2017 Doctor's Thesis

Three Essays in Corporate Financial Policy

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Abstract

This dissertation includes three essays in corporate financial policy. The first essay examines the factors that determine the variation in leverage ratios of non-financial firms listed on the First and Second Section of Tokyo Stock Exchange. This study finds that leverage ratios of Japanese firms remain stable over long term. High levered firms continue to be high leveraged and low levered firms continue to be low leveraged even twenty years after the initial observation period. Almost 70% of the variation in leverage ratios can be explained by the firm fixed effect. Keiretsu membership is found to have a significant positive impact on firms leverage ratios, which is more pronounced during the pre-bubble period. The second essay is related to the determinants of capital structure of private firms. Private firms have significantly higher leverage than the public firms. Private firms leverage ratio exhibit even greater persistence than the public firms. The adjustment speed to target leverage ratio is slower for private firms than public firms reflecting the high cost of adjustment for private firms. This third essay investigates the announcement effect of cash dividend changes on share prices listed on the Dhaka Stock Exchange. This study finds that shareholders earn only normal return on the announcement of dividend increase although significant positive abnormal return is observed in the preannouncement period. The announcement of dividend decrease results in a significant negative abnormal return on the announcement day and persists even twenty days after the announcement. Information content of dividend has a little explanatory power for an emerging market like Bangladesh.

Keywords: Capital structure, Leverage, Determinants, Stability, Cash dividend, announcement effect, abnormal returns, information signaling.

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Chapter 1

Introduction

1.1 Background of the study

Financial policy is one of the most researched topics in corporate finance. Many theories and ideas have been used to explain the effect of financial policy. Although there has been controversy regarding its impact on firm value, the existence of market imperfections clearly justifies the importance of financial policy. The first essay of this dissertation talks about one of the puzzling issues in corporate finance. How the capital structure decisions are made? What are the factors that influence the capital structure decisions? Why do some firms use more leverage than others? Since, most of the empirical studies are done on public firms, the second essay of this dissertation focus on how the private firm`s capital structure decisions are made. Private firms have limited access to external equity and debt market. Information asymmetry and ownership concentration prevalent in private firms are likely to increase the costs of debt in private firms. Thus it is important to investigate whether these differences result in differences in capital structure between private and public firms. Finally, the third essay of the dissertations is about announcement effect of cash dividend changes on share price in Dhaka Stock Exchange. Dividend policy is considered another unresolved issue in corporate finance. Ambiguity still exists regarding the motivation behind the dividend payment. Dividend reduces the amount of fund available for future investment. Instead of paying dividend, money could be reinvested which increases the value of share. Tax on dividend is often higher than the tax on capital gain. Despite the drawback, announcement of dividend increase (decrease) is often accompanied by the share price increase (decrease). Most of the empirical studies are done on the developed market. This study is

carried out on the DSE to find out whether dividend acts as a signaling device in an emerging market.

1.2 The determinants of capital structure: Evidence from Japan

Why do some firms prefer to take on more leverage than others? What factors influence firms` capital structure decisions? Financial researchers have proposed a large number of theories and ideas to explain the capital structure dynamics. The trade-off theory and pecking order theory are the two most important theories that explain the capital structure decisions. According to trade-off theory, there are some costs and benefits of financing. Firm will choose a target leverage ratio by balancing the costs and benefits of financing. Optimal leverage ratio will minimize the costs and maximize the firm`s value. According to pecking order theory, because of asymmetric information between managers and outside investors, firm will follow a hierarchy of financing. Firm prefers to use internal equity first, followed by debt and only in extreme circumstances equity is issued.

Many empirical studies have been conducted following these theories. Bradley et al. (1984), Titman and Wessels (1988), Razan and Zingales (1995), Frank and Goyal (2009) among others find evidence consistent with trade-off theory. However, many firms use lower leverage than would maximize the value of the firm (Miller (1977), Graham (2000) and Ju et al. (2005)). The negative relationship observed between leverage and profitability, one of the shortcomings of the trade-off theory, can be explained by pecking order theory (Myers and Majluf, 1984). Shyam-Sunder and Myers (1999) show that much of the time series variation in debt ratios can be explained by the pecking order rather than trade-off model. However, Frank and Goyal (2003) find that pecking order theory is mostly applicable to mature firms and small firms issue more equity (Fama and French,

2005) which goes against this theory. Empirical evidence in favor of these theories is mixed. Despite having many useful insights to capital structure decisions, none of these theories provide a unified framework that can simultaneously account for many empirical facts.

To add to this already existing puzzle, Lemmon, Roberts and Zender (2008) find that leverage ratios of US firms remain stable over long term. They show that leverage ratio exhibit two important features- convergence and persistency. The leverage ratios of very high, high, medium leverage portfolios fall and low leverage portfolio increases in the short run. However, leverage ratios of very high leverage portfolio remain higher than that of any other portfolios and leverage ratios of low leverage portfolio remain lower than that of any other portfolio even twenty years after the portfolio is formed. Cross-sectional differences in leverage ratios cannot be explained by the time-varying determinants. Almost 60% of the variation in leverage ratios can be explained by the firm fixed effect whereas only 30% of the variation in leverage ratios can be explained by the time-varying determinants only. An unobserved factor, missing from the existing model, explains most of the variation in leverage ratios.

The objective of this study is to examine the factors that determine the capital structure of Japanese firms. Since recent studies reveal that traditional capital structure theories cannot explain all the variation in leverage ratios, I investigate the capital structure determinants in a different environment. Japan has some major differences as well as similarities with the US. Japanese firms traditionally relied on bank loans as a major source of financing. However, capital market began to play a major role since the financial big bang had been initiated. Japan also has a unique institutional settings

characterized by keiretsu form of industrial organization. All these justify Japan is unique to test whether same empirical regularities are observed in a different environment.

Our sample firms include non-financial firms listed on the first and second sections of Tokyo Stock Exchange. Following Lemmon et al. (2008), we form four portfolios based on leverage ratios to observe the changes in leverage ratios in the following twenty years. We carefully replicate their approach to find any significant differences. Leverage ratios of Japanese firms' exhibit convergence and persistency as observed in the US. The study finds cross-sectional dispersion in the initial period is very high. The range of average book (market) leverage is 50% (52%) when the portfolio is formed. Over time the differences in leverage ratios fall. After 20 years, the very high book leverage portfolio declined from 82% to 65%, whereas the low book leverage portfolio increased from 32% to 36%. Likewise, the very high market leverage portfolio also decreased from 74% to 66% and the low market leverage portfolio increased from 22% to 37%. Although leverage ratios of portfolios converge in the short run, the difference between these portfolios exists even twenty years after the portfolio is formed.

The persistency in leverage ratios implies that firm`s future leverage ratios are anchored on its past leverage ratios. Regression analysis shows initial leverage ratios is significantly positively related to firms future leverage ratios. Even when other time varying determinants are included in the model the relationship remains highly significant. It implies that a certain part of initial leverage ratio remain fixed for long term. The adjusted R-squares from a regression of leverage on traditional capital structure determinants range from 25% to 39% based on model specifications. Conversely, adjusted R-square from a regression of leverage on firm fixed effect shows 70% of the variation in leverage ratios can be explained by the firm fixed effect only, which indicates

most of the variations in leverage ratios is cross sectional which cannot be explained by the traditional capital structure determinants. The parameter estimates in pooled OLS regression fall by 40%, on an average, when fixed effect regression is used. Thus the parameter estimates in traditional leverage regression is inefficient where unobserved firm specific factors are ignored.

Among the time varying determinants, profitability is significantly negatively related to leverage which is consistent with the pecking order theory. Consistent with trade-off theory, leverage ratio is positively related to industry median leverage ratios, firm size and tangibility. Age is positively related to leverage; older firms have higher leverage than young firms. Keiretsu dummy used as an indicator of unique institutional characteristics of Japanese firms shows that it indeed has a positive impact on firms future leverage ratio.

This study contributes to the existing literature in several ways. First, this study provides evidence of a new feature of the capital structure of Japanese firms. Stability of capital structures that Lemmon et al. (2008) uncovered for US firms is almost equally applicable to Japanese firms. The robustness of the same empirical observation in a different environment justifies the inclusion of time-invariant factors in existing model to aid in better understanding of actual determinants of capital structure. The traditional model based only on time-varying determinants is not enough to understand the capital structure dynamics. This study also relates leverage to the institutional characteristics of Japanese firms. We showed that keiretsu firms generally have higher leverage than the non-keiretsu firms. This relationship continues to exist even after financial deregulation took place. Although, Hirota (1999), Hirota et al. (2007) studied the effect of institutional features and corporate culture on the capital structure decisions of Japanese firms,

incorporating these features in a time invariant model is still missing. Our study contributes to this gap. This study use a larger sample period which includes time period both before and after the financial big bang took place. Age is an important factor that is positively related to the leverage of Japanese firms.

1.3 The determinants of capital structure: Insight from private firms

Theories of capital structure relate the differences in financing decisions to a number of firm-specific characteristics. Empirical studies based on these theories primarily focus on the public firms. Not many studies analyze the capital structure decisions of private firms. Although Public and private firms may be comparable in terms of firm specific characteristics, sources of financing for private firms are limited. Public firms can access external capital market to raise equity from public. Private firms do not have flexibility in financing (Huyghebaert and Van Hulle, 2006). The access to external equity and debt market is limited for private firms. Information asymmetry is significantly higher in private firms because of lack of disclosure of information. Ownership in the private company is concentrated in the hands of a group of investors. They are likely to retain control over the firms and unwilling to issue external equity (Stulz 1988, Amihud et al. 1990).

Information asymmetry and ownership concentration prevalent in private firms are likely to increase the costs of debt in private firms. Saunders and Steffen (2011) find that the cost of issuing debt for private firms is significantly larger than that for public firms. Since market frictions for private firms are higher relative to the public firms, capital structure of firms may be different. Thus, it is important to examine whether these differences affect the capital structure of private and public firms.

The objective of this study is to find out the factors that determine capital structure decisions made by Japanese private firms. How does a firm`s access to external equity market affects its choices of financing? Is there any difference in capital structure decisions made by the private and public firms? This study uses the Japanese private firm's data obtained from Nikkei NEEDS Financial Quest for the period 1980 to 2014. The study also compares result with public firms listed on the First Section of Tokyo Stock Exchange.

This study finds that leverage ratios of private firms are significantly larger than that of public firms. Even when firm specific differences are removed using propensity score matching, we find that private firms have more leverage than public firms. We also examine how the leverage ratios of private firms changes over time and compare it with the public firms. Following the methodology of Lemmon, Roberts and Zender (2008), we examine how the leverage ratios of very high-, high-, medium- and low-leverage portfolios changes over time. We find that leverage ratios of these portfolios remain stable over long term and differences among the portfolios remain persistent. The range in book leverage ratios for private firms is 62% and for public firms is 50% in the formation period. After twenty years the range in book leverage ratios is 44% for private firms and 29% for public firms. Changes in leverage ratio for private firms are less than that for public firms. Leverage ratios of private firms exhibit greater persistence than public firms. Adjusted R-square from a regression of leverage on firm specific effects shows almost 72 % of the variation in leverage ratios can be explained by the unobserved factor. Whereas adjusted R-square from a regression of leverage on traditional capital structure determinants can explain almost 31% of the variation in leverage ratios.

Unobserved factors can explain more than twice the variation in leverage ratios as explained by the traditional capital structure determinants.

Regression result shows initial leverage is significantly positively related to leverage. Almost 48% of the variation in leverage ratios of private firms can be explained by the initial leverage ratios. Among the traditional capital structure determinants, leverage is negatively related to profitability and positively related to firm size, tangibility, age and industry median leverage for both samples. Sales growth, a proxy for firm`s future growth opportunities, is significantly positively related to leverage. Generally a negative relationship is expected, because growing firms want to keep more flexibility for financing in future. Possibly, the positive relationship results from private firms limited sources of financing. As private firms have limited access to external equity market, they have to rely on debt financing. Cash flow volatility is negatively related to leverage for private firm`s but turns significantly positive when both public and private firms are included in the sample. Badertcher et al. (2015) find that as private firms cannot access public equity market, risk of bankruptcy is higher for private firms. The significant negative relationship could be due to higher risk of bankruptcy of private firms relative to public firms. The indicator variable private is significantly positive which means private firms leverage ratio is significantly higher than the public firms leverage ratio.

To the best of our knowledge, this is the first study in Japan that examines determinants of capital structure of private firms. Although, several studies investigated leverage positon of public firms in Japan, a comprehensive study on the comparison between capital structure of public and private firms is still missing. Our study fills this gap in the existing literature by providing evidence on the factors that make capital structure of private firms different from that of public firms.

1.4 The announcement effect of cash dividend changes on share prices: Evidence from Dhaka stock exchange

Dividend policy is perceived as a puzzle in corporate finance. Ambiguity still exists about the motivation behind dividend payment by companies and preference of dividend by investors. Generally, companies pay dividends to shareholders as a reward for their investment and attract potential investors to the company. Alternatively, companies can reinvest the money which also increases the return to shareholders in the form of capital gain. Tax on the dividend is often higher than the tax on capital gain. From the shareholders perspective dividend should be less preferable to capital gain as it reduces the wealth of investors. Regardless of the disadvantage associated with dividend payment, companies continue to pay dividend and investors prefer to receive the dividend.

