size reduces firms' need to hoard cash due to the presence of economies of scale, fewer information asymmetries, and more access to bank lines of credit (except for Japanese firms). There is, however, strong evidence that cash holdings are positively related to cash flows. Such strong, consistent evidence is in support of Opler et al. (1999) and Bates et al. (2009) that firms with stronger cash flows tend to accumulate more cash and may have more growth opportunities.

Consistent with Fazzari et al. (1988) that financially unconstrained (possibly cash-rich) firms are likely to pay dividends, I find strong evidence that firms that pay dividends hoard more cash. Finally, I show that both capital expenditures and net working capital have a significant, negative impact on cash holdings. My finding here hence is agreeable to Riddick and Whited (2009) and Bates et al. (2009) that significant investments in assets may temporarily reduce firms' cash holdings (inconsistent with the trade-off view) and net working capital may reduce firms' need to hold cash since it contains highly liquid assets which can be considered as close substitutes for cash.

Table 4.2: Fixed-Effects Regression of Target Cash Holdings

This table presents the fixed-effects regression results for the target cash holdings model (4.3):

$$CH_{it} = \beta' \mathbf{x}_{it} + \varepsilon_{it},$$

where CH_{it} is firms' cash holdings and $\mathbf{x}_{it}$ represents the vector of the independent variables. See Table 4.1 for these variables' definitions. My sample includes 103,562 firm-year observations for France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. ** and * indicate the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

	Expected sign	France	Germany	Japan	UK	US
GO_{it}	+	0.006	0.008	0.017**	0.007**	0.009**
		(1.91)	(1.24)	(7.67)	(4.02)	(10.90)
FS_{it}	-	-0.013**	-0.014*	0.011**	-0.024**	-0.012**
		(-3.09)	(-2.48)	(2.75)	(-8.41)	(-5.65)
CFV_{it}	+	-0.001*	$4*10^{-4}$	$-2*10^{-4}$	$2*10^{-4}$	$2*10^{-4}$
		(-1.99)	(0.60)	(-0.82)	(0.58)	(0.85)
CF_{it}	+	0.174**	0.103**	0.043	0.028*	0.086**
		(6.06)	(3.66)	(1.86)	(2.04)	(11.58)
$CAPEX_{it}$	-	-0.201**	-0.132**	-0.274**	-0.223**	-0.183**
		(-5.12)	(-4.79)	(-11.54)	(-8.40)	(-10.32)
NWC_{it}	-	-0.183**	-0.110**	-0.190**	-0.177**	-0.150**
		(-10.17)	(-5.08)	(-12.48)	(-12.11)	(-13.44)
$R\&D_{it}$	+	0.112	0.241	0.200*	0.364**	0.134**
		(0.92)	(1.22)	(2.35)	(4.27)	(6.34)
Dividend Dummy	-/+	0.017**	0.015**	0.009**	0.018**	0.011**
		(4.69)	(3.00)	(5.74)	(5.78)	(4.63)
Time Dummies		Yes	Yes	Yes	Yes	Yes
Constant		0.276**	0.301**	0.069	0.376**	0.297**
		(5.80)	(4.41)	(1.46)	(12.26)	(12.34)
R^2		0.10	0.07	0.01	0.16	0.30
Observations		7,477	5,230	28,035	18,192	44,628

Table 4.3: Target Cash Holdings Adjustments Conditional on Deviations from Target Cash Holdings

This table presents the SYS-GMM regression results for firms' symmetric and asymmetric partial target adjustments conditional on deviations from target cash holdings, as modeled by Equations (4.1) and (4.4):

$$\Delta CH_{it} = \lambda_0 + \lambda_1 CDev_{it} + u_{it}, \text{ and } \Delta CH_{it} = \alpha_0 + \alpha_1 CDev_{it} CH^a_{it} + \alpha_2 CDev_{it} CH^b_{it} + v_{it},$$

where ΔCH_{it} is the change in cash holdings ratios. Target cash holdings are estimated by Equation (4.2). See Table 4.1 for variable definitions and Table 4.2 for target cash holdings estimation. $CDev_{it}$ is the difference between cash holdings in the last period and target cash holdings for the current period. CH^a_{it} (CH^b_{it}) is a dummy variable equal to 1 if cash holdings are higher than or equal to (lower than) targets and 0 otherwise. My sample includes 103,562 firm-year observations for France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients of speeds of adjustments for firms with above- and those with below-target cash holdings are equal. *AR2* reports the *p*-value of the test for no second-order serial correlation, which is asymptotically distributed as *N(0,1)* under the null hypothesis of no serial correlation. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$CDev_{it}$	0.393**		0.406**		0.401**		0.462**		0.484**	
	(18.33)		(16.43)		(41.74)		(31.05)		(46.43)	
$CDev_{it}.\ CH^a$ (i)		0.487**		0.496**		0.469**		0.570**		0.544**
		(14.09)		(13.16)		(28.26)		(23.24)		(31.75)
$CDev_{it}.\ CH^b$ (ii)		0.304**		0.297**		0.318**		0.333**		0.414**
		(7.67)		(5.51)		(16.88)		(10.76)		(18.69)
Constant	0.000	0.003**	-0.001	0.004*	-0.002**	0.000	-0.001	0.004**	-0.001**	0.002**
	(0.00)	(2.70)	(-1.39)	(1.96)	(-11.37)	(-0.49)	(-1.70)	(4.02)	(-3.93)	(2.63)
AR2	0.10	0.08	0.40	0.40	0.02	0.03	0.14	0.23	0.00	0.00
F-test [(i) = (ii)]		0.00		0.01		0.00		0.00		0.00
Observations	7,477		5,230		28,035		18,192		44,628	

4.4.2. Symmetric Adjustments toward Target Cash Holdings

Table 4.3 (columns 1, 3, 5, 7, and 9) reports the two-step SYS-GMM estimation results for the symmetric, partial cash holdings adjustment model (4.1). I find that firms adjust rather fast toward their target cash holdings at speeds of adjustments from 0.393 (French firms) to 0.484 (US firms). This finding would indicate that on average, firms may close out their deviations from target cash holdings between 2 and 2.5 years, a finding qualitatively similar to that of Venkiteshwaran (2011). My estimated speed of adjustments for US firms is higher than that reported by Opler et al. (1999) but that for UK firms is somewhat lower than the speed of adjustments documented by Ozkan and Ozkan (2004).[44]

By magnitude, firms in the UK and the US seem to experience speeds of adjustments faster than those of firms in bank-oriented economies. This finding supports the results in Table 4.1 that their major fundamentals and looser relationships with banks may lead to less access to external financing sources such as bank loans and lines of credit, thus making achieving target cash holdings become relatively more important.

[44] The difference between my estimate of speed of adjustments for US firms and that of Opler et al. (1999) may be driven by different estimation periods. Their sample includes firm-year observations from 1971 to 1994 while my sample includes those from 1980 to 2007. Due to changes in firms' characteristics and the business environment, US firms have seen an annual increase of 0.46% in their cash-to-assets ratios, suggesting the importance of achieving target cash holdings for these firms has also increased (Bates et al. (2009)).

4.4.3. Asymmetric Adjustments toward Target Cash Holdings Conditional on Deviations from Target Cash Holdings

Columns 2, 4, 6, 8, and 10 of Table 4.3 report the estimation results for the asymmetric partial adjustment model as specified by Equation (4.4). These results strongly support the optimal cash holdings view and Hypothesis 4.1 that the presence of over-target cash holdings is likely to lead to faster speeds of adjustments. Specifically, conditional on having over-target cash holdings, firms in France, Germany, Japan, the UK, and the US adjust toward their target cash holdings at speeds of 0.487, 0.496, 0.469, 0.570, and 0.544, respectively. These are both economically and statistically faster than speeds of adjustments of firms with below-target cash holdings (0.304, 0.297, 0.318, 0.333, and 0.414, respectively), as shown by the *F*-tests. This finding would suggest that on average, speeds of adjustments for firms in these five countries may be 13-24% faster when they have above- than when they have below-target cash holdings.

Table 4.4 sheds light on why firms with above-target cash holdings may adjust toward their targets faster. There is evidence that these firms reduce *CFF* (across firms in all countries) and *CFO* (except for UK firms which experience a slight increase and US firms which see no change in *CFO*) but increase *CFI* (across firms in all countries). These mechanisms of adjustments are likely to involve lower costs of adjustments, thus allowing these firms to adjust toward their targets faster to reduce potential costs associated with the free cash flow problem. In contrast, firms with below-target cash holdings may undertake opposite mechanisms (to increase *CFF* and *CFO* (across firms in all countries) but reduce *CFI* (except for US firms)). The magnitudes of the adjustments in each cash flow group vary significantly between these two groups of firms and will be discussed in details in the following subsections.

4.4.3.1. Adjustments for Firms with Above-Target Cash Holdings

I find that overall, firms with above-target cash holdings tend to experience a fall in their cash balances, as can be seen from Panel A in Table 4.5. Panel A of Table 4.4 reports the magnitudes and relative ranks of the adjustments in the three cash flow groups (*CFF*, *CFO*, and *CFI*) among firms with above-target cash holdings. To make it easier to compare the magnitudes of firms' cash holdings adjustments, the changes in *CFF*, *CFO*, and *CFI* are taken from Panel A in Table 4.5 to Panel A of Table 4.4.

Table 4.4: Magnitudes of Cash Flow Adjustments Conditional on Deviations from Target Cash Holdings

This table represents the magnitudes of the adjustments in *CFF*, *CFO*, and *CFI* which are defined as changes in *CFF*, *CFO*, and *CFI* scaled by firms' total assets conditional on their deviations from target cash holdings together with their relative ranks ranging from to 1 (largest) to 3 (smallest). See Table 4.5 for the definitions of *CFF*, *CFO*, and *CFI*.

	France		Germany		Japan		UK		US	
Panel A: Firms with above-target cash holdings										
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
CFF	-1.4	[1]	-1.1	[2]	-0.8	[2]	-2.8	[1]	-2.3	[1]
CFO	-0.6	[3]	-0.1	[3]	-0.9	[1]	+0.1	[3]	No	[3]
CFI	+1.3	[2]	+1.9	[1]	+0.7	[3]	+2.3	[2]	+1.6	[2]
Panel B: Firms with below-target cash holdings										
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
CFF	+0.8	[3]	+0.3	[3]	+0.7	[2]	+0.6	[3]	+1.8	[2]
CFO	+1.5	[1]	+2.0	[1]	+1.3	[1]	+2.0	[2]	+2.3	[1]
CFI	-1.1	[2]	-1.8	[2]	-0.2	[3]	-2.2	[1]	No	[3]

Adjustments in CFF. Adjustments in *CFF* are significant across firms in all countries (ranked 1st among French, UK, and US firms with 1.4%, 2.8%, and 2.3% of total assets in monetary terms, respectively) (Panel A of Table 4.4), especially UK and US firms for the magnitude of the adjustments in this cash flow group seems to be much greater than that of the others.[45] As can be seen from Panel A of Table 4.5, these firms consistently experience a fall in their net equity issues (0.3%, 0.7%, 0.4%, 3.1%, and 2.6% of total assets in France, Germany, Japan, the UK, and the US, respectively),

[45] The adjustments in net equity issues among UK and US firms are more significant than those of firms in bank-oriented economies, suggesting these firms may be more active in the equity market.

which is mainly driven by the decrease in their equity proceeds. In addition, French, German, and Japanese firms also see a decline in their net debt issues. These together with a slight increase in dividend payout then lead to a significant decrease in *CFF*.

Compared with those in bank-oriented economies, UK and US firms reduce their net equity issues with very significant amounts (3.1% and 2.6% of total assets in monetary terms, respectively) and still increase their net debt issues (0.5%) (Panel A of Table 4.5).[46] The net effect of these adjustments is therefore a fall in *CFF*. Interestingly, by magnitude, the increase in dividend payout seems to be smaller than the increase in equity repurchases among UK and US firms (0.2% in each country), suggesting that firms' managers in these countries prefer to distribute some of their firms' excess cash in the way that is likely to establish the least level of commitment.

The reason why managers prefer to distribute their firms' excess cash to shareholders in the form of share repurchases is rather intuitive. The current literature on firms' dividend policies since Miller and Modigliani (1961) suggests that investors tend to interpret firms' dividend changes as an indicator of changes in their management's view about their firms' future prospects (Bhattacharya (1979), John and Williams (1985), Miller and Rock (1985), among others). In particular, an increase in dividends may indicate that firms' managers are optimistic about their firms' future while a fall in these implies the opposite. Dividend cuts therefore have been considered as a "last resort" action for firms and investors tend to associate these with financial problems that are not likely to reverse in the near term. Leftwich and Zmijewski (1994) show that a dividend reduction has much more information content about changes in firms' future operations than a dividend increase does as it signals serious deterioration

[46] Lee and Suh (2011) find that the increase in cash holdings prior to share repurchases is obtained from the decrease in firms' capital expenditures rather than the improvement in their operating performance.

in firms' long-term prospects. Hence, managers tend to be unwilling to increase dividend payments by large amounts as once they have done so, it may be tough for them to cut these latter during times of adverse cash flow shocks. Equity repurchases may be a much more flexible approach to distribute firms' excess cash to shareholders.

The evidence on the small change in firms' dividend payout whether they experience above- or below-target cash holdings is particularly interesting. Apart from its implication about managers' incentive to distribute their firms' excess cash in the way that is likely to establish the least level of commitment, it may also reflect firms' attempts to smooth dividends which have been acknowledged by a vast body of the current literature on corporate dividend policies. For example, Brav, Graham, Harvey, and Michaely (2005) find that as managers tend to believe that the market is likely to put a premium on firms that have stable dividend policies due to the signaling effect of any negative changes on these, they are willing to visit costly external capital markets or even give up positive *NPV* investments rather than cutting their dividends.[47]

I find that, except for US firms, those in all other countries have negative net debt issues, indicating that overall they are using excess cash to reduce debt. Given that firms with above-target cash holdings, except for those in Japan, tend to be under-levered in the last accounting period ($BLDev_{t-1} < 0$), as reported in Panel A of Table 4.5, such a finding may suggest there is no link between cash holdings adjustments and leverage adjustments when these firms experience above-target cash holdings.

---

[47] Firms' motive for dividend smoothing can be explained by information asymmetry models (e.g., coarse signaling models (Kumar (1988), Kumar and Lee (2001), Guttman et al. (2010), among others), principal-agent models (Fudenberg and Tirole (1995), and DeMarzo and Sannikov (2008)), information asymmetry among investors (Brennan and Thakor (1990)), and external financial constraints (Almeida et al. (2004), and Bates et al. (2009))), agency-based models (Jensen (1986), Allen et al. (2000), DeAngelo and DeAngelo (2007), and Lambrecht and Myers (2010)), and income smoothing models (Miller and Scholes (1978), Baker et al. (2007), and Baker and Wurgler (2010)).