To solve the puzzle of dividend payment, many financial economists have looked into the reactions of the stock market on the announcement of a dividend. Early empirical evidence shows that dividend payment has a profound impact on share price (Pettit, 1972; Aharony and Swary, 1980). On the announcement of dividend increase share price increases and vice versa. The rationale behind such reactions in the stock market has been explained by two prominent hypotheses. One is information signaling hypothesis and the other is free cash flow hypothesis. According to information signaling hypothesis ((Battachrya, 1979), dividends could be used as a tool to reduce the information asymmetry between shareholders and managers. When a dividend is increased it sends a signal to the shareholders about managers` positive (negative) expectation of firms` future earnings. Therefore, share price increase (decrease) following the dividend increase (decrease) announcement. Free cash flow hypothesis ((Jensen, 1986), on the other hand, considers dividend as a mechanism to reduce agency problems between shareholders and managers. When free cash flows are available to managers, they tend to overinvest to

maximize their own interests. The increase in dividend decreases the cash flows available to managers, leading to a positive impact on share price.

The objective of the study is to find out how stock price reacts to the announcement of dividend for companies listed on the Dhaka Stock Exchange. This study will shed light on whether dividend could be used as an effective tool to reduce the information asymmetry between shareholders and managers for DSE listed companies.

Focus of empirical studies has been the developed market, particularly the US. As an emerging market, Bangladesh has different institutional settings which make the announcement effect not as clear as in the US. There are some unique institutional characteristics that make Dhaka stock exchange an interesting market to examine the announcement effect of cash dividend changes on share prices. Ownership structure of Bangladeshi listed companies is concentrated at the hand of a single family or large individual investors. Because of concentrated ownership, agency conflict between shareholders and managers is not significant; rather agency conflict between minority shareholders and controlling shareholders is more noticeable. In contrast to the developed country, Bangladeshi companies do not follow a stable dividend policy. They are found not very cautious about the likely impact of changing dividend every now and then.

Standard event study methodology is used to investigate the announcement effect of cash dividend changes on share prices for an event window of -3 to + 3 days relative to dividend announcement date. The study finds that announcement of dividend increase does not produce a significant abnormal return on the announcement day. Shareholders earning only normal return on the announcement day for dividend increase announcement are quite contrary to the expectation and inconsistent with the signaling hypothesis. Insignificant positive abnormal return on the announcement day could be related to

concentrated ownership structure of Bangladeshi companies. If the concentrated ownership reduces the information asymmetry between shareholders and managers, dividend announcement is not expected to have a significant effect on share price. However, CAR (-20,-1) reveals that investors earned a significant positive abnormal return in the pre-announcement period. Significant positive abnormal return earned before the announcement day could be related to some kind of information leakage before the announcement is actually made.

Dividend decrease is associated with significant negative reactions on the announcement day which is consistent with the signaling hypothesis. Abnormal returns associated with the announcement of decrease in dividend are larger than the announcement of increase or no change in the dividend. Negative reaction to dividend decrease clearly signifies investors demand cash dividend. No significant abnormal return is observed in the preannouncement period. Negative abnormal return persists even twenty days after the dividend decrease announcement is made which goes against the semi-strong form of market efficiency. Shareholders earn only normal return on the announcement day for no change in dividend group. The study shows that information content of dividend has a little explanatory power for an emerging market like Bangladesh.

Chapter 2

Historical Background of Corporate Finance in Japan and Bangladesh

1. Historical background of corporate finance in Japan

The Financial system facilitates transfer of funds from the lenders to borrowers. The financial system not only transfers fund but also transfers risks from those who want to avoid them to those who want to assume them. Financial systems operate through interconnected components such as financial markets, financial institutions and financial instruments. Financial systems of a country help to promote growth of the corporate sector that ultimately help to the development of the national economy by mobilizing savings, facilitating investment, redistributing risks, and supporting entrepreneurship growth. An efficient financial system requires that different components play distinctive roles successfully. Financial market is a mechanism through which borrowers and lenders of fund interact together to meet their financing and investment need. Primary and secondary markets of a country mobilize fund from lenders to borrowers through financial instruments such as stocks, bonds, notes, mortgages, derivatives and so on. Financial institutions, on the other hand, act as an intermediary among savers and borrowers. Financial securities are designed in a way so that they satisfy the need of both borrowers and lenders. More complex financial securities like collateralized debt obligations, collateralized mortgage obligations, credit default swaps and others are designed to meet special demand of the borrowers and lenders. Although the complex financial systems have been evolved over time through innovation to satisfy needs of related parties, they have increased the overall risk level to a great extent. To make sure that components are working in order and related parties are not exposed to excessive level of risks, regulatory agencies of a country enacts rules and regulations related to the

securities transaction. The complex interaction among the components has made financial systems a sensitive issue because failure of one component has systemic effect on other components leading to a crash to the whole systems and economy as a whole. Financial systems crash of 2008 is an example of how problems associated with mortgage backed securities transactions lead to a collapse of the whole financial systems.

The advancement of the financial systems has been evolved over time as well. From the very inception of the commercial civilization, the banks played a central role in the financial systems to satisfy the need of surplus and deficit fund holders. During the eighteenth and nineteenth century, banks were the main source of financing to business and government. The nature of banking business during this time made banks susceptible to risks and as a result, we observed several incidents of bank failures. Such a failure made banking regulations hard but overall reliance on bank financing had not reduced. From the late nineteenth century the importance of stock exchanges increased dramatically as a mean of financing.

Broadly, the financial systems of Japan are not materially different from those in the major industrialized nations of the world. A commercial bank dominated financial systems along with the presence of a well-developed stock market, foreign exchange market, and specialized financial institutions feature the financial systems in Japan. Regulatory framework of financial systems in Japan also grossly the same as that in other developed countries of the world.

Traditionally, Japanese government and business relied in the bank financing. Japanese main bank system developed in the pre-war period. At the beginning, most of the banks were owned and controlled by industrial entrepreneur for the purpose of financing their own business. Main bank system grew enormously during high growth

era. Although banking corporations in Japan used to provide full banking services, during the late 1980s, banks were found to be more specialized on their services. There were 13 national and 64 regional commercial banks, 7 long-term credit banks; 7 trust banks, 69 mutual loans and savings banks, and other financial institutions were in operation during that time. In the early postwar financial system, city banks were used to finance major domestic corporations and regional banks were used to finance small and medium sized corporations.

In the postwar financial systems, city banks, regional banks and specialized banks used to satisfy the need of three different sectors of the economy. City banks provided short term loan to large corporations whereas regional banks provided loans to medium-sized and small businesses. Bank of Tokyo, specialized in foreign exchange transactions, provided foreign exchange related services to the government and corporations. Long term credit banks were specialized in providing long term loan to keiretsu firms while trust banks were specialized in providing retail banking and also managed portfolios. Trust bank often worked with commercial banks and long-term credit banks. Besides the main stream banking institutions such as mutual loan and savings banks, credit associations and cooperatives mobilized deposits from ordinary people. This deposit was use to extend loan to cooperative members, small businesses and corporations.

Government financial institutions helped promote the specialized sectors of the domestic economy. Japan Export-Import Bank, Japan Development Bank, and several finance companies used to collect deposit through postal savings system and deposit the money with Trust Fund Bureau. The Japan Bank for International Cooperation was involved in international operations such as financing trade between Japan and developing countries.

Although securities market in Japan was established quite earlier, volume of trading of securities markets increased rapidly during 1980s. Business of securities firms increased rapidly during this time. Three types of securities firms were involved in the business. The first type of securities firms such as Nomura, Daiwa, Nikko, Yamaichi played a key role in international financial transactions. In the second category, there were ten medium-sized firms. In the third category, all small firms registered in Japan were included. In the late 1980s, a number of foreign securities firms, including Salomon Brothers and Merrill Lynch, became players in Japan's financial world.

Apart from securities business, insurance business grew at a rapid rate in the late 1980's. Most of the Japanese people owned a life insurance that reflects risk avoiding tendency of the people. Investment in insurance policies of Japanese people was almost 50% higher than that of US people. Enormous growth in domestic business as well as deregulation allowed insurance companies to get involved in foreign investment. As a result, Nippon Life Insurance Company became the biggest holder of United States Treasury Securities in 1989.

During the era of rapid growth in business in Japan, there were eight stock exchanges in Japan. Two of the world's largest stock market in terms of market capitalization was from Japan in 1988.Tokyo Stock Exchange, representing 83 % of Japan equity investment, was ranked the largest stock exchange in the world in 1988. 80% of the publicly listed companies in Japan are listed with Tokyo Stock Exchange. Osaka Stock Exchange ranked the third largest stock exchange.

Two important changes in the late 1980's helped to flourish Tokyo Stock Exchange. Change in the modes of financing was the first cause. Traditionally Japanese firms relied on bank loans as a prime source of financing. Due to deregulations, form of financing

shifted from the bank loan to market based financing. Permission given to foreign brokerage firms was the second development. Permitting foreign brokerages firms to work as a member of stock exchanges made foreign investment easy in Japanese stocks listed in the Japanese stock markets. These developments lead to increase in trading in Japanese stock market. The trading volume increased from 6850 in October 1982 to around 39000 in the beginning of 1990, as trading recorded by the Nikkei 225. The trading volume even increased by 250%, during a six-month period in 1986. However, the 1987 stock market crash in the New York Stock exchange caused Tokyo stock averages to drop by 15%. Tokyo stock averages were recovered in 1988 but collapsed again in 1990 along with other major indices. This collapse in the Tokyo stock market is followed by the lost decade.

2. Historical background of corporate finance in Bangladesh

Financial system of an emerging economy is somewhat different from that of a developed country. Although major components of a financial system are also found in the emerging countries, prevalence of informal financial sector make emerging countries' financial systems unique. In Bangladesh, financial systems are operated through three distinct sectors such as formal financial sector, semi-formal financial sector, and informal financial sector. These divisions are based on the regulations imposed on the financial transactions. In the formal financial sector, financial markets, financial institutions, and financial instruments are subject to the regulation of the Central Bank and Securities and Exchange Commission. Semi-formal financial sector is partially regulated but do not fall under the direct supervision of the Central Bank and the Securities and Exchange Commission. The informal financial sector is completely outside of the regulation and usually negotiated privately.

The size of the economy of Bangladesh was quite small after the independence in December, 1971. Few commercial banks and development financial institutions were the major sources of private, business and government financing. Although, the Dhaka stock exchange was established in 1954, equity and debt financing through stock market were very thin. During that period, all banks and financial institutions were nationalized and brought under a strict regulation and supervision. From late 1970s, privatization and deregulatory measures were taken to open the financial sector. Financial sector went through several regulatory regimes since then. A series of deregulatory measures during the 1990s finally made the sector much more open and a good place for investment. Since 2000s, both the economy and financial sector of Bangladesh began to flourish. Because of the withdrawal of restriction on investment and privatization programs, a number of private financial institutions were established. From late 1990s, equity financing through stock market became popular but could not be able to replace banking institutions from its position as the prime source of financing.

The present formal financial sector of Bangladesh is comprised of financial markets such as money market, capital market, and foreign exchange market, financial institutions such as 56 scheduled and 4 non-scheduled banks, 31 non-bank financial institutions, 62 insurance companies, and 599 registered microfinance institutions. Bangladesh Bank, the central bank of Bangladesh is the regulator of the banks and non-bank financial institutions, Insurance Development and Regulatory Authority is the regulatory authority of the insurance companies, Bangladesh Securities and Exchange Commission is the regulatory authority of the stock exchanges, investment banks, and brokerage firms, and Microcredit Regulatory Authority regulates the activities of the microfinance institutions. The semi-formal financial sector includes four specialized

financial institutions that are governed by specific statutes but not directly operate under the supervision of Bangladesh Bank. The institutions are House Building Finance Corporation (HBFC), Palli Karma Shahayak Foundation (PKSF), Samabay Bank, and Grameen Bank. The informal financial sector is dominated by the money lenders, pawn brokers, and others. Compared to the formal and semi-formal financial institutions, interest rates in the informal sector are much higher and incidents of failure to repay loan are reported frequently.

Chapter 3

The Determinants of Capital Structure: Evidence from Japan

Abstract

This study empirically examines the factors that determine variation in leverage ratios of non-financial firms listed on the Tokyo Stock Exchange First and Second Section from 1980 to 2014. The study finds that leverage ratios of Japanese firms remain stable in the long term. High levered firms continue to be high leveraged and low levered firms continue to be low leveraged for at least two decades. A panel regression analysis shows that initial leverage ratio is significantly positively related to future leverage ratios. Although the marginal effect of time varying determinants is significant, majority of the variation in capital structure can be explained by time invariant factors. Moreover, Keiretsu membership is also found to have a significant positive impact on firms leverage ratios, which is more pronounced during the pre-bubble period.

Keywords: Capital structure, Leverage, Determinants, Stability, Japan

1. Introduction

Why do some firms prefer to take on more leverage than others? What factors influence firms` capital structure decisions? Financial researchers have proposed a large number of theories and ideas to explain the capital structure dynamics. Trade-off theory and pecking order theory are the two most prominent theories that explain the capital structure decisions. These theories assume factors relating to costs and benefits of financing and information asymmetry causes the heterogeneity in leverage ratios. Despite having many useful insights to capital structure decisions, none of these theories provide a unified framework that can simultaneously account for many empirical facts. More importantly, recent research (Lemmon et al. 2008) shows that firms leverage ratios remain stable over long term. Cross sectional variation in leverage ratios account for much of the variation in leverage ratios than time series variation. Therefore current capital structure theories that focus only on time varying determinants cannot explain majority of variation in capital structure. Firm-specific permanent components needed to be taken into consideration to understand the observed heterogeneity in capital structure.

The objective of this study is to examine the factors that determine the capital structure of Japanese firms. Since recent studies reveal that traditional capital structure theories cannot explain all the variation in leverage ratios, we investigate the capital structure determinants in a different environment. Japan has some major differences as well as similarities with the US. Japanese firms traditionally relied on bank loans as a major source of financing. However, capital market began to play a major role since the financial big bang had been initiated. Japan also has a unique institutional settings characterized by keiretsu form of industrial organization. All these justify Japan is unique to test whether same empirical regularities are observed in a different environment.

Our sample firms include non-financial firms listed on the First and Second Section of Tokyo Stock Exchange. Following Lemmon et al. (2008), we form four portfolios based on leverage ratios to observe the changes in leverage ratios in the following twenty years. We carefully replicate their approach to find any significant differences. Leverage ratios of Japanese firms' exhibit convergence and persistency as observed in the US. The study finds cross-sectional dispersion in the initial period is very high. The range of average book (market) leverage is 50% (52%) when the portfolio is formed. Over time the differences in leverage ratios fall. After 20 years, the very high book leverage portfolio declined from 82% to 65%, whereas the low book leverage portfolio increased from 32% to 36%. Likewise, the very high market leverage portfolio also decreased from 74% to 66% and the low market leverage portfolio increased from 22% to 37%. Although leverage ratios of portfolios converge in the short run, the difference between these portfolios exists even twenty years after the portfolio is formed.

The persistency in leverage ratios implies that firm`s future leverage ratios are anchored on its past leverage ratios. Regression analysis shows initial leverage ratios is significantly positively related to firms future leverage ratios. Even when other time varying determinants are included in the model the relationship remains highly significant. It implies that a certain part of initial leverage ratio remain fixed for long term. The adjusted R-squares from a regression of leverage on traditional capital structure determinants range from 25% to 39% based on model specifications. Conversely, adjusted R-square from a regression of leverage on firm fixed effect shows 70% of the variation in leverage ratios can be explained by the firm fixed effect only, which indicates most of the variations in leverage ratios is cross sectional which cannot be explained by the traditional capital structure determinants. The parameter estimates in pooled OLS

regression fall by 40%, on an average, when fixed effect regression is used. Thus the parameter estimates in traditional leverage regression is inefficient where unobserved firm specific factors are ignored.

Among the time varying determinants, profitability is significantly negatively related to leverage which is consistent with the pecking order theory. Consistent with trade-off theory, leverage ratio is positively related to industry median leverage ratios, firm size and tangibility. Age is positively related to leverage; older firms have higher leverage than young firms. Keiretsu dummy used as an indicator of unique institutional characteristics of Japanese firms shows that it indeed has a positive impact on firms future leverage ratio.

We contribute to the existing literature in several ways. First, our study provides evidence of a new feature of the capital structure of Japanese firms. Stability of capital structures that Lemmon et al. (2008) uncovered for US firms is almost equally applicable to Japanese firms. The robustness of the same empirical observation in a different environment justifies the inclusion of time-invariant factors in existing model to aid in better understanding of actual determinants of capital structure. The traditional model based only on time-varying determinants is not enough to understand the capital structure dynamics. We also relate leverage to the institutional characteristics of Japanese firms. We showed that keiretsu firms generally have higher leverage than the non-keiretsu firms. This relationship continues to exist even after financial deregulation took place. Although, Hirota (1999), Hirota et al. (2007) studied the effect of institutional features and corporate culture on the capital structure decisions of Japanese firms, incorporating these features in a time invariant model is still missing. Our study contributes to this gap. We used a larger sample period which includes time period both before and after the financial big bang

took place. We also clearly pointed out age to be an important factor that is positively related to the leverage of Japanese firms.

This paper is organized as follows. Section 2 presents the literature review, section 3 describes sample selection and methodology, section 4 describes basic statistics followed by the analysis of the determinants of capital structure in section 5, and section 6 concludes this paper.

2. Literature review

Many theories have been developed over the years to explain the financing behavior of firms. According to the trade-off theory (Modigliani and Miller, 1963) firms strive to achieve an optimal debt ratio by balancing the cost and benefit of debt financing. Much of the early empirical evidence is consistent with trade off theory predictions. Bradley et al. (1984) observe strong industry influences on cross-sectional leverage ratios which they interpret as evidence of static trade off theory. Consistent with their view, Titman and Wessels (1988) find that firm's leverage ratio is negatively related to the uniqueness of product. Razan and Zingales (1995) consider industry effect as fundamental for understanding firm's capital structure. Frank and Goyal (2009) find industry median leverage, tangibility, firm size, expected inflation are positively related to leverage, while market-to-book ratio and profitability are negatively related to leverage.

An important implication of trade off theory is target leverage adjustment. In a survey, Graham and Harvey (2001), show that 71% of the CFOs in their sample responded to having a target range for their debt-equity ratio. Empirical evidence shows that leverage ratios generally exhibit a mean reversion (Hovakimian, Opler and Titman, 2001; Flannary and Rangan, 2006; Kayhan and Titman, 2007).However, there is disagreement about the pace at which mean reversion takes place. Fama and French

(2002) reports that adjustment speed toward target leverage is very slow. On the other hand, Alti (2006), Flannary and Rangan (2006) and Leary and Roberts (2005) report evidence that reversion is quite fast and is mostly accomplished in two to three years.

One of the shortcomings of trade off theory is the negative relationship observed between leverage and profitability, which can be explained by pecking order theory (Myers and Majluf, 1984). Pecking order theory states that because of adverse selection cost associated with information asymmetry firms prefer internal financing to external financing and if external financing is needed debt is more preferable to equity. Shyam-Sunder and Myers (1999) show that much of the time series variation in debt ratios can be explained by the pecking order rather than trade off model. However, their empirical evidence is challenged by whether same result could be observed for a sample of growth firms. Frank and Goyal (2003) find pecking order is only applicable to mature firms as oppose to growth firms. Chirinko and Singha (2000) question the ability of Shyam-Sunder and Myers (1999) test to distinguish among alternative hypotheses. Leary and Roberts (2010) also argue that pecking order determinants can explain only a small fraction of the variation in debt ratios. Fama and French (2005) agree that small firms frequently issue equity even higher than their debt issues. According to Lemmon and Zender (2010) finding small firms financing with equity is not contrary to the predictions of pecking order theory because of restrictive debt capacity.

Thus the standard version of trade off theory and pecking order theory appear to be inadequate to explain all empirical evidence. A growing literature argues that empirical evidence is more consistent with dynamic trade-off model. Negative relationship observed between profitability and leverage could be explained by dynamic trade-off model (Fischer et al., (1989) and Leland (1994); Hovakimian et al., (2004)).

Leary and Roberts (2005) find that adjustment costs may shy away a firm from its optimal leverage ratio and thus result in persistent effect in leverage. Goldstein et al. (2001) observe that the option to increase leverage in the future serves to reduce the otherwise optimal level of leverage today. Morellec et al. (2012) argues that cross-sectional differences in leverage ratios are due to differences in the agency conflicts across firms. Thus many of the empirical results inconsistent with static trade- off model could be explained by dynamic trade-off model.

Recent evidence shows that firms leverage ratios remain remarkably stable over long term (Lemmon et al., 2008).Traditional capital structure theories cannot explain majority of variation in leverage ratios. Frank and Goyal (2007) provide some evidence that the persistence in leverage across firm may actually result from its correlation with the managerial team. Specifically, CEO`s compensation contract is directly related to the level of leverage. Hackbarth (2008) shows that managerial characteristics contribute to significant variation in capital structure, although the underlying firms and industry characteristics are the same.

Most of the empirical studies are done in the context of US. The institutional and regulatory environment in Japan is quite different from the US. Hirota (1999) find that capital structure determinants derived from traditional theories are equally applicable to Japan as in the US. Unique institutional and regulatory environment in Japanese capital market also have an effect on capital structure decisions. Strength of main bank relationship and keiretsu membership are positively related to leverage ratios. Rajan and Zingales (1995) report that factors identified in the US as important determinants of capital structure are also related with leverage in Japan. Nishioka and Baba (2004) find that governance structure has strong influence on the adjustment speed to target leverage.

Firms in good credit standing retire more debt to reduce excess leverage than firms in lower credit standing. Hirota et al. (2007) report corporate culture has a strong influence on firms financing decisions.

Static theory suffers from empirical inconsistency. Negative relationship between profitability and leverage, more equity issues by small firms are some of the empirical inconsistencies found in the static version of trade off and pecking order theory. When dynamic version of these theories are taken into considerations empirical evidence are more consistent with these theories. However dynamic theories consider firms will adjust leverage continuously over time but accounting information is available at fixed time interval only. A large part of the unexplained capital structure variation is captured by firm-specific, and largely time-invariant, characteristics which are missing from these models. A part of firm specific effect could be explained by factors such as managerial characteristics, corporate cultural differences. But identifying these factors requires careful considerations and may differ among researchers.

3. Sample selection and methodology

3.1 Sample selection

The sample consists of non-financial firms listed on the First section and Second section of Tokyo Stock Exchange from 1980 to 2014. We exclude financial firms because their capital structure is strongly influenced by legal requirements. Moreover, differences in financial statements make it difficult to compare financial firms with non-financial firms. Firms with book leverage ratios higher than 1 are also excluded from the sample. Among the non-financial firms, we exclude those without continuous book leverage data and other variables during the study period that are required for regression analysis. In

total, we have 45,419 firms' year observations in the sample. The equity data and firm-specific variables were collected from the Nikkei NEEDS Financial Quest.

3.2 Method

To examine the trend in leverage ratios, every year firms are sorted on the basis of book leverage and market leverage ratios and are divided into four equal portfolios. The leverage ratios for the same portfolio are observed for the next twenty years. Finally, the leverage ratios are averaged across the event time to determine the leverage ratio trend over time. OLS regression models are used to find the factors that affect the leverage ratio. Both book and market leverages are regressed on firm-specific factors that have been identified as the most important factors correlated with leverage in previous empirical studies.

3.3 Variable definition and measurement issues

To examine the leverage ratio of non-financial firms in Japan, we used a number of firm-specific variables that were used in previous studies, including Titman and Wessels (1988), Rajan and Zingales (1995), Frank and Goyal (2009), Mackay and Phillips (2005) and Lemmon et al. (2008).

Leverage has been calculated using two different measures; book leverage and market leverage. Book leverage is defined as the ratio of (1- equity/total book value of assets). Market leverage is defined as the ratio of debt over sum of debt and market equity. Market equity is the product of end of year market price of shares times the number of shares outstanding.

Firm size is measured by the log of sales. Another widely used measure for firm size is log of total book value of assets. We used log of sales instead of log of assets to

avoid the possible multicollinearity problem with the measure of tangibility. Asset tangibility is measured as the ratio of net property, plant, and equipment to total book value of assets. Profitability is measured as the ratio of operating income before depreciation to total assets. Market-to-book value is the ratio of market value of total equity and total debt as a percentage of total book value of assets. Cash flow volatility is measured as the standard deviation of firms last three years' operating income. Age is the difference between the actual date of foundation and the current year.

Tokyo Stock Exchange industry classification has been used to classify the industry. In total twenty nine industries are identified. Industry median leverage is the median level of leverage for each industry calculated in every year.

Initial leverage is the first available data on leverage in the Nikkei-NEEDS database. Although our sample time period starts from 1980, initial leverage data is collected from the year 1965 and onwards according to the year of establishment and enlistment with the stock exchange of particular companies. Therefore, initial leverage is not the leverage value lagged just few years ago. It has been documented in several studies that institutional environment has an effect on firms capital structure (Rajan and Zingales, 1995; Fan et al. 2012). A unique characteristic of Japanese institutional structure is that many firms belong to an industrial group called keiretsu. We use a dummy variable that equals 1 if a firm belongs to a keiretsu. A firm is considered to have keiretsu membership if it belongs to any of the six major groups (Mitsubishi, Mitsui, Sumitomo, Fuyo, Ichikan, and Sanwa) and participate in the president club.

4. Basic results

4.1 Descriptive statistics

Table 1 presents the summary statistics for the sample firms. The sample consists of all non-financial firms listed on the First and Second Section of Tokyo Stock Exchange for the period 1980 through 2014. It is found that mean book leverage and market leverage ratio for the Japanese firms are 54% and 49% respectively. Average age of the firms is about 55 years, which is much higher than that of US firms.