Adjustments in CFI. Contingent on having above-target cash holdings, French and German firms adjust *CFI* mainly through adjustments in their portfolio investments, short-term investments, and marketable securities (Panel A of Table 4.5). On the contrary, as the mergers and acquisitions (M&A) markets may be more active in the UK and the US, firms in these two countries experience a significant rise in their net assets from acquisitions (1.0% of total assets in monetary terms in each country). The significant increase in net assets from acquisitions among UK and US firms is in support of Harford (1999) and Harford et al. (2008) that cash-rich firms are more likely to make acquisitions even when their acquisitions may be value-decreasing. This is so because their managers tend to enjoy an increase in their compensation following these acquisitions (Bliss and Rosen (2001), and Harford and Li (2007)).

US firms with above-target cash holdings seem to experience the most significant increase in capital expenditures among firms in the five countries (0.5%). This finding is consistent with the statistics reported in Table 4.1 that these firms on average have most growth opportunities, as suggested by their market-to-book ratios.

Adjustments in CFO. Firms with above-target cash holdings in Germany and the UK tend to experience a small change in *CFO* and those in the US even do not see any change in it (smallest among the three groups) (Panel A of Table 4.4) as the increase in their funds from operations closely matches with the rise in their working capital (Panel A of Table 4.5). In contrast, the change in *CFO* is rather large for French and Japanese firms (0.6% and 0.9%, respectively) as their working capital increases at higher rates than funds from operations. The size mismatch between the rise in working capital and that in funds from operations among French and Japanese firms supports the view that in the presence of weak corporate governance, excess cash can be used unproductively (Dittmar and Mahrt-Smith (2007)). According to Ando et al. (2003), corporate governance among Japanese firms overall is weak and ineffective.

Table 4.5: Firms' Major Characteristics Conditional on Deviations from Target Cash Holdings

This table summarizes the mean levels of major characteristics of different groups of firms: A-firms with above-target cash holdings and B-firms with below-target cash holdings in the last accounting period in five countries - France – FRA (1), Germany – GER (2), Japan – JPA (3), the UK – UK (4), and the US – US (5). See Table 4.1 for the definition of book leverage (BL_t). Book leverage deviations ($BLDev_t$) are book leverage minus target book leverage. Book leverage change (*BL change* $_t$) is the difference between book leverage in the current and the last accounting periods. Cash (CH_t) is cash and cash equivalents (*Datastream* item WC02001) scaled by the book value of total assets (WC02999). Cash deviations ($CHDev_t$) are cash holdings minus target cash holdings. Cash holdings change (*CH change* $_t$) is the difference between cash holdings in the current and the last accounting periods. Cash and short-term investment change is increase/decrease in cash and short-term investments (WC04851) scaled by total assets. Cash flows from financing/operating/investing (CFF_t /CFO_t /CFI_t) are net cash flow from financing/operating/investing activities (WC04890/WC04860/WC04870) scaled by total assets. Changes in cash flows from financing/operating/investing is the difference between cash flow from financing/operating/investing in the current and the last accounting periods scaled by total assets. These figures will be taken to Table 4.4 for the comparison purpose. *Equity proceeds* are net proceeds from sale/issue of common and preferred equity (WC04251) scaled by total assets. *Equity repurchases* are common/preferred equity purchased, retired, converted, and redeemed (WC04751) scaled by total assets. Long-term borrowings (WC04401), increase/decrease in short-term borrowings (WC04821), and long-term debt reductions (WC04701) are scaled by total assets. *Net equity issue* is the net difference between equity proceeds and equity repurchases. *Net debt issue* is the sum of net long-term debt issue (long-term borrowings minus long-term debt reductions) and increase/decrease in short-term borrowing. *Cash dividends* are cash dividends paid (WC04551) scaled by total assets. *Funds from operations* (WC04201) are scaled by total assets. *Working capital* is funds from/for other operating activities (WC04831) scaled by total assets. Net assets from acquisitions/increase in investments/decrease in investments/fixed asset disposal/ other uses/(sources) of investing/capital expenditures (*CAPEX*) are WC04355/WC04760/WC04440/WC04351/WC04797/WC04601 scaled by total assets. *t*-statistics reports the *t*-value of the *t*-test for the hypothesis that the means for firms with above-target cash holdings and those with below-target cash holdings in each country are equal.

	Panel A - Firms with above-target cash holdings					**Panel B - Firms with below-target cash holdings**					***t-stats***				
	FRA	GER	JPA	UK	US	FRA	GER	JPA	UK	US	FRA	GER	JPA	UK	US
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
BL_{t-1}	0.230	0.192	0.238	0.155	0.205	0.249	0.249	0.262	0.202	0.250	-3.38	-8.31	-8.29	-14.34	-20.13
$BLDev_{t-1}$	**-0.007**	**-0.012**	**0.002**	**-0.013**	**-0.016**	**0.001**	**0.015**	**0.002**	**0.016**	**0.014**	**-3.25**	**-8.56**	**0.48**	**-15.57**	**-25.85**
BL_t	0.228	0.196	0.228	0.165	0.214	0.250	0.249	0.251	0.202	0.246	-3.91	-7.67	-8.51	-10.89	-13.74
$BLDev_t$	-0.012	-0.010	-0.008	-0.007	-0.011	0.001	0.017	-0.006	0.015	0.011	-4.73	-7.93	-2.19	-11.85	-17.89
BL change $_t$	-0.001	0.005	-0.010	0.010	0.010	0.001	-0.001	-0.009	0.000	-0.004	-1.08	1.79	-1.90	5.26	10.79
CH_{t-1}	0.177	0.204	0.200	0.215	0.234	0.085	0.075	0.118	0.073	0.089	23.71	23.45	51.76	46.04	67.90
$CHDev_{t-1}$	0.044	0.056	0.037	0.067	0.063	-0.038	-0.042	-0.032	-0.051	-0.052	57.53	52.79	142.78	96.23	161.69
CH_t	**0.155**	**0.174**	**0.177**	**0.177**	**0.198**	**0.101**	**0.096**	**0.130**	**0.099**	**0.118**	**13.35**	**13.52**	**29.39**	**24.50**	**35.82**
$CHDev_t$	**0.023**	**0.027**	**0.016**	**0.032**	**0.029**	**-0.021**	**-0.021**	**-0.020**	**-0.024**	**-0.024**	**22.60**	**19.26**	**55.79**	**34.26**	**55.38**
***CH change* $_t$**	**-0.013**	**-0.027**	**-0.012**	**-0.032**	**-0.020**	**0.020**	**0.019**	**0.012**	**0.024**	**0.028**	**-16.41**	**-14.55**	**-39.94**	**-26.85**	**-41.96**
Cash & S-T investment change $_t$	-0.013	-0.025	-0.010	-0.034	-0.019	0.022	0.020	0.012	0.025	0.026	-13.29	12.23	-30.68	-22.73	-32.18
CFF_t	-0.007	-0.008	-0.018	0.005	0.030	0.009	-0.001	-0.011	0.018	0.037	-4.64	-1.66	-7.41	-3.48	-2.48
***CFF change* $_t$**	**-0.014**	**-0.011**	**-0.008**	**-0.028**	**-0.023**	**0.008**	**0.003**	**0.007**	**0.006**	**0.018**	**-4.93**	**-2.21**	**-12.57**	**-6.68**	**-13.08**
CFO_t	0.059	0.053	0.046	0.037	0.029	0.072	0.072	0.054	0.060	0.060	-3.75	-4.33	-8.92	-6.71	-10.86
***CFO change* $_t$**	**-0.006**	**-0.001**	**-0.009**	**0.001**	**0.000**	**0.015**	**0.020**	**0.013**	**0.020**	**0.023**	**-6.58**	**-4.87**	**-23.64**	**-7.43**	**-10.90**
CFI_t	0.065	0.069	0.038	0.077	0.080	0.060	0.053	0.031	0.055	0.072	2.03	4.33	9.93	8.40	4.98
***CFI change* $_t$**	**0.013**	**0.019**	**0.007**	**0.023**	**0.016**	**-0.011**	**-0.018**	**-0.002**	**-0.022**	**0.000**	**6.65**	**7.36**	**10.73**	**12.34**	**6.79**

Table 4.5 – Cont.

	Panel A - Firms with above-target cash holdings					**Panel B - Firms with below-target cash holdings**					***t-stats***				
	FRA	GER	JPA	UK	US	FRA	GER	JPA	UK	US	FRA	GER	JPA	UK	US
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Equity proceeds $_t$	0.012	0.013	0.005	0.035	0.043	0.016	0.015	0.007	0.046	0.049	-2.01	-0.84	-3.39	-4.06	-2.88
Equity proceeds change $_t$	-0.004	-0.005	-0.003	-0.027	-0.021	0.004	0.004	0.002	0.011	0.017	-3.52	-3.29	-7.52	-10.37	-17.75
Equity repurchases $_t$	0.004	0.004	0.005	0.005	0.016	0.002	0.003	0.005	0.003	0.013	2.89	3.32	7.51	5.40	8.04
Equity repurchase change $_t$	-0.001	0.002	0.001	0.004	0.005	0.001	0.000	0.001	0.000	0.001	0.40	2.75	4.75	4.63	8.44
Net equity $_t$	0.008	0.009	0.000	0.030	0.027	0.014	0.012	0.002	0.043	0.036	-1.10	-1.55	-5.26	-4.57	-4.47
Net equity change $_t$	**-0.003**	**-0.007**	**-0.004**	**-0.031**	**-0.026**	**0.003**	**0.004**	**0.001**	**0.011**	**0.016**	**-2.53**	**-4.06**	**-8.47**	**-10.85**	**-18.59**
Net debt $_t$	-0.003	-0.002	-0.011	-0.002	0.013	0.006	-0.001	-0.007	-0.003	0.010	-2.55	-0.29	-2.88	3.11	3.07
Net debt change $_t$	**-0.009**	**-0.002**	**-0.003**	**0.005**	**0.005**	**0.006**	**0.000**	**0.006**	**-0.004**	**0.003**	**-1.04**	**-0.31**	**-5.80**	**3.63**	**2.45**
Cash dividends $_t$	0.012	0.015	0.007	0.023	0.010	0.011	0.012	0.006	0.022	0.009	0.41	4.57	6.45	1.19	1.49
Cash dividend change $_t$	**0.002**	**0.002**	**0.001**	**0.002**	**0.002**	**0.001**	**0.001**	**0.000**	**0.001**	**0.001**	**1.40**	**2.89**	**7.73**	**4.71**	**3.25**
Funds from operations $_t$	0.064	0.065	0.053	0.045	0.041	0.067	0.072	0.052	0.062	0.067	-0.90	-1.63	1.29	-4.74	-8.38
Funds from operations change $_t$	**0.006**	**0.013**	**0.001**	**0.009**	**0.008**	**0.005**	**0.013**	**0.007**	**0.014**	**0.017**	**0.01**	**0.61**	**-1.89**	**-1.94**	**-3.88**
Working capital $_t$	-0.005	-0.011	-0.006	-0.008	-0.011	0.004	-0.001	$2*10^{-4}$	-0.002	-0.007	-4.12	-3.37	-9.84	-4.04	-4.07
Working capital change $_t$	**0.012**	**0.014**	**0.010**	**0.008**	**0.008**	**-0.010**	**-0.007**	**-0.006**	**-0.006**	**-0.006**	**7.24**	**4.86**	**17.88**	**6.33**	**8.57**
Net assets from acquisitions $_t$	**0.007**	**0.017**	**0.002**	**0.038**	**0.025**	**0.005**	**0.012**	**0.002**	**0.031**	**0.021**	**1.68**	**2.47**	**2.35**	**4.41**	**5.96**
Change in net assets from acquisitions $_t$	**0.001**	**0.004**	**0.001**	**0.010**	**0.010**	**-0.002**	**-0.004**	**0.000**	**-0.006**	**-0.003**	**3.10**	**3.60**	**4.71**	**7.76**	**14.51**
Increase in investments $_t$	0.018	0.024	0.035	0.008	0.100	0.016	0.015	0.025	0.006	0.050	1.46	4.00	9.64	2.29	20.38
Change in increase in investments $_t$	0.000	0.001	0.001	0.000	0.002	-0.002	-0.003	-0.003	0.000	0.007	1.05	1.38	4.62	-0.06	-2.47
Decrease in investments $_t$	0.010	0.024	0.033	0.007	0.104	0.011	0.015	0.026	0.007	0.047	-0.60	3.42	7.00	1.15	22.48
Change in decrease in investments $_t$	-0.004	-0.006	0.000	-0.001	0.010	0.004	0.001	-0.003	0.001	0.000	-3.74	-2.01	3.37	-2.70	5.74
Net investments $_t$	0.009	0.001	0.002	0.001	-0.002	0.006	0.001	-0.001	$4*10^{-4}$	0.004	1.50	0.30	5.96	0.42	-5.73
Change in net investments $_t$	0.004	0.006	0.001	$3*10^{-5}$	-0.008	-0.005	-0.003	$-1*10^{-5}$	-0.001	0.007	3.43	2.20	1.64	1.95	-10.46
Fixed asset disposal $_t$	0.011	0.013	0.006	0.023	0.011	0.012	0.022	0.008	0.032	0.014	-1.12	-5.31	-6.18	-6.84	-6.12
Change in fixed asset disposal $_t$	-0.002	-0.004	-0.001	-0.007	-0.002	0.002	0.004	0.001	0.010	0.003	-4.21	-4.15	-5.68	-9.76	-9.49
Other uses/(sources) of investing $_t$	0.007	0.003	0.002	0.000	-0.001	0.005	0.001	0.001	0.000	-0.003	1.75	1.22	4.25	1.36	3.66
Change in other uses/(sources) of investing $_t$	0.002	0.002	0.001	0.000	0.006	-0.002	-0.002	0.000	0.000	-0.004	2.47	2.81	4.13	1.39	6.01
CAPEX $_t$	0.048	0.053	0.036	0.055	0.065	0.050	0.055	0.035	0.052	0.061	-1.05	-1.21	0.67	2.61	4.66
CAPEX change $_t$	0.001	-0.001	0.002	0.002	0.005	0.001	-0.002	0.001	0.000	0.003	0.55	0.66	2.78	2.50	3.47
Observations	3,906	2,602	15,230	9,198	22,645	3,571	2,628	12,805	8,994	21,983					

4.4.3.2. Adjustments for Firms with Below-Target Cash Holdings

The story for firms with below-target cash holdings is also very interesting. I find that firms with below-target cash holdings try to increase their cash balances, as can be seen from Panel B in Table 4.5. Further, I find evidence that overall these firms tend to undertake mechanisms of adjustments opposite to those undertaken by firms with above-target cash holdings. Panel B of Table 4.4 reports the magnitudes and relative ranks of their adjustments in three cash flow groups. The magnitudes of these adjustments are taken from Panel B in Table 4.5.

Adjustments in CFF. I find that firms with below-target cash holdings may adjust toward their targets by increasing *CFF*. However, since these firms tend to be over-levered in the previous accounting period ($BLDev_{t-1} > 0$), as shown in Panel B of Table 4.5, it may be costly for them to visit external capital markets. This is probably why the magnitude of the increase in *CFF* is particularly small among German, Japanese, and UK firms (smallest among the three cash flow groups) (Panel B of Table 4.4). Due to their high levels of deviations from target leverage, German firms do not experience any change in net debt issues while UK firms even have to reduce them (Panel B of Table 4.5), possibly to avoid potential costs of financial distress.[48]

Adjustments in CFO. The change in firms' *CFO* becomes an important driver of firms' cash holdings adjustments (ranked 1st in most countries) (Panel B of Table 4.4) in the presence of below-target cash holdings as it may be more costly for these firms to visit capital markets. The increase in funds from operations among Japanese, UK, and US firms seems to be higher when they experience below-target than when they have

[48] I find some link between cash holdings and leverage adjustments among firms with below-target cash holdings. Over-levered firms with large deviations from target leverage may find it harder to increase net debt issues. Such a link is not found among those with above-target cash holdings.

above-target cash holdings. In addition, there is evidence that the magnitude of the fall in working capital among firms with below-target cash holdings tends to be much smaller than that of the increase in funds from operations (except for French firms where the change in working capital is more significant and Japanese firms which see almost equal changes in these two items) (Panel B of Table 4.5), suggesting a significant improvement in their operational efficiency.

Even when firms with below-target cash holdings need to increase cash, they may be still concerned about potential impacts of a significant reduction in their working capital on their operations as the magnitude of the decrease in their working capital tends to be smaller than that of the increase in working capital among firms with above-target cash holdings. The implication here is, when these firms have to reduce working capital to improve *CFO* (e.g., reducing inventories and accounts receivable and/ or increasing accounts payable), they still need to ensure their ability to meet their customers' demand and offer them reasonable credit terms and meet their suppliers' credit requirement.

Adjustments in CFI. The presence of below-target cash holdings seems to force firms, especially those which are highly over-levered and hence may have less access to capital markets (e.g., German and UK firms) to reduce *CFI* (except for US firms) (Panel B of Table 4.4). The decrease in net assets from acquisitions among German and UK firms is particularly significant. The noticeable rise in German and UK firms' fixed asset disposal (Panel B of Table 4.5) may imply their attempts to boost operational efficiency i.e., to streamline their operations by selling less productive assets to improve both profitability and liquidity.

Overall, in support of the optimal cash holdings view, I find evidence that the presence of costs of adjustments may prevent firms from continuously rebalancing their cash balances. In addition, firms with above-target cash holdings experience faster speeds of adjustments since their mechanisms of adjustments may involve lower costs than those undertaken by firms with below-target cash holdings. These firms adjust toward their targets generally through significant changes in *CFF* and *CFI* while firms with below-target cash holdings tend to adjust mainly through changes in *CFO*. Such evidence implies the asymmetry in both speeds of adjustments and mechanisms of adjustments and lends strong support to Hypothesis 4.1. Finally, I show that firms' speeds of adjustments vary across the sample countries.

4.4.4. Asymmetric Adjustments toward Target Cash Holdings Conditional on the Magnitude of Deviations from Target Cash Holdings

The impact of the magnitude of deviations from targets on firms' adjustments is reported in Table 4.6. I find some evidence in support of Hypothesis 4.2 that firms' speeds of adjustments may be determined by how far they are away from their targets. In particular, the presence of the fixed cost component is likely to discourage US firms with above-target cash holdings and small deviations from targets to adjust, thus leading to statistically slower speeds of adjustments compared with those of firms that have above-target cash holdings and large deviations in the country. It is, however, an opposite story with Japanese firms as those with above-target cash holdings and small deviations from targets are likely to adjust statistically faster, which is rather puzzling. Although speeds of adjustments for firms with above-target cash holdings and large deviations in France, Germany, and the UK are not statistically faster than those of firms with above-target cash holdings and small deviations, by magnitude, it seems that the former firms adjust faster, a finding to some extent in line with Hypothesis 4.2 about the "shared" fixed cost argument and agency theories on costs of deviations from target cash holdings i.e., firms with large excess cash holdings may face lower costs of adjustments but higher costs of deviations associated with the free cash flow problem.

Among firms with below-target cash holdings, although speeds of adjustments do not statistically differ between firms with large deviations and those with small deviations, by magnitude, the presence of large deviations still leads to faster speeds of adjustments (except for Japanese firms). This evidence lends some support to the earlier argument that firms with a large cash shortage may need to adjust more quickly for they are more likely to suffer from operational problems and have to give up positive *NPV* investments when costs of adjustments can be effectively "shared".

I find that conditional on having large deviations from targets, firms with above-target cash holdings are likely to adjust toward their targets statistically faster than those with below-target cash holdings. A similar pattern can be also found among firms with small deviations from targets i.e., firms with above-target cash holdings and small deviations from targets adjust statistically faster than those with below-target cash holdings and small deviations. These findings suggest deviations from targets i.e., whether firms have above- or below-target cash holdings may be the major driver of firms' target adjustments, not the magnitude of these deviations.

Firms' characteristics and actual cash holdings adjustments contingent on whether they have above- or below-target cash holdings and the magnitude of their deviations from targets reported in Table 4.7 can effectively shed light on why firms with large deviations from targets are likely to adjust faster than those with small ones. First, as expected, on average, firms with large deviations from targets, whether having above- or below-target cash holdings, in terms of absolute values, experience much more significant deviations from targets (from 2.8% (firms with large excess cash holdings or A-L firms in Japan) to 5.0% (firms with a large excess cash holdings in the UK) of total assets) than those of firms with small deviations (from 0.5% (firms with small excess cash holdings or A-S firms in Japan and firms with a small cash shortage or B-S firms in all sample countries except for Japan) to 1.2% (firms with small excess cash holdings in the UK)). Hence, both the "shared" fixed cost argument and agency theories may suggest they should undertake faster adjustments.

Second, except for French firms with above-target cash holdings and small deviations from target cash holdings, whether having above- or below-target cash holdings, firms with small deviations tend to have stayed close to their target leverage (especially US firms) (small $BLDev_t$). This finding implies that the presence of fixed costs related to leverage adjustments may discourage these firms to visit external capital markets to rebalance their cash holdings via adjustments in *CFF* (Faulkender et al. (2012)), which explains why compared with firms that experience large deviations, those with small ones tend to experience much smaller changes in *CFF* in most cases.

In line with the traditional view that excess cash tends to be used unproductively (Dittmar and Mahrt-Smith (2007)), I find that firms tend to become less efficient when having too much excess cash i.e., the increase in funds from operations is far less than that in working capital. Firms across the sample countries on average even experience a fall in their funds from operations when having too much cash. However, when the magnitude of excess cash holdings is small, they start trying to become more efficient i.e., the growth of funds from operations starts exceeding that of working capital (except for German firms). Especially, facing a large cash shortage, firms across all sample countries seem to experience the largest improvement in funds from operations and significant reductions in working capital. These findings, to some extent, implies firms' operational efficiency contingent on the position relative to their target cash holdings.

Overall, I find moderate evidence that too much excess cash may make firms become less efficient and the "shared" fixed cost argument and agency theories can explain why firms with large deviations from targets may adjust faster. Firms with small deviations from target cash holdings may be discouraged to undertake adjustments possibly due to higher incremental costs of adjustments and lower costs of deviations.

Table 4.6: Target Cash Holdings Adjustments Conditional on the Magnitude of Deviations from Target Cash Holdings

This table presents the SYS-GMM regression results for firms' asymmetric partial target adjustments conditional on the magnitude of deviations from target cash holdings, as modeled by Equation (4.5):

$$\Delta CH_{it} = \varphi_0 + (\varphi_1 CDev^L_{it} + \varphi_2 CDev^S_{it}) CDev_{it} CH^a_{it} + (\varphi_3 CDev^L_{it} + \varphi_4 CDev^S_{it}) CDev_{it} CH^b_{it} + \eta_{it},$$

where ΔCH_{it} is the change in cash holdings ratios. Target cash holdings are estimated by Equation (4.2). See Table 4.1 for variable definitions and Table 4.2 for target cash holdings estimation. $CDev_{it}$ is the difference between cash holdings in the last period and target cash holdings for the current period. CH^a_{it} (CH^b_{it}) is a dummy variable equal to 1 if cash holdings are higher than or equal to (lower than) targets and 0 otherwise. $CDev^L_{it}$ ($CDev^S_{it}$) is a dummy variable equal to 1 if deviations from target cash holdings are larger than or equal to (smaller than) the median level and 0 otherwise. My sample includes 103,562 firm-year observations for France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the coefficient estimates for each pair of scenarios are equal. *AR2* reports the *p*-value of the test for no second-order serial correlation, which is asymptotically distributed as *N(0,1)* under the null hypothesis of no serial correlation. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

	France	Germany	Japan	UK	US
	(1)	(2)	(3)	(4)	(5)
$CDev_{it}.\ CH^a_{it}.CDev^L_{it}$ (i)	0.502**	0.510**	0.467**	0.576**	0.548**
	(15.43)	(14.19)	(28.78)	(23.50)	(35.32)
$CDev_{it}.\ CH^a_{it}.CDev^S_{it}$ (ii)	0.494**	0.455**	0.548**	0.537**	0.400**
	(6.15)	(4.93)	(13.65)	(7.96)	(8.92)
$CDev_{it}.\ CH^b_{it}.CDev^L_{it}$ (iii)	0.319**	0.297**	0.317**	0.342**	0.429**
	(8.35)	(5.91)	(17.27)	(11.16)	(20.24)
$CDev_{it}.\ CH^b_{it}.CDev^S_{it}$ (iv)	0.146	0.291**	0.335**	0.288**	0.358**
	(1.86)	(2.72)	(7.44)	(4.62)	(8.46)
Constant	0.004**	0.004*	0.000	0.005**	0.002*
	(3.32)	(2.17)	(-0.27)	(3.95)	(2.04)
AR2	0.09	0.40	0.03	0.24	0.00
F-test [(i) = (ii)]	0.92	0.54	0.03	0.55	0.00
F-test [(iii) = (iv)]	0.04	0.95	0.69	0.34	0.08
F-test [(i) = (iii)]	0.00	0.00	0.00	0.00	0.00
F-test [(ii) = (iv)]	0.00	0.28	0.00	0.02	0.54
Observations	7,477	5,230	28,035	18,192	44,628

Table 4.7: Changes in Cash Flows Conditional on the Magnitude of Deviations from Target Cash Holdings

This table summarizes the mean levels of major characteristics of different groups of firms: A-L firms with above-target cash holdings and large deviations from targets, A-S firms with above-target cash holdings and small deviations, B-L firms with below-target cash holdings and large deviations, and B-S firms with below-target cash holdings and small deviations in five countries - France, Germany, Japan, the UK, and the US. See Table 4.5 for these variables' definitions. *t*-statistics reports the *t*-value of the *t*-test for the hypothesis that the means for each pair of scenarios are equal.

	A-L	A-S	B-L	B-S	*t* - stats					
FRANCE	(1)	(2)	(3)	(4)	(1)-(2)	(1)-(3)	(1)-(4)	(2)-(3)	(2)-(4)	(3)-(4)
BL_t	0.203	0.253	0.234	0.268	-6.02	-3.70	-8.00	2.49	-2.04	-4.56
$BLDev_t$	**-0.012**	**-0.012**	**0.004**	**-0.002**	**-0.13**	**-4.01**	**-2.54**	**-4.10**	**-2.57**	**1.68**
CH_t	0.206	0.105	0.117	0.084	15.42	13.87	20.04	-2.65	5.20	8.04
$CHDev_t$	**0.040**	**0.006**	**-0.036**	**-0.005**	**11.76**	**23.58**	**16.56**	**16.75**	**6.30**	**-12.95**
CH change $_t$	-0.026	-0.001	0.030	0.009	-7.66	-16.47	-11.63	-12.00	-5.07	8.77
CFF_t	-0.005	-0.008	0.008	0.010	0.67	-2.49	-3.03	-3.54	-4.35	-0.35
CFF change $_t$	**-0.015**	**-0.013**	**0.008**	**0.008**	**-0.24**	**-3.16**	**-3.55**	**-3.43**	**-4.06**	**-0.06**
CFO_t	0.049	0.070	0.079	0.064	-4.16	-5.65	-3.18	-2.08	1.49	3.49
CFO change $_t$	-0.017	0.005	0.028	0.001	-4.89	-9.08	-4.08	-5.20	1.18	6.42
CFI_t	0.071	0.060	0.056	0.064	2.50	3.55	1.69	1.16	-0.97	-2.15
CFI change $_t$	0.026	0.000	-0.020	-0.002	5.07	8.25	5.73	3.76	0.46	-3.52
Funds from operations change $_t$	**0.004**	**0.008**	**0.012**	**-0.002**	**-1.31**	**-2.64**	**2.00**	**-1.64**	**3.82**	**4.88**
Working capital change $_t$	**0.021**	**0.003**	**-0.016**	**-0.003**	**4.22**	**7.86**	**5.84**	**4.45**	**1.68**	**-3.14**
Observations	2,333	1,557	1,832	1,755						
GERMANY										
BL_t	0.150	0.238	0.220	0.277	-8.74	-7.05	-13.67	1.88	-4.15	-6.32
$BLDev_t$	**-0.012**	**-0.008**	**0.024**	**0.009**	**-0.67**	**-7.41**	**-4.53**	**-6.73**	**-3.81**	**3.32**
CH_t	0.248	0.104	0.120	0.073	15.09	13.73	21.51	-2.31	5.54	8.08
$CHDev_t$	**0.046**	**0.009**	**-0.039**	**-0.005**	**9.52**	**19.72**	**14.11**	**14.68**	**5.80**	**-11.35**
CH change $_t$	-0.048	-0.004	0.028	0.010	-9.30	-14.63	-12.96	-8.08	-4.32	5.59
CFF_t	-0.014	-0.003	-0.006	0.003	-1.78	-1.20	-2.95	0.55	-1.20	-1.71
CFF change $_t$	**-0.026**	**0.004**	**-0.003**	**0.008**	**-3.14**	**-2.22**	**-3.83**	**0.79**	**-0.71**	**-1.42**
CFO_t	0.045	0.061	0.075	0.069	-2.22	-4.29	-3.69	-2.46	-1.54	1.22
CFO change $_t$	-0.003	0.000	0.035	0.006	-0.43	-5.17	-1.42	-5.63	-1.17	5.20
CFI_t	0.075	0.063	0.045	0.061	2.02	5.06	2.63	3.65	0.57	-3.35
CFI change $_t$	0.039	-0.001	-0.030	-0.007	5.39	8.38	6.64	4.12	1.05	-3.55
Funds from operations change $_t$	**0.014**	**0.011**	**0.024**	**0.003**	**0.44**	**-0.85**	**2.49**	**-1.41**	**2.28**	**3.69**
Working capital change $_t$	**0.017**	**0.011**	**-0.011**	**-0.003**	**0.97**	**4.15**	**3.36**	**3.56**	**2.61**	**-1.38**
Observations	1,574	1,044	1,315	1,297						