[Insert Table 1 around here]

Table 2 shows the correlation matrix of the different variables used in this study. The coefficients on the control variables are largely consistent with the previous findings. Book leverage and industry median leverage are positively related. Firms in the same industry tend to follow the same level of leverage. Firms with higher profitability have lower level of leverage, while firms with high tangible assets and large size have more leverage. Cash flow volatility is positively related to leverage, which is inconsistent with previous findings. Keiretsu affiliation is positively related to leverage.

[Insert Table 2 around here]

Figure 1 shows the differences in firm characteristics depending on the degree of book leverage. Specifically, we observe how profitability, tangibility, age, firm size, volatility of earnings and market-to-book ratio changes across four groups based on leverage. At first, we sort firms based on leverage ratios and divide it into four equal groups. We average the variables representing firm characteristics for each quartile every year from 1980 to 2014. Finally we average the 35 sets of averages for each quartile and present the results in column figure.

The graph shows there are some major differences between firms with very high leverage and low leverage. In general profitability and market-to-book ratios are negatively related to leverage while firm size, tangibility, cash flow volatility and age are positively related to leverage. As can be seen from the graph that firms in very high leverage quartile have the lowest profitability. As we move to the right profitability increases and firms in the lowest leverage quartile have the highest profitability. Likewise, market-to-book ratio is the lowest for very high leverage firms and the highest for the low leverage firms. However, for all variables this relationship is not precisely linear. Although tangibility in general shows a positive relationship, very high leverage firms do not have the highest tangibility.

For some variables differences between very high and low leverage firms are more pronounced than others. For example, very high and low leverage firms have large differences in terms of profitability and firm size. On the other hand, for tangibility little differences are observed between very high and low leverage quartiles.

Leary and Roberts (2011) examines the US firm characteristics conditional on leverage. They find there are significant fundamental differences between high leverage firms and low leverage firms. High leverage firms are significantly larger, older, less profitable, have more fixed assets, lower market-to-book ratios and less cash flow volatility. In this criterion Japanese firm closely resembles to US firms except that the cash flow volatility is positively related to leverage for Japanese firm.

[Insert Figure I around here]

4.2 Trends in leverage ratios

How the leverage ratio changes over the years can shed light on how firms determine these ratios. In this section, we examine the nature of the changes in the

leverage ratio of Japanese firms from 1980 through 2014. First, we sort firms on the basis of their actual leverage ratios, and then divide them into four portfolios by taking one-fourth of the firms in each portfolio. These four portfolios are indicated as very high-, high-, medium-, and low-levered portfolios. Because we seek to reveal the long-term trends in leverage ratios, we observe their changes in the subsequent twenty years without changing the composition of any of the firms in the particular portfolios. We obtain 35 sets of event time averages for these portfolios. Event time is indicated as year 0 to 20. We then compute the average leverage of each portfolio across the 35 sets within each event year. Both book leverage and market leverage ratios are used to calculate portfolios' average leverage ratios. These event time averages are then plotted to obtain a trend line, as shown in Figure 2

The graph reveals some interesting characteristics of leverage ratios of Japanese firms. At the beginning of the portfolio construction period (indicated as event time zero) a large gap exists in the leverage ratios among these four portfolios. At this point, the difference between the leverage ratios between the highest and lowest groups is the largest. The range of average leverage ratios is 50% for book and 52% for market leverage ratios. Over time, the gap shrinks as very high-, high-, and medium-levered portfolios' leverage ratios decline and low-levered firms' leverage ratios increase for the total sample groups. Noticeable convergence is observed among four portfolio averages over time. After 20 years, the very high book leverage portfolio declines from 82% to 65%, whereas the low book leverage portfolio increases from 32% to 36% for the total sample.

Similarly, the very high market leverage portfolio decreases from 74% to 66% and the very low market leverage portfolio increases from 22% to 37%. However, the cross-

sectional differences between these portfolios remain persistent. The average book leverage ratios of very high, high, medium and low leverage portfolios are 65%, 57%, 47% and 36% respectively. This difference is economically large when compared to average within firm standard deviation of book leverage 11.5%. The cross-sectional differences between these portfolios remain substantially large. We repeat the test on the survivor firms and found the similar results as for total sample. The long term trend in leverage ratios for Japanese firms are very similar to the findings of Lemmon et al.(2008), for US firms. Lemmon et al. focus on two important characteristics of leverage - convergence and persistency. Leverage ratios of Japanese firms also exhibit these similar features. The leverage ratios of high (low) leverage firm decrease (increase) over a period of twenty years. However, the leverage ratios of four portfolios never coincide, i.e. high (low) leverage firms remain high (low) leverage.

In general, the data indicates that Japanese firms' leverage ratios remain stable. What causes firms to maintain the same leverage ratio over the years? The cause may be firms' entry or exit processes. An exit is more common for highly levered firms in financial distress because they tend to be highly levered during their entire existence until bankruptcy. That some highly levered firms are prone to bankruptcy is highly likely. To ensure that this type of distressed firm does not influence the result, we separately analyze firms that have survived for 20 continuous years. This data also confirms that the trend in leverage is persistent over the years. The result is robust regardless of whether we include these firms in or exclude these firms from our sample that are not prone to bankruptcy. The trend in leverage ratios for survivor groups indicates the same feature.

[Insert Figure 2 around here]

In short, this analysis reveals an interesting feature of the leverage ratio. The leverage ratios of firms indeed remain stationary in the long term—also an insight revealed by Lemmon et al. (2008) into firms in the United States. They find that the leverage ratio of U.S. firms remains remarkably stable over the long term, beginning from 1965 and going to 2003. Although they observe some convergence, it is transitory rather than permanent. Similar trends are also observed for Japanese firms. The leverage ratios of the very high, high, medium, and low portfolios change very little over time. Cross-sectional differences in the leverage ratios remain persistent even twenty years after the portfolio was formed. Little difference is observed between Japanese and U.S. firms, except that the convergence in U.S. firms is more noticeable than Japanese firms.

There is a potential concern which should be addressed. It is possible that Figure 1 is mainly resulted by cross-sectional variation of firm-specific variables, such as firm size, profitability, tangibility and market-to-book ratio. In order to remove the effects of these observable differences among firms, a cross-sectional regression of leverage on firm-specific variables is run for each year. Residuals from these regressions are then used to rank firms and form four equally weighted portfolios to observe future changes in leverage. The portfolios are called very high, high, medium, and low unexpected book and market leverage portfolios. We observe the leverage ratios of these portfolios in the subsequent 20 years. As before, this process results in 35 sets of event time averages and a new trend line for unexpected book and market leverage ratios of Japanese firms.

Figure 3 indicates the trends in leverage ratios for these portfolios. The range of average book leverage and market leverage for the very high and low portfolios are 34% and 38% respectively, during the formation period. The cross-sectional variation in leverage changes only slightly indicating that most capital structure differences are found

in the residual of existing specifications. The differences in leverage ratios between the very high and low portfolios are 18% (17%) for book (market) leverage, even 20 years after the portfolios are formed. The average leverage ratios of highly levered firms remain higher than that of other portfolios and the average leverage ratios of low-levered firms remain lower than that of any other portfolio.

This feature in the leverage ratio is similar to the findings of Lemmon et al. (2008) for U.S. firms. They find that differences in leverage ratios exist even after removing all observable differences across firms. Highly levered firms remain highly levered and low-levered firms remain low levered, indicating that the differences in the leverage ratios cannot be explained by traditional capital structure theories.

[Insert Figure 3 around here]

5. Capital structure determinants

5.1 The role of initial leverage on future leverage

The main feature of Figures 2 and 3 is that the leverage ratios remain stable over time. This stability indicates that there may be some time-invariant factors which keep the leverage ratios remain stable over long term. We examine this possibility by analyzing the relationship between firms' initial leverage ratio and future leverage ratios. We assume a positive relationship exists between initial leverage and future leverage ratios and use the following regression equation to determine whether or not the relationship actually exists. The regression model is constructed following the methodology of Lemmon et al. (2008), except that an additional control variable age is included in the model.

$$Leverage_{it} = \alpha + \beta X_{it-1} + \gamma Leverage_{i0} + \nu_t + \varepsilon_{it} \qquad (1)$$

α is the constant, $leverage_{i0}$ is the firm's initial leverage, X represents 1-year lagged control variables, ν_t is the time-fixed effect, ε_{it} is the random error term assumed to be possibly heteroskedastic and correlated within firms, *i* indexes firms and *t* indexes year respectively. β is the coefficient of control variables and γ is the coefficient of the main variable, initial leverage. The first observation of each firm is excluded from the regression to avoid an identity at time zero. To understand the relationship between initial leverage and future leverage, the value and significance of γ must be observed. The first available data of firms leverage in the Nikkei- NEEDS database is used as a proxy for initial leverage.

Table 3 reports the regression coefficient for two models. First column shows the regression coefficient when initial leverage is taken as the sole explanatory variable. In the second column controls variables motivated by Rajan and Zingales (1995), Frank and Goyal (2009) and Lemmon et al. (2008) are included in addition to initial leverage. Age is also included as an explanatory variable. Results are presented for book and market leverage ratios.

As can be seen from column one, significant positive relationship exists between book leverage and initial leverage ratio. For one standard deviation increase in the initial leverage ratios book leverage (market leverage) increases by 8% (6%). Adjusted R-square from regression analysis shows that 16% (10%) of the variation in book (market) leverage could be explained by the initial leverage ratios only. In column two, we include conventional capital structure determinants which are proved to have a consistent relationship with leverage in empirical studies, along with the initial leverage ratios. Surprisingly, initial leverage has the single largest effect on book leverage even after time-varying determinants are taken into considerations. Moreover, including the

conventional capital structure determinants increases the adjusted R-square from 16% to 28%, a magnitude of only 12% increase. Our findings are consistent with Lemmon et al. (2008) who find a significant positive relationship between initial leverage and firms` future leverage ratios for US firms and this relationship remain existent even after traditional capital structure determinants are taken into considerations.

Among the control variables, industry median leverage generates the largest effect on leverage in this specification. For one standard deviation increase in industry median leverage, book leverage (market leverage) increases by 5% (6%). Firms in a particular industry tend to follow a similar target capital structure which is consistent with the trade-off theory.

Firm size and leverage are significantly positively related which is also consistent with the trade-off theory. For one standard deviation increase in firm size, book leverage and market leverage increases by 2%. Large firms are more diversified, thus have the low risk of failure. Besides, cost of issuing debt is also lower for large firms. Rajan and Zingales (1995) have reported the positive effects of firm size on leverage for Japanese firms. Tangibility is significantly positively related to market leverage, indicating the importance of collateral in the case of borrowing. In the event of default, collateralized assets could be sold to recover the loaned money, which increases the creditworthiness of firms with high tangible assets. Profitability is significantly negatively related to leverage which is consistent with the pecking order theory (Myers and Majluf, 1984). Rajan and Zingales (1995) and Wald (1999) have also reported a significant negative relationship between profitability and leverage for Japan. Market-to-book ratio is significantly negatively correlated with market leverage. High growth firms prefer less debt to maintain financial slack to take advantage of future investment opportunities. Besides,

risk of financial distress is also high for such firms. Alternatively, this could be related to the timing of equity issuance because firms prefer to issue more equity when market price is high.

Surprisingly, a significant positive relationship is observed between book leverage and cash flow volatility. Keiretsu firms, because of their interlocking shareholdings and relationships with the main bank, can undertake riskier activities than nonmember firms, which may lead to a positive relationship between leverage and cash flow volatility. Wald (1999) also reports a positive relationship between leverage ratio and cash flow volatility for Japan.

Age is significantly positively related to leverage. Debt is used in mature firms as a disciplining device to check on agency problems. However, because of unique institutional settings, agency problem in Japan is considered low. Japanese firms has been using bank loan as the prime source of financing. It is not until 90`s that capital market began to play a major role in financing. If firms stick to their initial leverage ratio older firms must have a higher leverage ratio.

[Insert Table 3 around here]

5.2 Keiretsu versus non-keiretsu firms

One of the unique characteristics of Japanese industrial organization is the keiretsu form of business organization. Most of the Japanese firms are member of the six major industrial groups Mitsubishi, Mitsui, Sumitomo, Fuyo, Dai-ichi Kangyo, and Sanwa. Keiretsu firms are firms which are member of these six major industrial groups and participate in the president club. The rest are non-keiretsu firms. The data for keiretsu

firms is obtained from the Kigyo Keiretsu Soran. Every year 20-25% firms are included in the keiretsu firms.

[Insert Table 4 around here]

Table 4 provides summary statistics about keiretsu and non-keiretsu firms. The table shows that keiretsu firms have higher book and market leverage than that of non-keiretsu firms. Market-to-book value, size, cash flow volatility and age of keiretsu firms are also higher than that of non-keiretsu firms. Profitability and tangibility of keiretsu firms are lower than that of non-keiretsu firms.

[Insert Table 5 around here]

Table 5 shows results of the regression analysis when leverage is regressed on initial leverage, control variables and keiretsu dummy. A unique characteristic of Japanese firms is keiretsu. We made an analysis to find out whether keiretsu firms have an effect on firm's future leverage. For this purpose, we used a dummy variable in the regression analysis to indicate whether a firm is a keiretsu firm or not. Firms included in the keiretsu are changed from time to time. For example, keiretsu firms dummy from 1980 to 1983 are based on the information published in 1973. Again in the year 1984 there has been a change in the composition of keiretsu firms. So the keiretsu dummy in the following years is based on this information until new keiretsu firms list is published. The same process has been used to indicate the keiretsu and non-keiretsu firms every time a new list of keiretsu firms is published. Since there has been no publication after 2000, keiretsu dummy in the following years are assumed to be the same as prior year.