JAPAN										
BL_t	0.195	0.257	0.240	0.263	-15.65	-11.08	-17.44	4.31	-1.77	-6.05
$BLDev_t$	**-0.012**	**-0.005**	**-0.003**	**-0.009**	**-5.57**	**-6.06**	**-2.17**	**-1.27**	**3.74**	**4.53**
CH_t	0.220	0.139	0.146	0.113	32.39	28.88	44.67	-3.40	14.30	17.36
$CHDev_t$	**0.028**	**0.005**	**-0.032**	**-0.007**	**24.63**	**54.73**	**39.18**	**44.33**	**21.04**	**-29.43**
CH change $_t$	-0.025	-0.001	0.023	0.001	-30.20	-47.25	-33.14	-27.18	-3.47	25.08
CFF_t	-0.019	-0.018	-0.007	-0.015	-1.41	-7.50	-3.10	-7.56	-2.17	5.53
CFF change $_t$	**-0.015**	**-0.001**	**0.010**	**0.004**	**-7.86**	**-12.68**	**-10.99**	**-7.11**	**-4.24**	**3.38**
CFO_t	0.040	0.052	0.058	0.050	-9.63	-13.13	-7.91	-5.26	2.03	7.01
CFO change $_t$	-0.021	0.001	0.020	0.005	-17.20	-28.48	-19.40	-15.37	-2.90	12.64
CFI_t	0.044	0.034	0.029	0.032	8.27	11.50	9.63	4.67	1.83	-2.94
CFI change $_t$	0.013	0.003	-0.007	0.003	7.62	13.50	7.47	8.29	-0.20	-8.47
Funds from operations change $_t$	**-0.004**	**0.004**	**0.011**	**0.002**	**-5.53**	**-6.80**	**-0.99**	**-2.06**	**5.29**	**6.76**
Working capital change $_t$	**0.017**	**0.003**	**-0.009**	**-0.003**	**10.64**	**19.15**	**15.42**	**9.65**	**5.30**	**-4.60**
Observations	9,332	5,936	6,652	6,115						
UK										
BL_t	0.128	0.207	0.190	0.214	-16.61	-13.24	-19.59	3.53	-1.43	-5.33
$BLDev_t$	**-0.018**	**0.004**	**0.022**	**0.008**	**-8.15**	**-14.39**	**-10.06**	**-6.47**	**-1.34**	**5.69**
CH_t	0.244	0.104	0.126	0.071	26.18	22.99	37.46	-5.55	10.58	16.40
$CHDev_t$	**0.050**	**0.012**	**-0.044**	**-0.005**	**15.53**	**34.36**	**24.90**	**23.88**	**10.57**	**-18.79**
CH change $_t$	-0.063	0.000	0.038	0.010	-16.81	-27.77	-22.74	-14.57	-5.63	12.28
CFF_t	0.016	-0.007	0.026	0.009	4.55	-1.77	1.46	-6.21	-3.90	3.44
CFF change $_t$	**-0.033**	**-0.022**	**0.001**	**0.011**	**-1.39**	**-4.06**	**-6.18**	**-3.18**	**-6.09**	**-1.69**
CFO_t	0.011	0.065	0.050	0.070	-9.62	-6.59	-11.96	3.33	-1.50	-5.02
CFO change $_t$	-0.009	0.011	0.034	0.007	-4.82	-9.84	-4.22	-5.90	1.59	8.08
CFI_t	0.093	0.059	0.041	0.068	9.13	12.97	6.85	4.57	-2.90	-7.49
CFI change $_t$	0.054	-0.012	-0.044	0.000	12.40	17.52	11.29	5.85	-2.72	-9.04
Funds from operations change $_t$	**0.009**	**0.007**	**0.022**	**0.007**	**0.51**	**-2.44**	**0.68**	**-3.17**	**0.10**	**3.74**
Working capital change $_t$	**0.018**	**-0.004**	**-0.012**	**0.000**	**6.68**	**8.55**	**6.34**	**2.55**	**1.30**	**-3.98**
Observations	5,536	3,667	4,541	4,448						
US										
BL_t	0.163	0.266	0.221	0.273	-31.26	-17.77	-35.60	14.13	-2.27	-17.38
$BLDev_t$	**-0.021**	**-0.001**	**0.018**	**0.002**	**-11.47**	**-21.66**	**-13.74**	**-11.30**	**-2.08**	**9.72**
CH_t	0.289	0.108	0.159	0.074	52.08	36.99	68.58	-18.50	15.50	34.53
$CHDev_t$	**0.047**	**0.010**	**-0.041**	**-0.005**	**26.41**	**54.36**	**39.76**	**39.53**	**18.26**	**-29.89**
CH change $_t$	-0.041	0.003	0.040	0.009	-25.81	-44.76	-31.55	-28.02	-6.19	25.95
CFF_t	0.056	0.005	0.053	0.020	13.39	0.73	9.74	-11.97	-6.37	8.46
CFF change $_t$	**-0.039**	**-0.007**	**0.019**	**0.016**	**-6.32**	**-10.73**	**-11.61**	**-6.48**	**-7.99**	**0.95**
CFO_t	-0.015	0.073	0.048	0.073	-19.01	-12.32	-20.49	6.59	0.10	-7.08
CFO change $_t$	-0.014	0.014	0.040	0.005	-8.51	-14.34	-6.54	-8.45	4.64	12.57
CFI_t	0.086	0.074	0.060	0.084	4.28	9.15	0.77	6.27	-4.92	-10.78
CFI change $_t$	0.026	0.006	-0.010	0.010	5.41	9.12	4.42	4.98	-2.00	-7.07
Funds from operations change $_t$	**0.002**	**0.014**	**0.029**	**0.005**	**-3.21**	**-6.71**	**-0.14**	**-4.87**	**5.53**	**8.93**
Working capital change $_t$	**0.016**	**0.000**	**-0.011**	**0.000**	**6.57**	**10.01**	**7.26**	**4.72**	**0.07**	**-5.11**
Observations	13,851	8,994	11,054	10,729						

4.5. Robustness Checks

4.5.1. Alternative Measures of Cash Holdings – Cash to Net Assets and Cash to Sales

In this first robustness check I investigate whether my main findings are robust to the measures of cash holdings used. Following Bates et al. (2009), I re-estimate models (4.1), (4.4), and (4.5) using two alternative measures of cash holdings - cash to net assets and cash to sales. The results reported in Table C1 and Table C2 for cash to net assets and Table C3 and Table C4 for cash to sales in Appendix C show that overall, the main results are not sensitive to the measures of cash holdings used. In particular, for both of these alternative measures of cash holdings, there is strong evidence that firms with above-target cash holdings adjust significantly faster than those with below-target cash holdings. When the magnitude of firms' deviations from target cash holdings are considered, there is some evidence that those with large deviations, regardless of whether having above- or below-target cash holdings, experience faster speeds of adjustments than those with small deviations.

4.5.2. Target Cash Holdings Adjustments Conditional on Firms' Characteristics

In another robustness check, I examine the impact of several firm-specific factors such as bank lines of credit (as proxied by firm size), precautionary motive of cash holdings (as proxied by cash flow volatility and dividend payout), financial constraints (as proxied by dividend payout and growth opportunities), and corporate life-cycle (as proxied by firm age) on their cash holdings adjustments. These factors may affect their levels of costs of deviations, financial constraints, and costs of adjustments. For example, Sufi (2009) shows that firm size can be a strong statistical predictor of the use of bank lines of credit as large firms are likely to have more access to this source of financing. This suggests large firms may be less responsive to deviations from target cash holdings (lower costs of deviations) i.e., slower adjustments. However, it can be also argued that as these firms are likely to face lower costs of adjustments due to better access to external financing sources, they can adjust toward their targets at lower costs i.e., faster adjustments. Similarly, firms with low cash flow volatility may adjust either slowly for they are less likely to be affected by negative cash flow shocks (lower costs of deviations) or quickly as they tend to be mature firms with better access to external financing sources (lower costs of adjustments). To examine how these factors affect firms' target adjustments, I develop following partial, asymmetric cash holdings adjustment models:

(4.6) $$\Delta CH_{it} = \phi_0 + \phi_1 CDev_{it} CH_{it}^{L} + \phi_2 CDev_{it} CH_{it}^{H} + \omega_{it},$$

where CH_{it}^{L} (CH_{it}^{H}) is a dummy variable equal to 1 for firms with small size, low cash flow volatility, low dividend payout, low growth opportunities, and young age (big size, high cash flow volatility, high dividend payout, high growth opportunities, and old age) and 0 otherwise. Next, I let these firm-specific characteristics interact with firms' deviations from target cash holdings to examine how they jointly determine firms' target adjustments. This may allow me to identify which factors have the first-order effects on these adjustments.

(4.7) $$\Delta CH_{it} = \gamma_0 + (\gamma_1 CH_{it}^{L} + \gamma_2 CH_{it}^{H}) CDev_{it} CH_{it}^{a} + (\gamma_3 CH_{it}^{L} + \gamma_4 CH_{it}^{H}) CDev_{it} CH_{it}^{b} + \xi_{it}.$$

Bank lines of credit. I first examine the impact of firm size by splitting the sample firms into two groups i.e., one with larger size and another with smaller size than the median size level. The results in Panel A of Table 4.8 show that large firms in Germany, Japan, the UK, and the US adjust toward their targets at speeds of 0.320, 0.341, 0.470, and 0.493, respectively, which are statistically lower than those of small firms (0.480, 0.462, 0.532, and 0.542, respectively). This finding supports the argument that large firms with more access to external financing sources such as bank lines of credit may be less concerned about deviations from targets.[49] It, however, is contrary to Dittmar and Duchin (2010) that big firms with more access to bank lines of credit may adjust faster.

The interaction between firm size and whether firms have above- or below-target cash holdings basically does not change the above pattern as small firms (except for French firms) overall adjust toward their targets faster whether they experience above- or below-target cash holdings except for a few cases. For example, it turns out that in the presence of below-target (above-target) cash holdings, speeds of adjustments for small firms in the UK (US) now do not statistically differ from those for large firms in the country.[50]

The precautionary motive of cash holdings. Next, I investigate the impact of firms' cash flow volatility on their adjustments by splitting the sample firms into two subgroups basing on the median level of cash flow volatility. Firms with riskier cash flows may face higher costs of deviations from targets as they are more likely to experience negative cash flow shocks which may strongly affect their operations (e.g., their ability to meet debt obligations, finance working capital, and undertake growth opportunities) (Opler et al. (1999), Almeida et al. (2004), Han and Qiu (2007), and Bates et al. (2009)). From Panel B of Table 4.8, there is strong evidence that these firms adjust faster than those with low cash flow volatility, which fits nicely with the argument that these firms are more likely to be affected by negative cash flow shocks, thus facing higher costs of deviations from targets.

---

[49] I examine firms' mechanisms of adjustments to see the real drivers of the difference in the speeds of adjustments between the two groups of firms but obtain results that do not form any clear patterns.

[50] Controlling for firms' bank lines of credit as well as other firm-specific characteristics, I find strong evidence that firms with above-target cash holdings adjust statistically faster than those with below-target cash holdings.

The interaction between cash flow volatility and firms' deviations from targets seems to statistically reduce the influence of cash flow volatility on their adjustments. Although by magnitude, firms with high cash flow volatility appear to adjust faster whether they have above- or below-target cash holdings (except for firms with below-target cash holdings and high cash flow volatility in Japan), their speeds of adjustments do not statistically differ from those of firms with low cash flow volatility in several cases i.e., firms with above-target cash holdings in France, Germany, the UK, and the US and those with below-target cash holdings in France, Japan, and the UK.

Dividend payout may also influence firms' adjustments as external investors may observe firms with higher dividend payout to be less risky, suggesting better access to capital markets and low costs of adjustments (Bates et al. (2009)). Consistent with Bates et al. (2009) that the precautionary motive of cash holdings should be weaker for firms which pay more dividends, these firms in France, Japan, and the UK adjust statistically less quickly than firms which pay less dividends (Panel C of Table 4.8).

When dividend payout is interacted with firms' deviations from targets, I find some different results. For example, speeds of adjustments for French firms with high dividend payout do not statistically differ from those of firms with low dividend payout among both groups of firms with above- and those with below-target cash holdings although by magnitude, firms with low dividend payout still seem to adjust faster. This is a similar story for firms with below-target cash holdings in Japan.

Financial constraints. Financial constraints i.e., growth opportunities and dividend payout may also influence firms' cash holdings adjustments. As I have discussed the impact of dividend payout, here I only focus on that of growth opportunities. Almeida et al. (2002) suggest that the benefit of achieving optimal cash holdings may be higher for high-growth firms since it helps them avoid situations in which a cash shortage forces them to give up positive *NPV* investments. Agency theories, however, suggest that these firms tend to be subject to more information asymmetries which lead to less access to external capital markets i.e., less ability to adjust via *CFF*.

The results reported in Panel D of Table 4.8 reveal that by magnitude, except for firms in Japan, firms in all other countries are likely to experience faster speeds of adjustments when having more growth opportunities. High-growth firms in France and the US adjust statistically faster than low-growth firms. The evidence for Japanese firms is somewhat puzzling as the presence of limited growth opportunities seems to be associated with faster adjustments. The interaction between growth opportunities and deviations from targets seems to reduce the statistical relevance of growth opportunities. For example, the presence of more growth opportunities does not lead to statistically faster speeds of adjustments among both firms with above-target cash holdings in France and the US and those with below-target cash holdings in France.

Corporate life-cycle. Finally, I investigate how firms' age may influence their target adjustments, as suggested by Dittmar and Duchin (2011). The authors empirically show that as firms' age increases, the precautionary motive of cash holdings may become weaker i.e., matured firms may hold less cash and adjust less quickly than younger firms. To test the impact of firms' age, I divide the sample firms into two subsamples - young firms whose age is less than and matured firms whose age is higher than the median age level.

Panel E of Table 4.8 shows strong evidence across firms in five countries that the precautionary motive of cash holdings may be weaker for matured firms. In particular, matured firms adjust toward their targets at speeds from 0.326 (Japanese firms) to 0.440 (US firms), statistically slower than those for young firms (from 0.456 (French firms) to 0.531 (UK firms)). Letting firms' age interact with their deviations from targets, I find that young firms adjust faster whether they experience above- or below-target cash holdings, except for a few cases i.e., speeds of adjustments for young firms in France and the UK are not statistically different from those for mature firms in these two countries in the presence of below-target cash holdings. Young firms with above-target cash holdings appear to experience fastest speeds of adjustments among the four groups of firms.

Overall, I show that firms' bank lines of credit, precautionary motive of cash holdings, financial constraints, and corporate life-cycle may influence their cash holdings adjustments although their impact tends to become less significant when I interact these factors with deviations from target cash holdings (except for firm age). The impact of deviations from target cash holdings, however, remains strong and significant even when these factors are taken into account. This suggests that firms' deviations from target cash holdings may be the major driver of their target adjustments, not firm-specific characteristics.

4.6. Conclusions

Consistent with the optimal cash holdings view, I find the asymmetry in both firms' speeds and mechanisms of adjustments. Firms with above-target cash holdings need to disgorge their excess cash by reducing *CFF* (across all firms in the sample countries) and *CFO* (except for UK and US firms) but increasing *CFI* (across all firms) while those with below-target cash holdings are likely to undertake opposite mechanisms to build up their cash reserves. Since the mechanisms undertaken by the former firms may involve lower costs, they can close out deviations from targets relatively faster than the latter firms. Further, firms with above-target cash holdings may adjust toward their targets mainly through changes in *CFF* and *CFI* while those with below-target cash holdings tend to undertake major adjustments in *CFO*.

There is some evidence that contrary to firms with small deviations, those with large deviations from target cash holdings may undertake faster adjustments due to lower costs of adjustments and higher costs of deviations, a finding to some extent in favor of both the “shared” fixed cost argument and agency theories. Intriguingly, I find that, consistent with agency theories, a lot of excess cash may make firms become less efficient. This problem is particularly prominent among firms with poor corporate governance (French and Japanese firms in particular). However, when having less cash than optimal levels, firms tend to try hard to improve their operational efficiency.

Finally, I document some evidence on the impact of firms’ access to bank lines of credit, precautionary motive of cash holdings, financial constraints, and corporate life-cycle on their target cash holdings adjustments. Overall, firms are likely to adjust toward their target cash holdings faster contingent on having smaller size, higher cash flow volatility, lower dividend payout, more growth opportunities, and younger age. When these factors are interacted with firms’ deviations from targets, however, their influence on firms’ target adjustments tends to become less significant in most cases (except for firm age), suggesting that firms’ deviations from targets may be the most important driver of their target cash holdings adjustments.

Table 4.8: Target Cash Holdings Adjustments Conditional on Firms' Characteristics

This table presents the SYS-GMM regression results for firms' asymmetric partial target adjustments conditional on levels of financial constraints, as modeled by Equations (4.6) and (4.7):

$$\Delta CH_{it} = \phi_0 + \phi_1 CDev_{it} CH^L_{it} + \phi_2 CDev_{it} CH^H_{it} + \omega_{it}, \text{ and } \Delta CH_{it} = \gamma_0 + (\gamma_1 CH^L_{it} + \gamma_2 CH^H_{it}) CDev_{it} CH^a_{it} + (\gamma_3 CH^L_{it} + \gamma_4 CH^H_{it}) CDev_{it} CH^b_{it} + \xi_{it},$$

where ΔCH_{it} is the change in cash holdings ratios. Target cash holdings are estimated by Equation (4.2). See Table 4.1 for variable definitions and Table 4.2 for target cash holdings estimation. $CDev_{it}$ is the difference between cash holdings in the last period and target cash holdings for the current period. CH^a_{it} (CH^b_{it}) is a dummy variable equal to 1 if cash holdings are higher than or equal to (lower than) targets and 0 otherwise. CH^H_{it} (CH^L_{it}) stands for $CH^{BS}_{it}/CH^{HCFV}_{it}/CH^{HDPO}_{it}/CH^{HGO}_{it}/CH^{O}_{it}$ ($CH^{SS}_{it}/CH^{LCFV}_{it}/CH^{LDPO}_{it}/CH^{LGO}_{it}/CH^{Y}_{it}$) which are dummy variables equal to 1 if firm size/cash flow volatility/dividend payout/growth opportunities, and firm age is (are) greater than or equal to (lower than) the median level. My sample includes 103,562 firm-year observations for France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the coefficient estimates for each pair of scenarios are equal. *AR2* reports the *p*-value of the test for no second-order serial correlation, which is asymptotically distributed as *N(0,1)* under the null hypothesis of no serial correlation. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

		Coefficients of speeds of adjustments					*t*-stats				
		(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
		France	Germany	Japan	UK	US	France	Germany	Japan	UK	US
Panel A – Firm size											
$CDev_{it}.\ CH^{SS}_{it}$	(i)	0.416**	0.480**	0.462**	0.532**	0.542**	(12.98)	(12.17)	(32.23)	(24.51)	(36.25)
$CDev_{it}.\ CH^{BS}_{it}$	(ii)	0.383**	0.320**	0.341**	0.470**	0.493**	(15.37)	(13.60)	(28.93)	(23.09)	(30.54)
F-test [(i)=(ii)]		0.41	0.00	0.00	0.04	0.03					
AR2		0.10	0.47	0.03	0.15	0.00					
$CDev_{it}.\ CH^a_{it}.\ CH^{SS}_{it}$	(i)	0.515**	0.596**	0.529**	0.677**	0.590**	(11.73)	(11.53)	(22.04)	(19.80)	(26.58)
$CDev_{it}.\ CH^a_{it}.\ CH^{BS}_{it}$	(ii)	0.490**	0.425**	0.429**	0.591**	0.618**	(11.95)	(11.97)	(23.21)	(18.53)	(26.68)
$CDev_{it}.\ CH^b_{it}.\ CH^{SS}_{it}$	(iii)	0.333**	0.372**	0.395**	0.372**	0.538**	(6.74)	(5.38)	(14.37)	(9.29)	(18.36)
$CDev_{it}.\ CH^b_{it}.\ CH^{BS}_{it}$	(iv)	0.299**	0.212**	0.234**	0.325**	0.320**	(7.37)	(4.49)	(11.94)	(8.81)	(11.52)
F-test [(i)=(ii)]		0.67	0.00	0.00	0.04	0.37					
F-test [(iii)=(iv)]		0.56	0.02	0.00	0.34	0.00					
F-test [(i)=(iii)]		0.01	0.02	0.00	0.00	0.23					
F-test [(ii)=(iv)]		0.00	0.00	0.00	0.00	0.00					
AR2		0.08	0.49	0.04	0.24	0.00					
Observations		7,477	5,230	28,035	18,192	44,628					

Table 4.8 – Cont.

		Coefficients of speeds of adjustments					*t*-stats				
		(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
		France	Germany	Japan	UK	US	France	Germany	Japan	UK	US
Panel B – Cash flow volatility											
$CDev_{it}. CH^{LCFV}_{it}$	(i)	0.360**	0.343**	0.376**	0.433**	0.471**	(13.29)	(11.31)	(29.10)	(21.98)	(32.71)
$CDev_{it}. CH^{HCFV}_{it}$	(ii)	0.436**	0.463**	0.419**	0.495**	0.512**	(15.20)	(14.08)	(34.03)	(25.78)	(38.00)
F-test [(i)=(ii)]		0.04	0.01	0.01	0.02	0.04					
AR2		0.10	0.39	0.02	0.14	0.00					
$CDev_{it}. CH^{a}_{it}. CH^{LCFV}_{it}$	(i)	0.460**	0.482**	0.433**	0.551**	0.540**	(11.59)	(10.83)	(21.61)	(16.94)	(28.32)
$CDev_{it}. CH^{a}_{it}. CH^{HCFV}_{it}$	(ii)	0.560**	0.548**	0.501**	0.605**	0.560**	(13.28)	(11.69)	(24.72)	(20.38)	(29.02)
$CDev_{it}. CH^{b}_{it}. CH^{LCFV}_{it}$	(iii)	0.287**	0.171**	0.326**	0.310**	0.378**	(6.49)	(3.08)	(14.91)	(8.77)	(14.46)
$CDev_{it}. CH^{b}_{it}. CH^{HCFV}_{it}$	(iv)	0.333**	0.391**	0.322**	0.354**	0.455**	(7.83)	(6.83)	(13.49)	(9.93)	(18.45)
F-test [(i)=(ii)]		0.07	0.25	0.00	0.17	0.39					
F-test [(iii)=(iv)]		0.34	0.00	0.88	0.29	0.01					
F-test [(i)=(iii)]		0.01	0.00	0.00	0.00	0.00					
F-test [(ii)=(iv)]		0.00	0.06	0.00	0.00	0.00					
AR2		0.09	0.45	0.03	0.25	0.00					
Observations		7,477	5,230	28,035	18,192	44,628					
Panel C – Dividend payout											
$CDev_{it}. CH^{LDPO}_{it}$	(i)	0.449**	0.434**	0.425**	0.506**	0.523**	(15.41)	(12.54)	(32.36)	(26.30)	(14.84)
$CDev_{it}. CH^{HDPO}_{it}$	(ii)	0.358**	0.396**	0.368**	0.411**	0.490**	(13.10)	(12.98)	(29.35)	(20.89)	(51.86)
F-test [(i)=(ii)]		0.02	0.42	0.00	0.00	0.37					
AR2		0.13	0.41	0.02	0.19	0.00					
$CDev_{it}. CH^{a}_{it}. CH^{LDPO}_{it}$	(i)	0.527**	0.552**	0.525**	0.617**	0.639**	(12.46)	(11.37)	(25.26)	(21.10)	(12.25)
$CDev_{it}. CH^{a}_{it}. CH^{HDPO}_{it}$	(ii)	0.467**	0.509**	0.412**	0.523**	0.540**	(12.20)	(11.33)	(21.00)	(16.54)	(34.28)
$CDev_{it}. CH^{b}_{it}. CH^{LDPO}_{it}$	(iii)	0.367**	0.318**	0.308**	0.375**	0.404**	(7.87)	(5.19)	(13.02)	(10.30)	(8.04)
$CDev_{it}. CH^{b}_{it}. CH^{HDPO}_{it}$	(iv)	0.284**	0.252**	0.332**	0.286**	0.435**	(6.20)	(4.65)	(16.35)	(7.80)	(20.70)
F-test [(i)=(ii)]		0.24	0.50	0.00	0.01	0.06					
F-test [(iii)=(iv)]		0.13	0.34	0.34	0.04	0.53					
F-test [(i)=(iii)]		0.02	0.01	0.00	0.00	0.00					
F-test [(ii)=(iv)]		0.01	0.00	0.01	0.00	0.00					
AR2		0.11	0.42	0.03	0.30	0.00					
Observations		7,477	5,230	28,035	18,192	44,628					

Table 4.8 – Cont.

		Coefficients of adjustment speeds					*t*-stats				
		(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
		France	Germany	Japan	UK	US	France	Germany	Japan	UK	US
Panel D – Growth opportunities											
$CDev_{it}.\ CH^{LGO}_{it}$	(i)	0.387**	0.378**	0.456**	0.458**	0.424**	(13.14)	(12.28)	(34.36)	(22.60)	(28.43)
$CDev_{it}.\ CH^{HGO}_{it}$	(ii)	0.468**	0.439**	0.373**	0.482**	0.543**	(15.53)	(12.75)	(30.50)	(25.47)	(40.99)
F-test [(i)=(ii)]		0.04	0.19	0.00	0.38	0.00					
AR2		0.11	0.39	0.02	0.16	0.00					
$CDev_{it}.\ CH^{a}_{it}.\ CH^{LGO}_{it}$	(i)	0.487**	0.470**	0.554**	0.556**	0.531**	(10.22)	(10.17)	(26.82)	(17.22)	(22.89)
$CDev_{it}.\ CH^{a}_{it}.\ CH^{HGO}_{it}$	(ii)	0.555**	0.554**	0.436**	0.599**	0.547**	(12.54)	(11.71)	(22.38)	(20.34)	(30.51)
$CDev_{it}.\ CH^{b}_{it}.\ CH^{LGO}_{it}$	(iii)	0.306**	0.281**	0.341**	0.354**	0.291**	(6.31)	(5.47)	(15.29)	(10.26)	(11.74)
$CDev_{it}.\ CH^{b}_{it}.\ CH^{HGO}_{it}$	(iv)	0.407**	0.332**	0.298**	0.334**	0.548**	(8.26)	(5.45)	(13.25)	(8.96)	(21.04)
F-test [(i)=(ii)]		0.28	0.16	0.00	0.28	0.55					
F-test [(iii)=(iv)]		0.10	0.43	0.12	0.63	0.00					
F-test [(i)=(iii)]		0.02	0.02	0.00	0.00	0.00					
F-test [(ii)=(iv)]		0.04	0.01	0.00	0.00	0.97					
AR2		0.10	0.39	0.04	0.26	0.00					
Observations		7,477	5,230	28,035	18,192	44,628					
Panel E – Firm age											
$CDev_{it}.\ CH^{Y}_{it}$	(i)	0.456**	0.484**	0.501**	0.531**	0.528**	(13.90)	(11.56)	(27.98)	(23.61)	(34.72)
$CDev_{it}.\ CH^{O}_{it}$	(ii)	0.358**	0.341**	0.326**	0.407**	0.440**	(13.39)	(14.03)	(30.11)	(23.14)	(32.85)
F-test [(i)=(ii)]		0.02	0.00	0.00	0.00	0.00					
AR2		0.10	0.44	0.03	0.18	0.00					
$CDev_{it}.\ CH^{a}_{it}.\ CH^{Y}_{it}$	(i)	0.586**	0.600**	0.593**	0.697**	0.603**	(12.08)	(11.23)	(22.82)	(19.66)	(27.02)
$CDev_{it}.\ CH^{a}_{it}.\ CH^{O}_{it}$	(ii)	0.447**	0.450**	0.404**	0.471**	0.504**	(11.32)	(12.28)	(23.56)	(15.04)	(24.84)
$CDev_{it}.\ CH^{b}_{it}.\ CH^{Y}_{it}$	(iii)	0.366**	0.394**	0.399**	0.319**	0.478**	(6.51)	(5.80)	(13.25)	(7.13)	(17.03)
$CDev_{it}.\ CH^{b}_{it}.\ CH^{O}_{it}$	(iv)	0.272**	0.204**	0.237**	0.354**	0.373**	(6.13)	(4.12)	(12.66)	(8.88)	(15.41)
F-test [(i)=(ii)]		0.02	0.01	0.00	0.00	0.00					
F-test [(iii)=(iv)]		0.17	0.01	0.00	0.55	0.00					
F-test [(i)=(iii)]		0.01	0.02	0.00	0.00	0.00					
F-test [(ii)=(iv)]		0.01	0.00	0.00	0.06	0.00					
AR2		0.09	0.45	0.05	0.28	0.00					
Observations		7,477	5,230	28,035	18,192	44,628					