Results of the regression analysis are presented for two sub-periods, the pre-bubble period and the post bubble period. In the pre-bubble period, during 1970s and

1980s Japan's economy was growing very quickly. Bank loan had been the major source of financing for firms. After the burst of the bubble in 1990, financial system had been deregulated and market started to play a role in financing.

Regression result shows that initial leverage is significantly positively related to future leverage. Control variables maintain the same sign and significance as regression analysis in table 3. Our main variable of interest keiretsu dummy is significantly positive which means that keiretsu firms have higher leverage than the non-keiretsu firms. Keiretsu firms are characterized by cross shareholdings and have special relationship with the main bank. Because of this, keiretsu firms can take on more leverage than the non-keiretsu firms. Nakatani (1984) and Hirota (1999) have also reported that keiretsu firms have higher leverage than non-keiretsu firms. Moreover, keiretsu dummy is significantly positive irrespective of the time period we take into account. Guo (2007) finds that keiretsu affiliations are beneficial to firms, even in the latter period.

5.3 Variance decomposition of leverage

Regression analysis shows a time-invariant factor is missing from existing capital structure specifications that have a significant influence on firms` future leverage ratios. To find out how important the unobserved factor is compare to the time varying factors, we perform a variance decomposition of leverage ratios. Within firm and between firms variation in book leverage ratio is 11.50% and 17.18% respectively. For market leverage the estimates are 13% and 17.38% respectively. Between firm variations in book leverage (market leverage) is 50% (33%) larger than that of within firm variation. This finding suggests that firms leverage ratios varies more across firms than over time which is consistent with figure 2. An unobserved factor(s) keeps the cross sectional differences in leverage ratios remain persistent over long term. Next, we perform an analysis of

covariance (ANCOVA), to examine the contribution of time varying and unobserved factors in the variation of leverage ratios. The analysis is based on following regression model:

$$Leverage_{it} = \alpha + \beta X_{it-1} + \eta_i + \nu_t + \varepsilon_{it} \qquad (2)$$

Where α is the constant, X represents 1-year lagged control variables, ν_t is the time-fixed effect, η_i is firm fixed-effect, ε_{it} is the random error term, i indexes firms and t indexes year respectively. In this regression model firm fixed effect is taken into consideration which is not included in the first regression model.

Table 6 reports the result of analysis of covariance (ANCOVA). Each Column in the table presents different model specifications using conventional capital structure variables and firm-specific effects. The numbers in the body of the table except the last row report the partial sum of square for each factor in the model. To get this figure, we calculate the partial sum of square of every model and normalize the effect for each factor. The sum of each column is 1.The normalized partial sum of square corresponding to each factor indicate the percentage of variation in leverage ratios that can be explained by that factor. For example, in column (d) the value corresponding to profitability is 0.13, meaning 13% of the variation in leverage ratios can be explained by profitability. When only one factor is taken into considerations, the total variation in leverage ratios is attributable to that factor. For example, in column (a) and (b) when we examine only firm-specific effect and time effect, we assign a value of 1 to that factor.

The adjusted R-square reported at the bottom row of the table shows percentage of the variation in leverage ratios that can be explained by each model. Adjusted R-square corresponding to Column (a) shows about 70% (57%) of the variation in book leverage (market leverage) ratios can be explained by the firm fixed effect only. Whereas column

(b) shows only 7% (15%) of the variation in book leverage (market leverage) ratios can be explained by time fixed effect. This finding implies that cross sectional variation in leverage ratios explain most of the variation in leverage ratios than time series variation. This result is also consistent with the figure 2 which shows leverage ratios of Japanese firms remain stable over long term but cross sectional differences remain persistent.

In order to find out the predictability of traditional capital structure determinants we include time varying determinants inspired by Rajan and Zingales (1995), Frank and Goyal (2009). Column (d) shows R-square from this specification is 25%. However, adding firm-fixed effect to this model increases the adjusted R-square from 25% to 75%. For market leverage the value of R-square increases from 41% to 64%.This implies that time varying determinants cannot explain all the variation in leverage ratios. Rather unobserved factors have more explanatory power than traditional capital structure determinants.

In column (f) and (g), we add keiretsu and age as a unique characteristics of Japanese firms. This model specification shows time varying factors can explain 39% (48%) of the variation in book (market) leverage whereas 77% (67%) of the variation in book (market) leverage ratios can be explained when firm effect is added to the model. Adding firm effect in this model also increases the adjusted R-square substantially. In sum, in all specifications unobserved factors explain a significant fraction of the variation in leverage ratios. Time varying factors derived from traditional capital structure theories cannot explain majority of the variation in leverage ratios.

Our results are analogues to Lemmon, Roberts and Zender (2008), who find that most of the variation in leverage ratios is cross sectional as oppose to time series variation. Firm-fixed effect alone can explain 60% of the variation in leverage ratios for US firms

whereas only 1% of the variations in leverage ratios can be explained by time varying factors. They conclude that an important unobserved factor is missing from the existing model and this factor has more explanatory power than any other traditional capital structure determinants.

[Insert Table 6 around here]

5.4 Short run versus long run effects

The existence of adjustment costs often prevent firm from immediately adjusting to target leverage ratio. In such a case firms may allow the leverage ratios to move around a range which could result in persistent effect in leverage ratios. The variability in leverage ratios cannot be completely explained by taking only one year lag in the determinants, if there is any delay in the adjustment to target leverage ratio. To account for such a possibility, we estimate the following regression model using a six-year lag:

$$Leverage_{it} = \alpha + \beta_s X_{it-s} + \gamma Leverage_{i0} + \nu_t + \varepsilon_{it} \qquad (3)$$

Where, $Leverage_{i0}$ is the firm's initial leverage, X represents the control variables, ν_t is the time-fixed effect, and ε is the error term. We assume that ε is potentially heteroskedastic and correlated within firms. Using the Akaike Information Criterion (AIC), the coefficient estimates are calculated for using six-year lag in control variables. Table 7 compares the short-term and long-term regression coefficients for book leverage and for market leverage. The first and second columns indicate the changes in leverage in response to the short-run and long-run changes in the leverage determinants, respectively. Short-run changes in leverage are measured using one-year lagged explanatory variables. Long-run changes in leverage are calculated using six-year lagged control variables. We multiply each regression coefficient by the corresponding variable's standard deviation to enable comparability. The scaled regression coefficients indicate the

percentage changes in leverage for one standard deviation changes in the leverage determinants.

Table 7 shows positive relationship between leverage and firms` initial leverage remain in existence even if long run lag in leverage determinants is taken. This finding is complementary to the long term trend in leverage ratio for Japanese firms that a high levered firm continues to maintain high leverage and a low levered firm continues to maintain low leverage for long term.

For some control variables long run lag result in larger impact on firms future leverage ratios. For example, one standard deviation increase in firm size results in 2% increase in future leverage ratios in the short run and 3% increase in leverage ratios in the long run. For some other variables, long run lag does not result in greater or even different coefficient estimates than when short run lag is taken into considerations. The short run coefficient shows that for one standard deviation increase in profitability firms future leverage ratios decreases by 3% both in the short run and in the long run as well. Industry median leverage has the largest impact on leverage in the short run. For one standard deviation increase in industry median leverage, firm's future leverage ratios increases by 5%. However, in the long run the initial large impact on leverage falls. For one standard deviation increase in industry median leverage ratios, book leverage increases by 2% in the long run. Adjusted R-square shows 20.32% (28%) of the variation in book (market) leverage ratios can be explained by the traditional capital structure determinants when 6 year lag in control variables is taken into considerations. Only a small fraction of the variation in leverage ratios can be explained by the traditional capital structure determinants irrespective of the lag in the leverage determinants is taken into considerations.

[Insert Table 7 around here]

5.5 Effect of unobserved firm-specific variables on leverage

From previous analysis, it is clear that an unobserved factor is missing from the existing model of capital structure. Firm specific factor(s) explain a large fraction of the variation in leverage ratios. This finding is in line with Lemmon et al. (2008) that majority of the variation in leverage ratios is cross sectional as oppose to time varying. Existence of unobserved factors like culture, technology, managerial characteristics has also been documented in other studies. For example, Hirota et al., (2007) report culture has a significant effect on firms leverage ratios. Hackbarth (2008) reports a significant impact of managerial characteristics on firms` capital structure. If the unobserved factor is not accounted for in the capital structure model, the coefficient estimates will be biased. Pooled Ordinary Least Square regression ignores firm-specific effects and serial correlation in the errors structure whereas fixed effects regression is a powerful tool for removing omitted variables.

Table 8 presents the coefficient estimates from the pooled OLS regression and fixed effect regression. Pooled OLS regression is estimated using the following equation:

$$Leverage_{it} = \alpha + \beta X_{it-1} + \nu_t + \varepsilon_{it} \qquad (4)$$

Fixed effect method regression is estimated using the following equations:

$$Leverage_{it} = \alpha + \beta X_{it-1} + \eta_i + \nu_t + \mu_{it} \qquad (5)$$

$$\mu_{it} = \rho\mu_{it-1} + \omega_{it} \qquad (6)$$

Where α is the constant, X represents 1-year lagged control variables, η_i is firm fixed-effect, ν_t is the time-fixed effect. μ is assumed to be stationary and ω is assmumed to be serially and cross-sectional uncorrelated but possibly heteroskedastic.

The marginal effect of all variables is statistically significant in OLS and fixed-effect model specifications except for age. Leverage is significantly positively related to age when between firm variations in leverage is taken into considerations in pooled OLS regression. However, when only within firm variation is taken into considerations in fixed effect regression leverage turns insignificantly negative. Possibly old firms have higher level of debt than young firms but over time the old firm may itself be reducing its leverage.

Although statistically significant, other variables show significant decline in coefficient value from pool OLS to fixed effect regression. Some of the variables fall by 100% or more than that. On an average both book and market leverage estimates fall by 40% when fixed effect method is used.[1] Estimated serial correlation coefficient for book and market leverage is 0.70 and 0.65 respectively which indicates there may be serial correlation in the error structure. The differences in regression coefficients from pooled OLS to fixed effect regression could be attributed to unobserved firms-specific effect.

[Insert Table 8 around here]

6. Conclusion

Motivated by the inconclusive evidence on capital structure determinants and recent evidence on the persistence in leverage ratios over the long term (Lemmon et al., 2008), this study examines the determinants of capital structure of non-financial firms listed on the Tokyo Stock Exchange. This study demonstrates that the capital structure of Japanese firms remains largely unchanged over long periods. Highly levered firms remain highly leveraged and low levered firms remain low leveraged for the long term despite

[1] Hausman test is performed to choose between fixed effect and random effect model. Chi square value of the test is found to be 4610.86. Statistically significant p values indicate significant differences exist in parameter estimates between the models. Fixed-effects (within) model is more preferable than the random effects model.

some convergence in the short term. Time varying determinants explain only a small part of the variations in the leverage ratios. The persistent effect in the leverage ratios cannot be explained using traditional theories. It appears that some unobserved factors are missing from existing specifications. The regression results show a significant positive relationship between initial leverage and future leverage ratios. The relationship holds whether we take into account other time varying leverage determinants, which indicates that firms' future leverage ratios are closely related to past financing activities. The fixed effect regression also shows that removing unobserved factors from the regression analysis causes the value of the coefficient estimates to decline. These unobserved factors remain constant over the long term, causing firms' leverage ratios to remain persistent for decades. Current capital structure theories consider only time varying determinants and ignore important time invariant component(s). Additionally, this study finds that old firms have higher leverage than young firms and keiretsu member firms have a significantly higher leverage than non-keiretsu firms.

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Figure 1: Firm characteristic across leverage quartiles

The sample consists of all non-financial firms listed on the First and Second Section of Tokyo Stock Exchange for the period 1980 to 2014. There are large differences in firm characteristics between very high and low leverage firms. Leverage in general is negatively related to profitability, market-to-book ratios and positively related to age, tangibility, firm size, volatility of earnings. However, some of the relationships are non-linear in nature. For example, although tangibility is positively related to leverage, very high leverage firms do not have the highest tangibility.

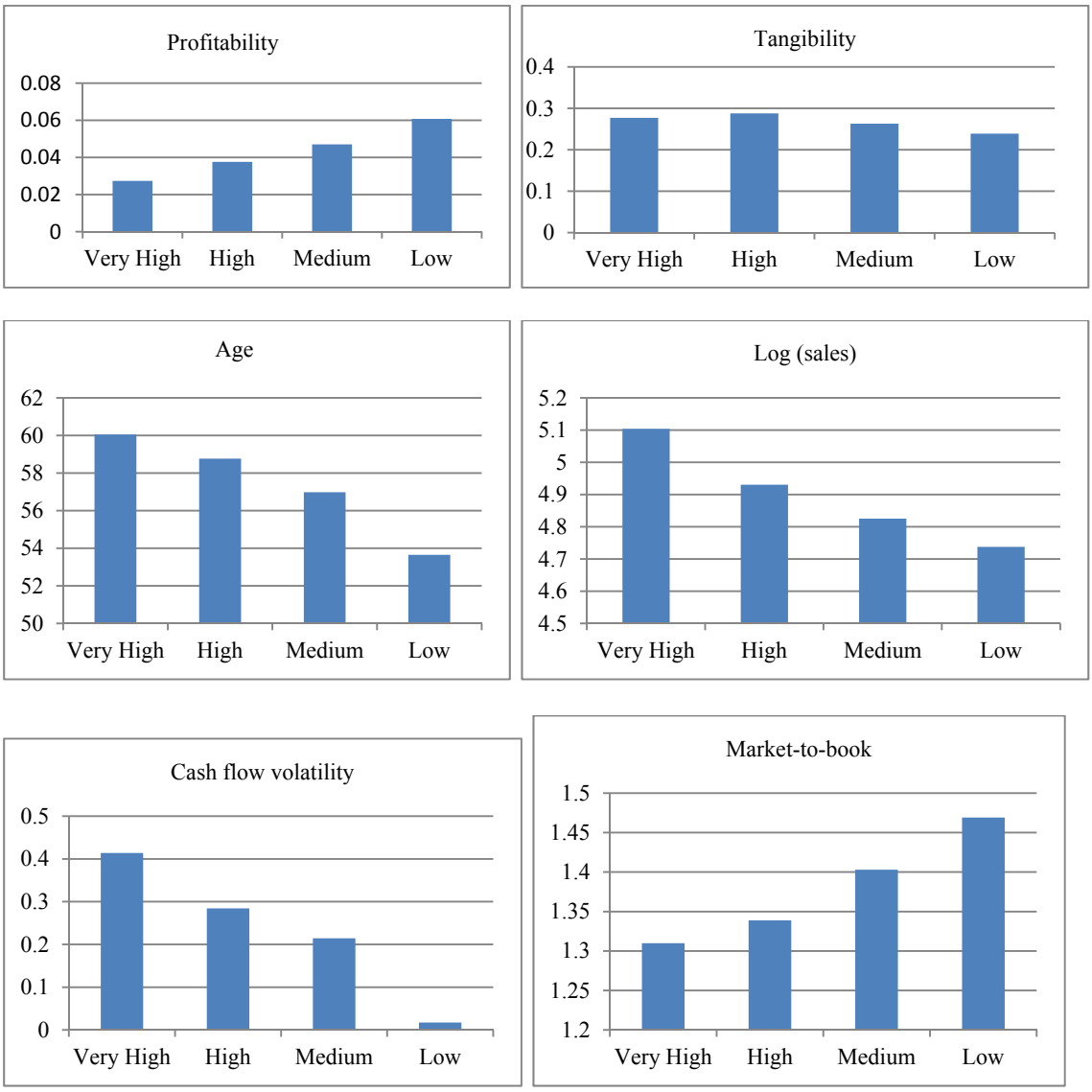

Figure 2: Trends in book and market leverage ratios

The sample consists of all non-financial firms listed on the First and Second Section of Tokyo Stock Exchange for the period 1980 to 2014.The graph shows average book and market leverage ratios of four portfolios over a period of twenty years. Left panels present the graphs for total sample and right panels present the graphs for survivor firms for both book and market leverage. To get the figure, at first we rank firms based on their leverage ratios and divide it into four equal portfolios- very high, high, medium and low. The starting period is denoted as 0. We observe the leverage ratios of each portfolio without changing any of the constituents in the following twenty years. This process is repeated for every year for total sample and final result is the average of these 35 sets of averages across the event time. Survivor firms must have 20 years continuous leverage data. Thus, we repeat the process for survivor firms until 1994 and average these 15 sets of averages across the event time. Finally, the event time averages are plotted in a trend line on the graph.

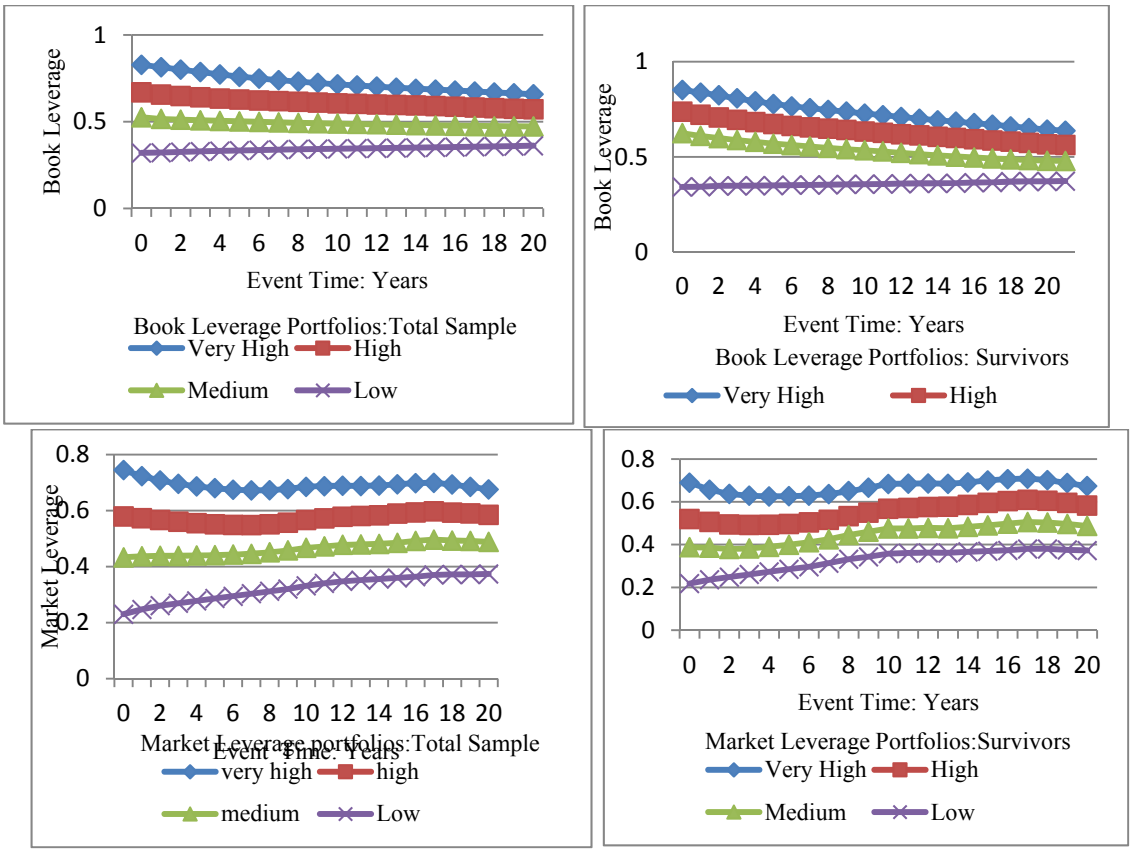

Figure 3: Trends in unexpected book & market leverage ratios

The sample consists of all non-financial firms listed on the First and Second Section of Tokyo Stock Exchange for the period 1980 to 2014.The graph shows average leverage ratios of firms for total sample and sub-sample of survivor firms for both book as well as market leverage. Every year we sort firms based on unexpected book (market) leverage ratios instead of total book (market) leverage ratios as in figure 2.Unexpected leverage ratio is the residuals from the cross sectional regression of leverage on traditional capital structure determinants. We then divide firms into four equal portfolios and observe how the leverage ratios changes over twenty years without changing any composition in the portfolios. We get 35 sets of averages which are then again averaged across the event time to get the final trend line for each portfolio. Survivors firms must have at least 20 years data. Thus, we repeat the process for survivor firms until 1994 and average these 15 sets of averages across the event time.

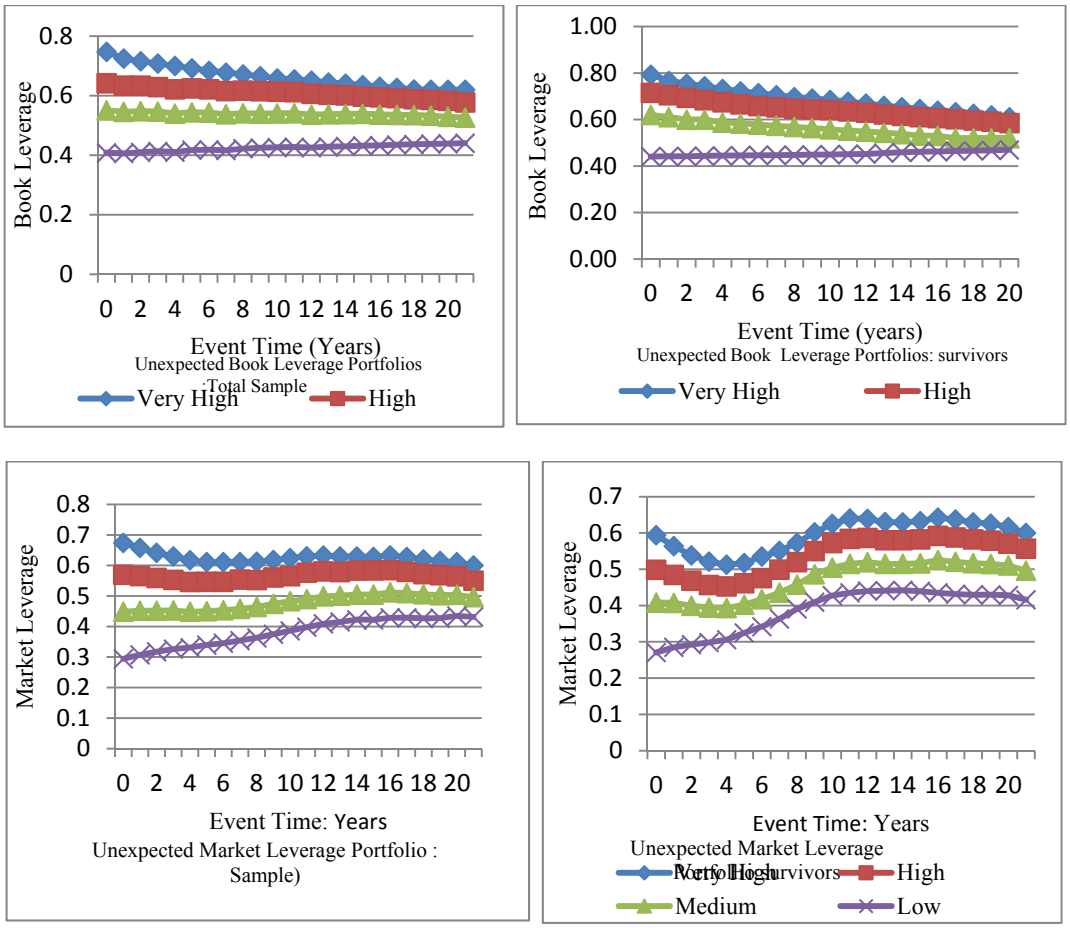

Table 1: Descriptive statistics

The sample consists of all non-financial firms listed on the First and Second Section of Tokyo Stock Exchange from 1980 to 2014. Table 1 presents means, standard deviations (SD), maximum and minimum values of the variables used in the study for the entire sample. Variable definitions are provided in the sample selections and methodology sections.

Variable	Mean	SD	Min	Max
Book Leverage	0.54	0.20	0.00	0.99
Market Leverage	0.49	0.21	0.00	0.99
Log (sales)	6.20	2.22	1.79	12.73
Market-to-book	1.24	0 .87	0.02	34
Profitability	0.04	0.06	-7.50	0.58
Tangibility	0.26	0.16	0.00	0.94
Industry median leverage	0.57	0.09	0.31	0.91
Cash Flow Volatility	0.02	0.11	0.00	10.12
Age	54.71	20.97	2.00	132
Observations	45419			

Table 2: Correlation matrix

The sample consists of all non-financial firms listed on the First and Second Section of Tokyo Stock Exchange for the period 1980 to 2014. The numbers in the table shows the correlations between different control variables that are used in this study. Correlation analysis shows a positive relationship between industry median leverage, tangibility, firm size, cash flow volatility and book leverage. Negative relationship exists between profitability and book leverage. Market-to-book is not related to book leverage ratios. Keiretsu affiliation is positively related to leverage.