Appendix C

Table C1: Target Cash Holdings Adjustments Conditional on Deviations from Target Cash Holdings Using Cash to Net Assets

This table presents the SYS-GMM regression results for firms' symmetric and asymmetric partial target adjustments conditional on deviations from target cash holdings using the cash to net assets measure, as modeled by Equations (4.1) and (4.4):

$$\Delta CH_{it} = \lambda_0 + \lambda_1 CDev_{it} + u_{it}, \text{ and } \Delta CH_{it} = \alpha_0 + \alpha_1 CDev_{it} CH^a_{it} + \alpha_2 CDev_{it} CH^b_{it} + v_{it},$$

where ΔCH_{it} is the change in cash holdings ratios. Target cash holdings are estimated by Equation (4.2). See Table 4.1 for variable definitions and Table 4.2 for target cash holdings estimation. $CDev_{it}$ is the difference between cash holdings in the last period and target cash holdings for the current period. CH^a_{it} (CH^b_{it}) is a dummy variable equal to 1 if cash holdings are higher than or equal to (lower than) targets and 0 otherwise. My sample includes 103,562 firm-year observations for France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients of speeds of adjustments for firms with above- and those with below-target cash holdings are equal. *AR2* reports the *p*-value of the test for no second-order serial correlation, which is asymptotically distributed as *N(0,1)* under the null hypothesis of no serial correlation. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$CDev_{it}$	0.382**		0.444**		0.392**		0.477**		0.492**	
	(13.60)		(11.21)		(33.15)		(19.52)		(25.66)	
$CDev_{it}$. CH^a_{it} (i)		0.501**		0.569**		0.492**		0.698**		0.630**
		(11.54)		(10.16)		(24.40)		(19.51)		(24.53)
$CDev_{it}$. CH^b_{it} (ii)		0.267**		0.278**		0.259**		0.247**		0.395**
		(5.28)		(3.48)		(11.63)		(6.02)		(11.73)
Constant	0.000	0.006**	-0.003**	0.008	-0.004**	0.002	-0.006**	0.009**	-0.004**	0.005**
	(-0.62)	(2.72)	(-2.66)	(1.70)	(-10.34)	(1.47)	(-6.83)	(4.18)	(-5.51)	(2.90)
AR2	0.02	0.02	0.18	0.20	0.25	0.37	0.29	0.43	0.00	0.01
F-test [(i) = (ii)]		0.00		0.01		0.00		0.00		0.00
Observations	7,477		5,230		28,035		18,192		44,628	

Table C2: Target Cash Holdings Adjustments Conditional on the Magnitude of Deviations from Target Cash Holdings Using Cash to Net Assets

This table presents the SYS-GMM regression results for firms' asymmetric partial target adjustments conditional on the magnitude of deviations from target cash holdings using the cash to net assets measure, as modeled by Equation (4.5):

$$\Delta CH_{it} = \varphi_0 + (\varphi_1 CDev_{it}^{L} + \varphi_2 CDev_{it}^{S})CDev_{it} CH_{it}^{a} + (\varphi_3 CDev_{it}^{L} + \varphi_4 CDev_{it}^{S})CDev_{it} CH_{it}^{b} + \eta_{it},$$

where ΔCH_{it} is the change in cash holdings ratios. Target cash holdings are estimated by Equation (4.2). See Table 4.1 for variable definitions and Table 4.2 for target cash holdings estimation. $CDev_{it}$ is the difference between cash holdings in the last period and target cash holdings for the current period. CH^{a}_{it} (CH^{b}_{it}) is a dummy variable equal to 1 if cash holdings are higher than or equal to (lower than) targets and 0 otherwise. $CDev^{L}_{it}$ ($CDev^{S}_{it}$) is a dummy variable equal to 1 if deviations from target cash holdings are larger than or equal to (smaller than) the median level and 0 otherwise. My sample includes 103,562 firm-year observations for France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the coefficient estimates for each pair of scenarios are equal. *AR2* reports the *p*-value of the test for no second-order serial correlation, which is asymptotically distributed as *N(0,1)* under the null hypothesis of no serial correlation. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

	France	Germany	Japan	UK	US
	(1)	(2)	(3)	(4)	(5)
$CDev_{it}.\ CH^{a}_{it}.CDev^{L}_{it}$ (i)	0.513**	0.578**	0.490**	0.715**	0.650**
	(12.29)	(10.97)	(24.81)	(19.91)	(23.10)
$CDev_{it}.\ CH^{a}_{it}.CDev^{S}_{it}$ (ii)	0.313**	0.298**	0.510**	0.347**	0.313**
	(3.68)	(2.88)	(11.73)	(5.85)	(8.61)
$CDev_{it}.\ CH^{b}_{it}.CDev^{L}_{it}$ (iii)	0.280**	0.284**	0.260**	0.244**	0.414**
	(5.79)	(3.92)	(11.94)	(6.08)	(10.98)
$CDev_{it}.\ CH^{a}_{it}.CDev^{S}_{it}$ (iv)	0.273**	0.026	0.353**	0.107	0.209**
	(3.32)	(0.24)	(7.78)	(1.71)	(5.78)
Constant	0.006**	0.008*	0.001	0.010**	0.004
	(2.70)	(1.98)	(1.29)	(4.26)	(1.60)
AR2	0.02	0.21	0.37	0.45	0.01
F-test [(i) = (ii)]	0.02	0.01	0.63	0.00	0.00
F-test [(iii) = (iv)]	0.94	0.01	0.05	0.04	0.00
F-test [(i) = (iii)]	0.00	0.00	0.00	0.00	0.00
F-test [(ii) = (iv)]	0.75	0.12	0.02	0.01	0.05
Observations	7,477	5,230	28,035	18,192	44,628

Table C3: Target Cash Holdings Adjustments Conditional on Deviations from Target Cash Holdings Using Cash to Sales

This table presents the SYS-GMM regression results for firms' symmetric and asymmetric partial target adjustments conditional on deviations from target cash holdings using the cash to sales measure, as modeled by Equations (4.1) and (4.4):

$$\Delta CH_{it} = \lambda_0 + \lambda_1 CDev_{it} + u_{it}, \text{ and } \Delta CH_{it} = \alpha_0 + \alpha_1 CDev_{it} CH^a_{it} + \alpha_2 CDev_{it} CH^b_{it} + v_{it},$$

where ΔCH_{it} is the change in cash holdings ratios. Target cash holdings are estimated by Equation (4.2). See Table 4.1 for variable definitions and Table 4.2 for target cash holdings estimation. $CDev_{it}$ is the difference between cash holdings in the last period and target cash holdings for the current period. CH^a_{it} (CH^b_{it}) is a dummy variable equal to 1 if cash holdings are higher than or equal to (lower than) targets and 0 otherwise. My sample includes 103,562 firm-year observations for France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the estimated coefficients of speeds of adjustments for firms with above- and those with below-target cash holdings are equal. *AR2* reports the *p*-value of the test for no second-order serial correlation, which is asymptotically distributed as *N(0,1)* under the null hypothesis of no serial correlation. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

	France		Germany		Japan		UK		US	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$CDev_{it}$	0.380**		0.346**		0.377**		0.392**		0.385**	
	(10.84)		(5.81)		(31.17)		(8.93)		(14.31)	
$CDev_{it}.\ CH^a_{it}$ (i)		0.601**		0.510**		0.463**		0.915**		0.627**
		(10.99)		(6.80)		(23.78)		(12.38)		(17.79)
$CDev_{it}.\ CH^b_{it}$ (ii)		0.172**		0.141		0.277**		0.153*		0.298**
		(2.97)		(1.78)		(12.27)		(2.24)		(7.40)
Constant	-0.003**	0.007**	-0.007**	0.004	-0.004**	0.000	-0.012**	0.009*	-0.007**	0.001
	(-3.99)	(3.06)	(-4.64)	(1.20)	(-12.05)	(-0.02)	(-7.03)	(2.26)	(-6.62)	(0.48)
AR2	0.86	0.84	0.08	0.11	0.25	0.18	0.18	0.12	0.73	0.74
F-test [(i) = (ii)]		0.00		0.00		0.00		0.00		0.00
Observations	7,477		5,230		28,035		18,192		44,628	

Table C4: Target Cash Holdings Adjustments Conditional on the Magnitude of Deviations from Target Cash Holdings Using Cash to Sales

This table presents the SYS-GMM regression results for firms' asymmetric partial target adjustments conditional on the magnitude of deviations from target cash holdings using the cash to sales measure, as modeled by Equation (4.5):

$$\Delta CH_{it} = \varphi_0 + (\varphi_1 CDev^L_{it} + \varphi_2 CDev^S_{it}) CDev_{it} CH^a_{it} + (\varphi_3 CDev^L_{it} + \varphi_4 CDev^S_{it}) CDev_{it} CH^b_{it} + \eta_{it},$$

where ΔCH_{it} is the change in cash holdings ratios. Target cash holdings are estimated by Equation (4.2). See Table 4.1 for variable definitions and Table 4.2 for target cash holdings estimation. $CDev_{it}$ is the difference between cash holdings in the last period and target cash holdings for the current period. CH^a_{it} (CH^b_{it}) is a dummy variable equal to 1 if cash holdings are higher than or equal to (lower than) targets and 0 otherwise. $CDev^L_{it}$ ($CDev^S_{it}$) is a dummy variable equal to 1 if deviations from target cash holdings are larger than or equal to (smaller than) the median level and 0 otherwise. My sample includes 103,562 firm-year observations for France, Germany, Japan, the UK and the US over the 1980-2007 period. Figures in parentheses are *t*-statistics. *F*-test reports the *p*-value of the *F*-test for the hypothesis that the coefficient estimates for each pair of scenarios are equal. *AR2* reports the *p*-value of the test for no second-order serial correlation, which is asymptotically distributed as *N(0,1)* under the null hypothesis of no serial correlation. ** and * indicate that the estimated coefficients are significant at the 1, and 5% levels of significance, respectively.

	France	Germany	Japan	UK	US
$CDev_{it}.\ CH^a_{it}.CDev^L_{it}$ (i)	0.619**	0.514**	0.462**	0.927**	0.670**
	(11.81)	(7.25)	(24.35)	(12.68)	(18.11)
$CDev_{it}.\ CH^a_{it}.CDev^S_{it}$ (ii)	0.493**	0.431**	0.518**	0.347**	0.164**
	(4.99)	(4.04)	(11.29)	(6.14)	(5.03)
$CDev_{it}.\ CH^b_{it}.CDev^L_{it}$ (iii)	0.177**	0.148*	0.279**	0.155*	0.307**
	(3.17)	(1.99)	(12.86)	(2.35)	(7.12)
$CDev_{it}.\ Cb^a_{it}.CDev^S_{it}$ (iv)	0.071	0.111	0.268**	0.145*	0.089**
	(0.82)	(1.11)	(6.09)	(2.00)	(2.64)
Constant	0.007**	0.004	0.000	0.010*	-0.003
	(3.46)	(1.29)	(0.13)	(2.19)	(-1.13)
AR2	0.83	0.11	0.18	0.11	0.74
F-test [(i) = (ii)]	0.19	0.49	0.22	0.00	0.00
F-test [(iii) = (iv)]	0.21	0.71	0.80	0.91	0.00
F-test [(i) = (iii)]	0.00	0.00	0.00	0.00	0.00
F-test [(ii) = (iv)]	0.01	0.04	0.00	0.03	0.12
Observations	7,477	5,230	28,035	18,192	44,628

Chapter 5: Conclusions

5.1. Introduction

In this thesis, I have empirically examined a number of important aspects of firms' leverage and cash management policies in the G-5 countries consisting of France, Germany, Japan, the UK, and the US. In particular I have discussed (1) firms' asymmetric, partial adjustments toward target leverage conditional on deviations from target leverage and financing gaps; (2) firms' choices of securities contingent on total costs of leverage adjustments and costs of adverse selection; and (3) the asymmetry in both speeds of firms' cash holdings adjustments and their mechanisms of adjustments. In this final chapter, I briefly summarize and discuss some of the major findings. I then raise some of the limitations of the study and suggest opportunities for further research.

5.2. Summary of the Results

5.2.1. The Results of Chapter 2

In this chapter I investigate how firms adjust toward their target leverage conditional on deviations from target leverage and financing gaps. Consistent with my predictions, I find empirical evidence that firms in the sample countries adjust toward their targets at speeds ranging from 0.399 (Japanese firms) to 0.495 (French firms), which are rather fast. Further, there is clear and consistent asymmetry in firms' adjustments. Over-levered firms adjust toward target leverage at rates 9-17% faster than under-levered ones. I also show empirical evidence in strong support of the argument that firms with a financing deficit may be under pressures to visit capital markets to offset it, thus having a convenient time to adjust their capital structure. Speeds of adjustments tend to be fastest among over-levered firms with a financing deficit due to both potentially high costs of financial distress and pressures to offset the deficit, which is not in line with Byoun's (2008) US evidence that over-levered firms with a financing surplus should be able to adjust the fastest. Finally, I find that speeds of adjustments may vary contingent on the magnitude of deviations from target leverage and financing gaps as well as the size mismatch between these two factors together with its size.

5.2.2. The Results of Chapter 3

In this chapter I examine how firms' choices of securities are shaped by allowing the main themes of both the pecking-order and trade-off theories to be simultaneously considered. I find that firms' deviations from target leverage are likely to affect their choices of securities in the manner suggested by the trade-off theory with under-levered firms being consistently more likely to issue debt. There is strong evidence that over-levered firms attempt to adjust toward their targets through debt retirements. Under-levered firms (except for German and Japanese firms) are also less likely to retire debt to avoid further deviations from target leverage.

I then let firms' deviations from target leverage interact with their financing gaps and show that firms' choices of securities may be explained by both the pecking-order and trade-off theories, particularly when these two theories have similar predictions on such choices. Consistent with both theories, I show that firms that would be considered as being over-levered by the trade-off theory with a financing surplus are less likely to issue debt (except for German firms) but more likely to retire it (across all countries). However, firms that would be considered as being under-levered by the trade-off theory with a financing deficit are more likely to issue debt (across all the sample countries) but less likely to retire it (except for French and German firms).