		1	2	3	4	5	6	7	8	9	10
1	Book Leverage	1									
2	Initial Leverage	0.38	1								
3	Industry Med. Leverage	0.37	0.19	1							
4	Profitability	-0.12	-0.07	-0.03	1						
5	Tangibility	0.02	-0.00	0.06	0.00	1					
6	Market-to-book	0.00	-0.03	-0.03	0.01	-0.02	1				
7	Firm Size	0.06	0.08	-0.05	-0.02	0.00	-0.21	1			
8	Volatility	0.04	-0.00	0.08	-0.02	0.01	0.03	-0.04	1		
9	Age	-0.03	-0.07	0.01	-0.16	0.03	-0.04	-0.13	0.08	1	
10	Keiretsu	0.14	-0.02	-0.03	-0.10	-0.01	-0.01	0.27	0.09	0.25	1

Table 3: The effect of initial leverage on future leverage

The sample consists of all non-financial firms listed on Tokyo Stock Exchange First and Second Section for the period 1980 to 2014. The table presents standardized regression coefficients from panel OLS regression of book leverage and market leverage on two different specifications. The scaled regression coefficients indicate the percentage change in leverage for one standard deviation change in the independent variables. For example, regression coefficients in column one shows 8% percent of the variation in book leverage can be explained by initial leverage ratios only. Year fixed effect indicates whether calendar year fixed effects are included in the model. Adjusted R^2 measure the percentage of variation in leverage ratios that can be explained by each model specifications. For example, R^2 corresponding to column one shows 16% of the variation in leverage ratios can be explained by initial leverage ratios only. The t-statistics presented in the parentheses are calculated using standard errors robust to both clustering at the firm level. The variable definitions are provided in the methodology section.

Variables	Book Leverage		Market Leverage	
Initial Leverage	0.08***	0.06***	.06***	0.04***
	(19.54)	(14.12)	(14.01)	(11.12)
Log(sales)		0.02***		0.02***
		(5.35)		(4.75)
Market-to-book	.	-0.00		-0.04***
		(-1.11)		(-6.89)
Profitability		-0.03***		-0.05***
		(-2.35)		(-15.77)
Tangibility		0.00		0.01***
		(0.92)		(2.92)
Industry median lev.		0.05***		0.06***
		(13.41)		(15.50)
Cash flow volatility		0.01***		0.00
		(6.68)		(0.93)
Age		0.03***		0.03***
		(7.41)		(6.85)
Year fixed effects		Yes		Yes
Adj. R^2	16%	28%	10%	37%
Observations	38557	38557	38557	38557

*** indicates significance at 1% level and ** indicates significance at 5% level

Table 4: Descriptive statistics: Keiretsu and non-keiretsu firms

Sample firms include all firms listed on the First and Second Section of Tokyo Stock Exchange for the period 1980 to 2014. Table 4 presents means, standard deviations (SD) of the variables used in the study for keiretsu and non-keiretsu firms. Variable definitions are provided in the sample selections and methodology sections.

	Keiretsu		Non-keiretsu	
Variables	Mean	SD	Mean	SD
Book Leverage	0.63	0.17	0.57	0.15
Market Leverage	0.52	0.20	0.49	0.21
Profitability	0.03	0.03	0.04	0.06
Tangibility	0.25	0.20	0.27	0.69
Market-to-book	1.37	1.2	1.22	1.05
Log(sales)	5.18	0.63	4.82	2.40
Cash flow volatility	0.02	0.04	0.01	0.12
Age	65	19	52	18
Observations	8,868		36,551	

Table 5: Leverage of keiretsu and non-keiretsu firms in the pre- and post-bubble periods

The sample consists of all non-financial firms listed on Tokyo Stock Exchange First and Second Section for the period 1980 to 2014. The table presents standardized regression coefficients from panel OLS regression of book leverage and market leverage on firm's initial leverage, control variables and keiretsu dummy. Keiretsu dummy is equal to '1' for keiretsu firms and '0' otherwise. Results are presented for both pre-bubble (1980-1989) and post-bubble (1990-2014) period. The scaled regression coefficients indicate the percentage change in leverage for one standard deviation change in the independent variables. Year fixed effect indicates whether calendar year fixed effects are included in the model. Adjusted R^2 measure the percentage of variation in leverage ratios that can be explained by the model specifications. The t-statistics presented in the parentheses are calculated using standard errors robust to clustering at the firm level. The variable definitions are provided in the methodology section.

Variables	Pre-bubble Book Lev.	Pre-bubble Market Lev.	Post-bubble Book Lev.	Post-bubble Market Lev.
Initial Leverage	0.04***	0.04***	0.03***	0.03***
	(7.22)	(8.97)	(4.33)	(5.08)
Industry Median Lev.	0.04***	0.06***	0.07***	0.07***
	(7.89)	(13.80)	(11.95)	(14.97)
Profitability	-0.08***	-0.08***	-0.09***	-0.08***
	(-17.72)	(-16.26)	(-15.30)	(-14.36)
Tangibility	0.01***	0.01**	0.00	0.00
	(3.28)	(1.97)	(0.97)	(1.01)
Market-to-book	-0.01***	-0.05***	0.01	-0.05***
	(-2.33)	(-5.53)	(.54)	(-4.77)
Log (sales)	0.00	0.04***	0.08***	0.01
	(0.48)	(3.00)	(4.18)	(0.59)
Cash flow volatility	0.01***	0.01***	0.01**	0.00
	(4.40)	(3.13)	(1.90)	(.19)
Age	0.02***	0.01***	0.03***	0.02***
	(5.12)	(3.67)	(5.92)	(4.5)
Keiretsu	0.02***	0.01	0.01**	0.01***
	(3.59)	(1.23)	(2.20)	(3.54)
R^2	21%	33%	27%	40%
Observations	11,017	27,540	11,017	27,540

***indicates significance at 1% and ** indicates significance at 5% level.

Table 6: Variance decomposition analysis

The sample consists of all non-financial firms listed on the First and Second Section of Tokyo Stock Exchange for the period 1980-2014. The table presents the variance decompositions for various model specifications. We calculate the partial sum of square for each model specifications and normalize the effect of each factor by dividing it by the total sum of square. Thus the sum of all effects in a column will be 1. Firm FE are firm fixed effects and Year FE are calendar year fixed effects. The adjusted R^2 in the bottom of the table shows how much of the variation in leverage ratios can be explained by these factors. For example, R^2 corresponding to column (g) shows 77% (67%) of the variation in leverage ratios can be explained by this model specifications. The numbers in the body of the table indicate the sum of square explained by the each factor. For example, in column (g) 6% (4%) of the variation in leverage ratios can be explained by the factor profitability.

Panel A: Book Leverage							
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
Firm FE	1.00		0.77		0.85		0.82
Year FE		1.00	0.33	0.41	0.03	0.39	0.03
Log (sales)				0.07	0.01	0.04	0.00
Market-to-book				0.00	0.00	0.01	0.00
Profitability				0.13	0.04	0.21	0.06
Tangibility				0.01	0.03	0.02	0.05
Industry med lev				0.37	0.04	0.27	0.01
Cash flow volatility				0.01	0.00	0.00	0.00
Age						0.03	0.02
Keiretsu						0.03	0.01
Adj. R^2	0.70	0.07	0.76	0.25	0.75	0.39	0.77
Panel B: Market Leverage							
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
Firm FE	1.00		0.70		0.67		0.63
Year FE		1.00	0.30	0.34	0.17	0.30	0.20
Log (sales)				0.01	0.04	0.01	0.01
Market-to-book				0.09	0.05	0.07	0.07
Profitability				0.21	0.03	0.22	0.04
Tangibility				0.01	0.01	0.01	0.01
Industry med lev				0.34	0.03	0.35	0.01
Cash flow volatility				0.00	0.00	0.00	0.00
Age						0.02	0.02
Keiretsu						0.01	0.01
Adj. R^2	0.57	0.15	0.60	0.41	0.64	0.48	0.67

Table 7: Short run versus long run effects

The sample consists of all non-financial firms listed on the First and Second Section of Tokyo Stock Exchange for the period 1980 to 2014. The table presents the parameter estimates under both short run and long run lag in the determinants. Parameter estimates under short run is calculated using 1-year lag in the determinants. Parameter estimates under long run is calculated using 6-year lag in the determinants. The scaled regression coefficient derived by multiplying regression coefficients by corresponding standard deviations, indicate the percentages changes in the dependent variable for one standard deviation changes in the independent variable. Year fixed effects indicate whether calendar year fixed effects are included in the model. The t-statistics presented in the parentheses are calculated using standard errors robust to clustering at the firm level. Variable definitions are provided in the methodology section.

	Book Leverage		Market Leverage	
Variable	Short Run	Long Run	Short Run	Long Run
Initial Leverage	0.06***	0.06***	0.04***	0.04***
	(13.79)	(14.01)	(11.12)	(9.33)
Log(sales)	0.02***	0.03***	0.02***	0.02**
	(5.35)	(5.41)	(4.75)	(4.27)
Market-to-book	-0.00	-0.00	-0.04***	-0.02***
	(-1.11)	(-1.29)	(-6.89)	(-11.12)
Profitability	-0.03***	-0.03*	-0.05***	-0.02
	(-2.33)	(-1.68)	(-15.77)	(-1.57)
Tangibility	0.00	0.00	0.01***	0.00
	(0.92)	(1.18)	(2.92)	(1.26)
Industry median leverage	0.05***	0.02***	0.06***	0.07***
	(13.41)	(6.55)	(15.50)	(14.86)
Cash flow volatility	0.01***	0.02***	0.00	0.00
	(6.68)	(6.55)	(.93)	(1.02)
Age	0.03***	0.04***	0.03***	0.00***
	(7.41)	(6.98)	(6.85)	(6.64)
Year fixed effects	Yes	Yes	Yes	Yes
Adj. R^2	28%	20.32%	37%	28%
Observations	38557	29885	38557	29885

***indicates significance at 1% and ** indicates significance at 5% level.

Table 8: Coefficient estimates in OLS and fixed effect model specifications

The sample consists of non-financial firms listed on the First and Second Section of Tokyo Stock Exchange for the period 1980 through 2014. The table presents the parameter estimates for both book and market leverage under pooled OLS and fixed effect regressions. t-values for corresponding regression coefficients are reported in the parentheses. The standard errors for pooled OLS regressions are robust to heteroskedasticity and within firm equicorrelation. The standard errors for the firm fixed effect regressions are robust to heteroskedsticity and within-firm serial correlation. AR (1) is the first-order serial correlation coefficient estimate.

Variable	Book-Leverage (Pooled OLS)	Book-Leverage (fixed-effect)	Market-Leverage (Pooled OLS)	Market-Leverage (fixed-effect)
Initial Leverage	0.03***		0.03***	
	(5.18)		(6.29)	
Profitability	-0.09***	-0.04***	-0.06***	-0.04***
	(-18.83)	(-15.23)	(-17.14)	(-19.20)
Tangibility	0.002	-0.00	0.00	0.00
	(0.99)	(-0.07)	(1.03)	(0.43)
Market-to-book	-0.002	0.00***	-0.03***	-0.02***
	(-0.25)	(2.88)	(-6.09)	(-5.63)
Log (sales)	0.09***	0.08***	0.03	0.05***
	(3.82)	(5.07)	(1.30)	(8.43)
Industry Median Lev.	0.07***	.03***	0.07***	-0.04***
	(12.09)	(3.54)	(16.16)	(-2.46)
Cash-flow volatility	0.004***	0.00	-0.00	-0.00
	(2.58)	(0.97)	(-1.03)	(-0.94)
Age	0.02***	-.00	0.01***	-0.00
	(6.18)	(-1.44)	(4.82)	(-0.01)
Keiretsu	0.02***	.00***	0.01***	0.00**
	(4.99)	(5.32)	(3.40)	(2.16)
R^2	32%	75%	39%	62%
AR(1)		0.70		0.67
Observations	38,557	38,557	38,557	38,557

***indicates significance at 1% and ** indicates significance at 5% level.

Chapter 4

Determinants of Capital Structure: Insight from Private Firms

Abstract

This study examines the capital structure of Japanese private firms. Using a dataset over a period of more than thirty years, the study shows that the leverage ratios of private firms remain stable over the long term and exhibit greater persistence than do those of public firms. Regression analysis shows that the firms' future leverage ratios are significantly positively related to initial leverage ratios. Most of the variation in leverage ratios can be explained by unobservable factors. Private firms are found to have a significantly higher leverage ratio than public firms. Adjustment to the target leverage ratio is slower for private firms than for public firms, reflecting the high adjustment costs of the former.

Keywords: capital structure, leverage, determinant, stability, Japan

1. Introduction

Theories of capital structure relate differences among financing decisions to a number of firm-specific characteristics. Empirical studies based on these theories focus on public firms. Few studies analyze the capital structure decisions of private firms. Although public and private firms may be comparable in terms of firm-specific characteristics, sources of financing for private firms are limited. Public firms can access the external capital market to raise equity, but private firms have little flexibility in financing (Huyghebaert and Van Hulle, 2006). Access to external equity and the debt market is limited for private firms. Moreover, information asymmetry is significantly higher in private firms because of a lack of information disclosure. Ownership in private companies is concentrated in the hands of a group of investors who are likely to retain control over the firms and be unwilling to issue external equity (Stulz 1988; Amihud et al. 1990). The information asymmetry and ownership concentration prevalent in private firms are likely to increase the costs of debt. Saunders and Steffen (2011) find that the cost of issuing debt is significantly higher for private firms than for public firms.

The capital structure decision of private firms could be different than that of public firms as private firms do not have easy access to external financing as public firms and compared to public firms, costs of financing is high because of higher frictions. Several studies have documented such differences in other developed countries. Brav (2009) documented that private firms in the UK use more leverage than do the public firms. Frank and Goyal (2011) provided evidence of significantly higher leverage used by private firms in the U.S. In a study on ten western European countries, Karin (2012) finds that unlisted firms are financially constrained. Significant unobservable institutional differences across countries explain more variation in leverage ratios of small and

unlisted firms than that for large and listed firms. Although previous studies show that institutional features of private firms are different from those of public firms and that leverage decision of private and public firms are different, there is no compatible study in Japan on the differences of capital structure decisions of public and private firms. How the capital structure decisions are made by these firms remain unresolved. Lack of empirical evidence on the capital structure decisions of private firms motivates us to conduct this study.