When the pecking-order and trade-off theories have conflicting predictions, there tends to be mixed and/or weak evidence that on balance seems to lend relatively more support to the pecking-order view. Firms that would be considered as being over-levered by the trade-off theory with a financing deficit are more likely to issue debt (except for French firms) but less likely to retire it (particularly relevant to Japanese firms). Firms that would be considered as being under-levered by the trade-off theory with a financing surplus are less likely to issue debt (except for French and German firms) but more likely to retire it (particularly relevant to Japanese firms), a finding also in line with the pecking-order argument. These findings, to some extent, are consistent with Leary and Roberts (2010) that firms' debt capacities and costs of adverse selection associated with information asymmetries can explain the majority of firms' observed debt and equity issues.

I also investigate how firms' issue/repurchase (retirement) size may be jointly determined by their deviations from target leverage and financing gaps. The results for the issue/repurchase (retirement) size models show patterns which are closely similar to those of the main logistic models.

Following recent developments in the literature (e.g., Leary and Roberts (2010), and de Jong et al. (2011)), in a robustness check, I investigate the impact of firms' debt capacities on their financing decisions. The results show that the probability of debt issues among firms that would be considered as being over-levered by the trade-off theory with a financing deficit is higher when their actual leverage exceeds their debt capacities by only small amounts. Firms that would be considered as being over-levered by the trade-off theory with a financing surplus, however, are more likely to retire debt in the presence of small unused debt capacities. These findings to some extent would confirm the need to consider firms' debt capacities when investigating their financing decisions.

In brief, I empirically show that firms' choices of securities may be influenced by costs of adverse selection proposed by the pecking-order theory even when they have target leverage and adjust toward it over time. This is in line with Myers' (2001) and Byoun's (2008) that the pecking-order and trade-off theories should be viewed as "close mates" rather than "racing horses" when examining firms' financing decisions.

5.2.3. The Results of Chapter 4

In the previous two chapters, I examine firms' financing decisions which are largely related to adjustments in cash flows from financing (*CFF*) and hence assume any adjustments in cash flows from operating (*CFO*) and cash flows from investing (*CFI*) are exogenous, independent of leverage management. In this chapter I explicitly account for these to investigate the asymmetry in both firms' speeds of cash holdings adjustments and their mechanisms of adjustments. I find empirical evidence that on average firms adjust toward their target cash holdings between 2 and 2.5 years (at speeds of adjustments of 0.393, 0.406, 0.401, 0.462, and 0.484, respectively). More importantly, I find clear asymmetry in firms' cash holdings adjustments. In particular, firms with above-target cash holdings experience speeds from 0.487 (French firms) to 0.570 (UK firms) which are significantly faster than those of firms with below-target cash holdings.

Examining the possible mechanisms of adjustments undertaken by firms conditional on whether they have above- or below-target cash holdings, I show why speeds of adjustments may vary between these two groups of firms. In addition to adjustments in *CFF*, firms may also adjust toward their target cash holdings through adjustments in *CFO* and *CFI*. Firms with excess cash holdings are likely to reduce *CFF* and *CFO* and increase *CFI*, while those with below-target cash holdings are likely to do the opposite (e.g., to increase *CFF* and *CFO* and reduce *CFI*). Since the mechanisms undertaken by firms with above-target cash holdings may incur lower costs than those undertaken by firms with below-target cash holdings, the former firms can adjust toward their target cash holdings relatively faster.

I further show some empirical evidence on how the magnitude of firms' deviations from target cash holdings may affect their target adjustments. In support of the "shared" fixed cost argument, I find that firms with large deviations from targets are likely to adjust toward their target cash holdings faster due to lower incremental costs of adjustments. In line with agency theories, compared to firms with small excess cash holdings, those with large excessive cash holdings are likely to experience faster speeds of adjustments since costs associated with the free cash flow problem may be more significant for them. Firms with a substantial cash shortage may also adjust faster than those with a small cash shortage as they are more likely to suffer from operational problems and have to give up positive *NPV* investments.

Finally, I conduct several robustness checks to see how firms' target cash holdings adjustments may be affected by their access to bank lines of credit, precautionary motive, financial constraints, and corporate life-cycle. I show empirical evidence in favor of the prediction that firms experience faster speeds of adjustments in the presence of less access to bank lines of credit (smaller size), stronger precautionary motive (higher cash flow volatility and lower dividend payout), more financial constraints (more growth opportunities), and lower level of maturity (younger age). These factors (except for firm age), however, when interacted with deviations from target cash holdings, tend to have a less significant impact on firms' target adjustments, suggesting that firms' deviations from target cash holdings may be the major driver of these adjustments.

5.3. Limitations and Opportunities for Future Research

In spite of my attempts to produce rigorous empirical evidence, my study is still subject to a number of limitations which may undermine the reliability and robustness of its major findings. These limitations consist of but are not limited to the following:

First, in Chapter 2, I examine the impact of firms' deviations from target leverage and financing gaps on their partial leverage adjustments. In doing so I only test the trade-off theory. However, as suggested by Myers (2001), Byoun (2008), and de Jong et al. (2011), the validity of such an assumption may be challenged since alternative corporate capital structure views may also have some impact on these decisions. Indeed, in Chapter 3, allowing the major themes of both the trade-off and pecking-order theories to be considered while shedding light on firms' choices of securities, I find that costs of adverse selection proposed by the pecking-order view may have significant influence on these choices.

Second, in Chapter 3, to figure out major drivers of firms' choices of securities, I choose to employ asymmetric, logistic models to predict firms' financing decisions basing on the past statuses of their fundamentals and deviations from target leverage and current financing imbalances. The major weaknesses of these models consist of their ability to allow only two optional financing decisions to be simultaneously considered and their failure to provide an insight into the amounts of securities to be issued/retired (repurchased) under each decision.

Third, in Chapter 4, to support the argument about the asymmetry in both firms' speeds of cash holdings adjustments and mechanisms of adjustments, I argue that costs associated with adjustments in *CFF*, *CFO*, and *CFI* among firms with below-target cash holdings may be relatively lower than those for firms with above-target cash holdings. While the explanations on the adjustments in *CFF* are rather reasonable since it should be less costly for firms to retire debt or repurchase equity than to issue these securities as documented by a vast body of literature on corporate leverage, those on the adjustments in *CFO* and *CFI* are far from clear and persuasive. For example, one may always challenge whether firms with too much excess cash which get rid of the excess cash by investing in negative *NPV* projects may experience a more or less significant fall in their values than those with a significant cash shortage and hence have to forgo future cash flows generated by positive *NPV* projects. Further research on such critical issues therefore is warranted.

My study gives rise to several interesting research questions for further studies. First, in Chapter 2 and Chapter 3, when examining firms' partial leverage adjustments and their choices of securities, I assume that any adjustments in firms' *CFO* and *CFI* are exogenous to their leverage adjustments. My findings in Chapter 4, however, suggest that adjustments in these two groups of cash flows are far from unimportant. Hennessy and Whited (2005) indeed show that the interaction between firms' financing and investment decisions has a significant impact on their target adjustments. As a result, better asymmetric, partial models of leverage adjustments which can account for adjustments in *CFO* and *CFI* may substantially expand our knowledge on firms' leverage management policies.

Besides, while examining firms' partial cash holdings adjustments, I find some link between cash management and leverage management among firms with below-target cash holdings which tend to be over-levered in the last accounting period and hence experience a very small rise in *CFF* in the current accounting period. Such a link, however, is not found among firms with above-target cash holdings as these firms still experience negative debt issues regardless of being under-levered. Hence, further research on the possible interaction between these two important financing processes would be interesting and provide a further insight into firms' cash and leverage management policies.

References

Agca, S., and A. Mozumdar. "Corporate Financing Choices Constrained by the Amount of Debt Firms Can Support." *Working Paper*, (2007), George Washington University and Virginia Tech.

Akerlof, G. "The Market for "Lemons": Quality Uncertainty and the Market Mechanism." *Quarterly Journal of Economics*, **84** (1970), 488-500.

Allen, F.; A. Bernardo; and I. Welch. "A Theory of Dividends Based on Tax Clienteles." *Journal of Finance*, **55** (2000), 2499-2536.

Almeida, H.; M. Campello; and M. Weisbach. "Corporate Demand for Liquidity." *Working Paper*, (2002), University of Illinois and New York University.

Almeida, H.; M. Campello; and M. Weisbach. "The Cash Flow Sensitivity of Cash." *Journal of Finance*, **59** (2004), 1777-1804.

Alti, A. "How Persistent Is the Impact of Market Timing on Capital Structure?" *Journal of Finance*, **61** (2006), 1681-1710.

Ando, A.; D. Christelis; and T. Miyagawa. "Inefficiency of Corporate Investment and Distortion of Savings Behavior in Japan." In M. Blomstrom et. al. eds., *Structural Impediments to Growth in Japan* (2003), 155-190, Chicago: University of Chicago Press.

Ang, J., and D. Peterson. "Optimal Debt versus Debt Capacity: A Disequilibrium Model of Corporate Debt Behavior." In Chen, A.W., ed. *Research in Finance*, **6** (1986), JAI Press.

Antoniou, A.; Y. Guney; and K. Paudyal. "The Determinants of Capital Structure: Capital Market-Oriented Versus Bank-Oriented Institutions." *Journal of Financial and Quantitative Analysis*, **43** (2008), 59-92.

Arellano, M., and O. Bover. "Another Look at the Instrumental Variable Estimation of Error-Components Models." *Journal of Econometrics*, **68** (1995), 29-51.

Arellano, M., and S. Bond. "Some Tests of Specification for Panel Data: Monte-Carlo Evidence and an Application to Employment Equations." *Review of Economic Studies*, **38** (1991), 277-297.

Baker, M., and J. Wurgler. "Market Timing and Capital Structure." *Journal of Finance*, **57** (2002), 1-32.

Baker, M., and J. Wurgler. "Signaling with Reference Points: Behavioral Foundations for the Lintner Model of Dividends." *Working Paper*, (2010), New York University.

Baker, M.; S. Nagel; and J. Wurgler. "The Effect of Dividends on Consumption." *Brookings Papers on Economic Activity*, **1** (2007), 231-291.

Bates, T.; K. Kahle; and R. Stulz. "Why Do U.S. Firms Hold so Much More Cash than They Used to?" *Journal of Finance*, **64** (2009), 1985-2021.

Baumol, W. "The Transactions Demand for Cash: An Inventory Theoretic Approach." *Quarterly Journal of Economics*, **66** (1952), 545-556.

Bhattacharya, S. "Imperfect Information, Dividend Policy, and the 'Bird in the Hand' Fallacy." *Bell Journal of Economics*, **10** (1979), 259-270.

Bliss, R., and R. Rosen. "CEO Compensation and Bank Mergers." *Journal of Financial Economics*, **61** (2001), 107-138.

Blundell, R., and S. Bond. "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models." *Journal of Econometrics*, **87** (1998), 115-143.

Blundell, R.; S. Bond; M. Devereux; and F. Schiantarelli. "Investment and Tobin's Q." *Journal of Econometrics*, **51** (1992), 233-257.

Bowsher, C. "On Testing Over-Identifying Restrictions in Dynamic Panel Data Models." *Economics Letters*, **77** (2002), 211-220.

Bradley, M.; G. Jarrell; and E. Kim. "On the Existence of an Optimal Capital Structure: Theory and Evidence." *Journal of Finance*, **39** (1984), 857-878.

Brav, A.; J. Graham; C. Harvey; and R. Michaely. "Payout Policy in the 21st Century." *Journal of Financial Economics*, **77** (2005), 483-527.

Brealey, R.; Myers, S.; and F. Allen. "*Principles of Corporate Finance*." McGraw-Hill (2010), New York.

Brennan, M., and A. Thakor. "Shareholder Preferences and Dividend Policy." *Journal of Finance*, **45** (1990), 993-1018.

Brown, J., and B. Petersen. "Cash Holdings and R&D Smoothing." *Journal of Corporate Finance*, **17** (2011), 694-709.

Byoun, S. "How and When Do Firms Adjust their Capital Structures toward Targets?" *Journal of Finance*, **63** (2008), 3069-3098.

Chang, X., and S. Dasgupta. "Target Behavior and Financing: How Conclusive Is the Evidence?" *Journal of Finance*, **64** (2009), 1767-1796.

Chiang, W., and G. Monahan. "Managing Inventories in a Two-Echelon Dual-Channel Supply Chain." *European Journal of Operational Research*, **162** (2005), 325-341.

Dang, V.; M. Kim; and Y. Shin. "In Search for a Robust Method for Estimating Dynamic Panel Data Models of Capital Structure." *Working Paper*, (2010), University of Manchester and University of Leeds.

Dang, V.; M. Kim; and Y. Shin. "Testing the Dynamic Trade-off Theory of Capital Structure: An Empirical Analysis." *Working Paper*, (2012), University of Manchester and University of Leeds.

de Jong, A.; M. Verbeek; and P. Verwijmeren. "Firms' Debt-Equity Decisions when the Static Trade-Off Theory and the Pecking-Order Theory Disagree." *Journal of Banking and Finance*, **35** (2011), 1303-1314.

de Jong, A.; R. Kabir; and T. Nguyen. "Capital Structure around the World: The Roles of Firm- and Country-Specific Determinants." *Journal of Banking and Finance*, **32** (2008), 1954-1969.

DeAngelo, H., and L. DeAngelo. "Capital Structure, Payout Policy, and Financial Flexibility". *Working Paper*, (2007), University of Southern California.

DeAngelo, H., and R. Masulis. "Optimal Capital Structure under Corporate and Personal Taxation." *Journal of Financial Economics*, **8** (1980), 3-29.

DeMarzo, P., and Y. Sannikov. "Learning in Dynamic Incentive Contracts." *Working Paper*, (2008), Stanford University.

Dittmar, A., and A. Thakor. "Why Do Firms Issue Equity?" *Journal of Finance*, **52** (2007), 1-54.

Dittmar, A., and J. Mahrt-Smith. "Corporate Governance and the Value of Cash Holdings." *Journal of Financial Economics*, **83** (2007), 599-634.

Dittmar, A., and R. Duchin. "The Dynamics of Cash." *Working Paper*, (2010), University of Michigan.

Dittmar, A., and R. Duchin. "The Dynamics of Cash." *Working Paper*, (2011), University of Michigan.

Dittmar, A.; J. Mahrt-Smith; and H. Servaes. "International Corporate Governance and Corporate Cash Holdings." *Journal of Financial and Quantitative Analysis*, **38** (2003), 111-133.

Elliott, W.; J. Koëter-Kant; and R. Warr. "Market Timing and the Debt-Equity Choice." *Journal of Financial Intermediation*, **17** (2008), 175-197.

Elsas, R., and D. Florysiak. "Dynamic Capital Structure Adjustment and the Impact of Fractional Dependent Variables." *Working Paper*, (2011), University of Munich.

Fama, E., and K. French. "Financing Decisions: Who Issues Stock?" *Journal of Financial Economics*, **76** (2005), 549-582.

Fama, E., and K. French. "Testing Trade-Off and Pecking-Order Predictions about Dividends and Debt." *Review of Financial Studies*, **15** (2002), 1-33.

Faulkender, M.; M. Flannery; K. Hankins; and J. Smith. "Cash Flows and Leverage Adjustments." *Journal of Financial Economics*, **103** (2012), 632-646.

Fazzari, S.; R. Hubbard; and B. Petersen. "Financing Constraints and Corporate Investment." *Brooking Papers on Economic Activity*, **1** (1988), 141-195.

Fischer, E.; R. Heinkel; and J. Zechner. "Dynamic Capital Structure Choice: Theory and Tests." *Journal of Finance*, **44** (1989), 19-40.

Flannery, M., and K. Hankins. "Estimating Dynamic Panel Models in Corporate Finance. *Working Paper*, (2011), University of Florida and University of Kentucky.

Flannery, M., and K. Rangan. "Partial Adjustment toward Target Capital Structures." *Journal of Financial Economics*, **79** (2006), 469-506.

Foley, C.; J. Hartzell; S. Titman; and G. Twite. "Why Do Firms Hold So Much Cash? A Tax-Based Explanation." *Journal of Financial Economics*, **86** (2007), 579-607.

Frank, M., and Goyal, V. "Testing the Pecking-Order Theory of Capital Structure." *Journal of Financial Economics*, **67** (2003), 47-55.

Frank, M., and Goyal, V. "The Effect of Market Conditions on Capital Structure Adjustment." *Finance Research Letters*, **1** (2004), 217-248.

Frank, M., and Goyal, V. "Trade-off and Pecking Order Theories of Debt." In Espen Eckbo (ed.) *The Handbook of Empirical Corporate Finance*, Elsevier Science, Chapter 12 (2008), 135-197.

Fudenberg, D., and J. Tirole. "A Theory of Income and Dividend Smoothing Based on Incumbency Rents." *Journal of Political Economy*, **103** (1995), 75-93.

Fukuda, A., and S. Hirota. "Main Bank Relationships and Capital Structure in Japan." *Journal of the Japanese and International Economies*, **10** (1996), 250-261.

Gao, N. "The Adverse Selection Effect of Corporate Cash Reserve: Evidence from Acquisitions Solely Financed by Stock." *Journal of Corporate Finance*, **17** (2011), 789-808.

Goldstein, R.; N. Ju; and H. Leland. "An EBIT-Based Model of Dynamic Capital Structure." *Journal of Business*, **74** (2001), 483-512.

Graham, R., and Leary, M. “A Review of Capital Structure Research and Directions for the Future.” *Annual Review of Financial Economics*, **3** (2011), 309-345.

Green, W. “*Econometric Analysis*.” Pearson Prentice Hall (2008), New Jersey.

Guan, W. “From the Help Desk: Bootstrapped Standard Errors.” *The Stata Journal*, **3** (2003), 71-80.

Guttman, I.; O. Kadan; and E. Kandel. “Dividend Stickiness and Strategic Pooling.” *Review of Financial Studies*, **23** (2010), 4455-4495.

Hall, A. “*Generalized Methods of Moments*.” Oxford University Press (2005).

Han, S., and J. Qiu. “Corporate Precautionary Cash Holdings.” *Journal of Corporate Finance*, **13** (2007), 43-57.

Hansen, L. (1982). “Large Sample Properties of Generalized Method of Moments Estimators.” *Econometrica*, **50** (1982), 1029-1054.

Harford, J. “Corporate Cash Reserves and Acquisitions.” *Journal of Finance*, **54** (1999), 1969-1997.

Harford, J., and K. Li. “Decoupling CEO Wealth and Firm Performance: The Case of Acquiring CEOs.” *Journal of Finance*, **62** (2007), 917-949.

Harford, J.; S. Mansi; and W. Maxwell. “Corporate Governance and Firm Cash Holdings.” *Journal of Financial Economics*, **87** (2008), 535-555.

Harris, M., and A. Raviv. “The Theory of Capital Structure.” *Journal of Finance*, **46** (1991), 297-355.

Hennessy, C., and T. Whited. “Debt Dynamics.” *Journal of Finance*, **60** (2005), 1129-1165.

Hovakimian, A. “Are Observed Capital Structures Determined by Equity Market Timing?” *Journal of Financial and Quantitative Analysis*, **41** (2006), 221-243.

Hovakimian, A. “The Role of Target Leverage in Security Issues and Repurchases.” *Journal of Business*, **77** (2004), 1041-1071.

Hovakimian, A., and G. Li. “In Search of Conclusive Evidence: How to Test for Adjustment to Target Capital Structure.” *Journal of Corporate Finance*, **17** (2011), 33-44.

Hovakimian, A.; T. Opler; and S. Titman. “The Debt-Equity Choice.” *Journal of Financial and Quantitative Analysis*, **36** (2001), 1-24.

Huang, R., and J. Ritter. “Testing Theories of Capital Structure and Estimating the Speed of Adjustment,” *Journal of Financial and Quantitative Analysis*, **44** (2009), 237-271.

Jensen, M. “Agency Cost of Free Cash Flows, Corporate Finance, and Takeovers.” *American Economic Review*, **76** (1986), 323-329.

Jensen, M., and W. Meckling. “Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure.” *Journal of Financial Economics*, **3** (1976), 305-360.

John, K., and J. Williams. “Dividends, Dilution, and Taxes: A Signaling Equilibrium.” *Journal of Finance*, **40** (1985), 1053-1070.

Kayhan, A., and S. Titman. “Firms' Histories and Their Capital Structure.” *Journal of Financial Economics*, **83** (2007), 1-32.

Kim, C.; D. Mauer; and A. Sherman. “The Determinants of Corporate Liquidity: Theory and Evidence.” *Journal of Financial and Quantitative Analysis*, **33** (1998), 335-360.

Klein, L.; T. O’Brien; and S. Peters. “Debt versus Equity and Asymmetric Information: A Review.” *The Financial Review*, **37** (2002), 317-350.

Korajczyk, R., and A. Levy. “Capital Structure Choice: Macroeconomic Conditions and Financial Constraints.” *Journal of Financial Economics*, **68** (2003), 75-109.

Korajczyk, R.; D. Lucas; and R. McDonald. “Equity Issues with Time-Varying Asymmetric Information.” *Journal of Financial and Quantitative Analysis*, **27** (1992), 397-417.

Kraus, A., and R. Litzenberger. “A State-Preference Model of Optimal Financial Leverage.” *Journal of Finance*, **33** (1973), 911-922.

Kumar, P. “Shareholder-Manager Conflict and the Information Content of Dividends.” *Review of Financial Studies*, **1** (1988), 111-136.

Kumar, P., and B. Lee. “Discrete Dividend Policy with Permanent Earnings.” *Financial Management*, **30** (2001), 55-76.

La Porta R.; F. Lopez-de-Silanes; A. Shleifer; and R. Vishny. “Legal Determinants of External Finance.” *Journal of Finance*, **52** (1997), 1131-1150.

La Porta, R.; F. Lopez-de-Silanes; A. Shleifer; and R. Vishny. “Law and Finance.” *Journal of Political Economy*, **106** (1998), 1113-1155.

Lambrecht, B., and S. Myers. “A Lintner Model of Dividends and Managerial Rents.” *Working Paper*, (2010), MIT Sloan School.

Leary, M., and M. Roberts. “Do Firms Rebalance Their Capital Structure?” *Journal of Finance*, **60** (2005), 2575-2619.

Leary, M., and M. Roberts. “The Pecking-Order, Debt Capacity and Information Asymmetry.” *Journal of Financial Economics*, **95** (2010), 332-355.

Lee, B., and J. Suh. "Cash Holdings and Share Repurchases: International Evidence." *Journal of Corporate Finance*, **17** (2011), 1306-1329.

Leftwich, R., and M. Zmijewski. "Contemporaneous Announcements of Dividends and Earnings." *Journal of Accounting, Auditing, and Finance*, **9** (1994), 725-762.

Lemmon, M., and J. Zender. "Debt Capacity and Tests of Capital Structure Theories." *Journal of Financial and Quantitative Analysis*, **45** (2010), 1161-1187.

Lemmon, M.; M. Roberts; and J. Zender. "Back to the Beginning: Persistence and the Cross-Section of Corporate Capital Structure." *Journal of Finance*, **63** (2008), 1575-1608.

Lockhart, G. "Adjusting to Target Capital Structure: The Effect of Credit Lines." *Working Paper*, (2009), University of Florida.

Mackie-Mason, J. "Do Taxes Affect Corporate Financing Decisions?" *Journal of Finance*, **45** (1990), 1471-1494.

Mahajan, A., and S. Tartaroglu. "Equity Market Timing and Capital Structure: International Evidence." *Journal of Banking and Finance*, **32** (2008), 754-766.

Mao, C. "Interaction of Debt Agency Problems and Optimal Capital Structure: Theory and Evidence." *Journal of Financial and Quantitative Analysis*, **38** (2003), 399-423.

Marsh, P. "The Choice between Equity and Debt: An Empirical Study." Journal *of Finance*, **37** (1982), 121-144.

Miller, M. "Debt and Taxes." *Journal of Finance*, **32** (1977), 261-275.

Miller, M., and D. Orr. "A Model of the Demand for Money by Firms." *Quarterly Journal of Economics*, **80** (1966), 413-435.

Miller, M., and F. Modigliani. "Dividend Policy, Growth and the Valuation of Shares." *Journal of Business*, **34** (1961), 411-433.

Miller, M., and K. Rock. "Dividend Policy under Asymmetric Information." *Journal of Finance*, **40** (1985), 1031-1051.

Miller, M., and M. Scholes. "Dividends and Taxes." *Journal of Financial Economics*, **6** (1978), 333-364.

Minton, B., and C. Schrand. "The Impact of Cash Flow Volatility on Discretionary Investment and the Costs of Debt and Equity Financing." *Journal of Financial Economics*, **54** (1999), 423-460.

Modigliani, F., and M. Miller. "Corporate Income Taxes and the Cost of Capital: A Correction." *American Economic Review*, **53** (1963), 433-443.

Modigliani, F., and M. Miller. "The Cost of Capital, Corporate Finance and the Theory of Investment." *American Economic Review*, **48** (1958), 261-297.

Mulligan, C.B. "Scale Economies, the Value of Time, and the Demand for Money: Longitudinal Evidence from Firms." *Journal of Political Economy*, **105** (1997), 1061-1079.

Myers, S. "Capital Structure." *Journal of Economic Perspectives*, **15** (2001), 81-102.

Myers, S. "Determinants of Corporate Borrowing." *Journal of Financial Economics*, **5** (1977), 147-175.

Myers, S. "The Capital Structure Puzzle." *Journal of Finance*, **39** (1984), 575-592.

Myers, S., and N. Majluf. "Corporate Financing and Investment Decisions When Firms Have Information that Investors Do not." *Journal of Financial Economics*, **13** (1984), 187-221.

Newey, W. "A Method of Moments Interpretation of Sequential Estimators." *Economic Letters*, **14** (1984), 201-206.

Nickell, S. "Biases in Dynamic Models with Fixed Effects." *Econometrica*, **49** (1981), 1417-1426.

Opler, T.; L. Pinkowitz; R. Stulz; and R. Williamson. "The Determinants and Implications of Corporate Cash Holdings." *Journal of Financial Economics*, **52** (1999), 3-46.

Ozkan, A. "Determinants of Capital Structure and Adjustment to Long Run: Target Determinants of Capital Structure and Adjustment to Long Run Target." *Journal of Business Finance and Accounting*, **28** (2001), 175-198.

Ozkan, A., and N. Ozkan. "Corporate Cash Holdings: An Empirical Investigation of UK Companies." *Journal of Banking and Finance*, **28** (2004), 2103-2134.

Öztekin, Ö., and Flannery, M. "Institutional Determinants of Capital Structure Adjustment Speeds." *Journal of Financial Economics*, **103** (2012), 88-112.

Pagan, A. "Econometric Issues in the Analysis of Regressions with Generated Regressors." *International Economic Review*, **25** (1984), 221-247.

Petersen, A. Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches. *Review of Financial Studies*, **22** (2009), 435-480.

Pinkowitz, L., and R. Williamson. "Bank Power and Cash Holdings: Evidence from Japan." *Review of Financial Studies*, **14** (2001), 1059-1082.

Rajan, R., and L. Zingales. "What Do I Know about Capital Structure? Some Evidence from International Data." *Journal of Finance*, **50** (1995), 1421-1260.

Riddick, L., and T. Whited. “The Corporate Propensity to Save.” *Journal of Finance*, **64** (2009), 1729-1766.

Rozeff, M. “Growth, Beta and Agency Costs as Determinants of Dividend Payout Ratios.” *Journal of Financial Research*, **5** (1982), 249-259.

Shyam-Sunder, L., and S. Myers. “Testing Static Trade-Off against Pecking-Order Models of Capital Structure.” *Journal of Financial Economics*, **51** (1999), 219-244.

Smith, W., and B. Warner. “Bankruptcy, Secured Debt, and Optimal Capital Structure Comment.” *Journal of Finance*, **34** (1979), 247-251.

Strebulaev, I. “Do Tests of Capital Structure Theory Mean What They Say?” *Journal of Finance*, **62** (2007), 1747-1787.

Stulz, R. “Managerial Discretion and Optimal Financing Policies.” *Journal of Financial Economics*, **26** (1990), 3-27.

Sufi, A. “Bank Lines of Credit in Corporate Finance: An Empirical Analysis.” *Review of Financial Studies*, **22** (2009), 1057-1088.

Taggart, R. “A Model of Corporate Financing Decisions.” *Journal of Finance*, **32** (1977), 1467-1484.

Titman, S., and R. Wessels. “The Determinants of Capital Structure.” *Journal of Finance*, **43** (1988), 1-19.

Venkiteshwaran, V. “Partial Adjustment toward Optimal Cash Holding Levels.” *Review of Financial Economics*, **20** (2011), 113-121.

Welch, I. “Capital Structure and Stock Returns.” *Journal of Political Economy*, **112** (2004), 106-131.

Wu, W.; O. Rui; and C. Wu. “Trade Credit, Cash Holdings, and Financial Deepening: Evidence from a Transitional Economy.” *Journal of Banking and Finance*, April (2011).