This study seeks to identify the factors that determine capital structure decisions made by private firms. It addresses two questions: How does a firm's access to external equity market affect its choices of financing, and are there any differences between the capital structure decisions made by private and public firms? This study uses data on Japanese private firms covering 1980 to 2014 and compares its results with those on public firms listed on the First Section of the Tokyo Stock Exchange.

This study finds that the leverage ratios of private firms are significantly higher than those of public firms. We find that private firms have more leverage than public firms, even when firm-specific differences are removed using propensity score matching. We also examine how the leverage ratios of private firms change over time and compare them with those of public firms. Following the methodology of Lemmon, Roberts, and Zender (2008), we find that the leverage ratios remain stable over the long term and that the differences among the portfolios remain persistent. The book leverage ratio range is 62% for private firms and 50% for public firms in the formation period. After 20 years, the range in book leverage ratios is 44% for private firms and 29% for public firms. There are smaller changes in leverage ratios for private firms than for public firms. The leverage ratios of private firms exhibit greater persistence than do those of public firms. The

adjusted R^2 from a regression of leverage on firm-specific effects shows that almost 72% of the variation in leverage ratios can be explained by the unobserved factor, whereas the adjusted R^2 from a regression of leverage on traditional capital structure determinants can explain almost 31% of the variation in leverage ratios. Thus, unobserved factors can explain more than twice the variation in leverage ratios than can be explained by the traditional capital structure determinants.

The regression result shows that initial leverage is significantly positively related to leverage. Almost 48% of the variation in the leverage ratios of private firms can be explained by the initial leverage ratios. Among traditional capital structure determinants, leverage is negatively related to profitability and positively related to tangibility, age, and industry median leverage for both samples. Sales growth, a proxy for the firm's future growth opportunities, is significantly positively related to leverage. A negative relationship is generally expected because growing firms want to maintain flexibility for future financing. The positive relationship may result from private firms' limited sources of financing. As private firms have limited access to the external equity market, they have to rely on debt financing. Cash flow volatility is negatively related to leverage for private firms but becomes significantly positive when both public and private firms are included in the sample. Badertcher et al. (2015) find that, as private firms cannot access the public equity market, they have a higher bankruptcy risk. The significantly negative relationship could thus be due to the higher risk of bankruptcy among private firms relative to public firms.

To the best of our knowledge, this is the first study to examine the determinants of the capital structure of Japanese private firms. Several studies have investigated the leverage positions of public firms in Japan (Fukuda and Hirota, 1996) or an international

comparison of capital structure (Rajan and Zingales, 1995), but no study has comprehensively compared the capital structure of public firms to that of private firms. In addition, a few studies examine the capital structure of private firms (Brav 2009; Degryse et al., 2012; Cole, 2013; Jõeveer, 2013), our study uses a longitudinal data. Our study fills this gap by providing evidence on the factors that make the capital structure of private firms different from that of public firms.

The rest of this paper is organized as follows. Section 2 explains the study's sample selection and methodology. Section 3 describes the basic statistics, followed by a detailed analysis of the determinants of firms' capital structure in section 4. Finally, section 5 concludes the paper.

2. Sample selection and methodology

2.1 Data

Our sample of public and private firms is collected from Nikkei-NEEDS Financial Quest. This study's private firms sample consists of 20,806 firm year observations starting from the period 1980 to 2014. The public firms sample consists of firms listed on the First Section of the Tokyo Stock Exchange. The public firm sample includes 35,717 firm year observations for the period from 1980 to 2014. Firms with book leverage ratios higher than 1 and without continuous book leverage data or other variables required for regression analysis are not included in the sample.

2.2 Method

Since market value data for private firms are not available, this study uses book leverage data to analyze the capital structure of private firms. Following the methodology of Lemmon, Roberts, and Zender (2008), this study examines the trend of private firms' leverage ratios. For each year, firms are sorted on the basis of book leverage ratios and

are divided into four equal portfolios. The leverage ratios for the same portfolio are observed for the next 20 years. Finally, the leverage ratios are averaged across the event time to determine how the leverage ratios change over time. Panel OLS regression models are used to identify the factors that determine the leverage ratios. Book leverage is regressed on initial leverage and other firm-specific factors that previous empirical studies have identified as the most important factors correlated with leverage.

2.3 Variable definition and measurement issues

To examine the factors influencing firms' future leverage ratios, this study uses a number of firm-specific variables. These variables have been used in previous studies (Brav (2009), Titman and Wessels (1988), Rajan and Zingales (1995), Frank and Goyal (2009), Mackay and Phillips (2005), and Lemmon et al. (2008)).

Since the market values of private firms are not available, we rely on the book leverage ratios. Book leverage is defined as the ratio of (1- equity/total book value of assets). Many studies show that book and market leverage yield the same result.

Firm size is measured as the log of total book value of assets. Asset tangibility is measured as the ratio of net property, plant, and equipment to total book value of assets. Profitability is measured as the ratio of operating income before depreciation to total assets. Cash flow volatility is measured as the standard deviation of a firm's last three years' of operating income. Sales growth is used as a proxy for the growth potential of a firm and is obtained by taking the differences between the current and previous year's sales expressed as a percentage of the previous year's sales. Age is the difference between the date of the firm's foundation and the current year. Industry median leverage is the median level of leverage for each industry calculated in every year. First non-missing value of leverage is used as a proxy for initial leverage.

3. Basic results

3.1 Descriptive statistics

Table 1 presents the summary statistics of private, public and matched public firms that are comparable to private firms in terms of size and industry. The first column shows the mean values of leverage ratios and other variables representing private firm's characteristics. The result shows that private firms hold significantly more leverage than the public firms. The mean leverage ratio of private firms is 0.62, that of public firms is 0.55, and that of matched public firms is 0.56. The two-sample t-stat rejects the null hypothesis that private firms hold as much leverage as do public firms at the 1% level. One might argue that the difference in leverage ratios is related to the differences in characteristics between private and public firms. When compared to the leverage ratios of matched public firms, the two-sample t-stat still rejects the null hypothesis that private firms hold leverage equal to that of public firms.

The mean value of the log of total assets is 9.66 for private firms and 10.93 for public firms. The two-sample t-stat shows that private firms are significantly smaller than private firms. Matched public firms are the same size as private firms by construction. However, when tangibility is taken into account, private firms have more tangible assets than public firms. Private firms have a larger proportion of fixed property, plant, and equipment in total assets than do public firms in both samples.

Mean profitability is 0.03 for private firms and 0.04 for public firms. The difference in profitability is statistically significant at the 1% level. No significant difference is observed in sales growth—the measure of a firm's growth opportunities—between public and private firms. Private firms have significantly lower cash flow volatility than public firms in both samples at a 1% level of significance. The average age

of private firms is 51 years. Private firms are significantly younger than the public firms as revealed by the two sample t-statistics.

[Insert Table 1 around here]

3.2 Propensity score matching

We employ propensity score matching to examine the differences in leverage ratios between private and public firms. We match private firms to a set of public firms that are comparable on the basis of observable firm characteristics. We use one-to-one nearest neighbor matching with replacement. Three different specifications are used in a probit regression analysis. These different specifications help us to better understand the differences in leverage ratios between private and public firms. The dependent variable is the private firm's indicator variable, which is equal to one for all private firms and zero for all public firms.

In the first model, the independent variables are Profitability and Firm size. In the second model, the variables used for matching are Firm size, Profitability and Tangibility. In the third model, all the variables listed in Equation 1 are used as independent variables.

The results of the regression analysis show that the differences in leverage ratios between private and public firms are statistically significant at the 1% level. On average, private firms are 5%, 7%, and 6% more highly levered in models 1, 2, and 3, respectively. This result indicates that, even when all differences between private and public firms are removed, private firms remain more leveraged than public firms.

[Insert Table 2 around here]

3.3 Trends in book leverage ratios of private and public firms

To see how the leverage ratios of unlisted firms change over the years, we sort firms based on their book leverage ratios and divide the result into four equal portfolios: very high-, high-, medium-and low-leverage portfolios. For each year, four portfolios are constructed. Starting from 1980 to 2014, we obtain 35 sets of averages for each portfolio. These 35 sets of portfolio averages are then averaged across the event time, producing mean leverage ratios of four portfolios from year 0 to 20. The portfolio averages are then plotted in a trend line as shown in the figure 1.

At the beginning of the portfolio construction period (indicated as event time zero), a large gap exists in the leverage ratios among these four portfolios. For the total sample, the leverage ratio of the very high leverage portfolio is .89 and that of the low leverage portfolio is .27 at the formation period. At the end of 20 years, the leverage ratio of the very high leverage portfolio decreases to 0.78 while that of the low leverage portfolio increases to .34. The differences in leverage ratios between very high and low leverage portfolios are .62 and 0.44 at the beginning and end of the formation period, respectively. The data on survivor firms also show that the average book leverage ratio of the very high leverage portfolio decreases from .91 to .78 while that of the low leverage portfolio remains almost constant, at around .35. The difference in book leverage ratios between very high and low leverage portfolios is 0.56 at the beginning of the portfolio formation period and 0.44, 20 years after the portfolio is formed. A decreasing trend in leverage ratio is observed in all portfolios except the low leverage portfolios. These findings are consistent with the findings in Lemmon et al. (2008) on US public firms. They find that the leverage ratio of US firms exhibit convergence in the short term but that differences in leverage ratios remain persistent in the long term; thus, the leverage ratios of high- (low-)

leveraged portfolios will remain higher (lower) than those of low- (high-) leveraged portfolios.

Following the same methodology trends in leverage ratios of public firms are also examined. Figure 2 shows the average leverage ratios of four portfolios: very high, high, medium and low. At the beginning of the portfolio construction period, a large gap exists in the leverage ratios among these four portfolios. For the total sample, the difference in book leverage ratios between the highest and lowest groups is 0.50 at the formation period. Over time, the gap shrinks, as very high- , high- , and medium-leveraged portfolios' leverage ratios decline and low-levered portfolios' leverage ratios increase. Noticeable convergence is observed among the four portfolio averages over time. After 20 years, the difference between very high and low book leverage portfolios is 0.29. For firms that survived for at least 20 years, the range of average book leverage ratios is 0.51 at the formation period and 0.27 at the end of the formation period. Convergence and persistency in leverage ratios are observed for public firms as in the case of private firms. However, compared to the public firms, private firms leverage ratios remain more persistent. The range in book leverage ratios for private firms is 62% and 50% for public firms in the formation period. After 20 years, the range in book leverage ratios is 44% for private firms and 29% for public firms. The changes in leverage ratio for private firms are smaller than those for public firms, implying that the leverage ratios of private firms remain more persistent than do those of public firms.

[Insert Figure 1 around here]

[Insert Figure 2 around here]

4. Capital structure determinants

4.1 Regression analysis

Figure 1 shows that firms leverage ratios remain stable over the long term. A regression analysis is conducted to examine the relationship between firms' initial leverage ratios and future leverage ratios using the following equation:

$$Leverage_{it} = a + bX_{it-1} + cLeverage_{i0} + dPrivate_{it} + \nu_t + \varepsilon_{it} \quad (1)$$

where α is the constant, *Private* is an indicator variable that takes a value of 1 if the firm is private and 0 if it is public, $leverage_{i0}$ is the firm's initial leverage, X represents a set of 1-year lagged control variables, ν_t is the time-fixed effect, ε_{it} is the random error term, assumed to be possibly heteroskedastic and correlated within firms, *i* indexes firms, *t* indexes year, *b* is the coefficient of control variables, *c* is the coefficient of the main variable, Initial Leverage, and *d* is the coefficient of the dummy variable Private. The first observation of each firm is excluded from the regression to avoid an identity at time zero. To understand the relationship between initial leverage and future leverage, the value and significance of *c* must be observed.

Table 3 presents the regression results for two samples. The first two columns include private firms, and the last two columns include private as well as public firms listed on the Tokyo Stock Exchange First Section. The first column shows the regression results when leverage is regressed only on initial leverage ratios. A significantly positive relationship exists between initial leverage and future leverage ratios for private firms. The scaled regression coefficient indicates that, for a one standard deviation increase in initial leverage ratios, the firm's future leverage increases by 16%. Adjusted R^2 of the regression analysis shows that almost 48% of the variation in book leverage ratios can be explained by the initial leverage ratios only. This result is consistent with the findings in

Lemmon et al. (2008) on US public firms that initial leverage ratio is significantly positively related to a firm's future leverage ratios. This implies that firms' future leverage ratios are influenced by unobserved components. According to McCumber (2014), unobservable firm and industry characteristics are strong determinants of a private firm's capital structure. In the second column, variables representing firm characteristics, used in previous studies (e.g., Rajan and Zingales (1995), Lemmon et al. (2008), Brav (2009), and Frank and Goyal (2009)), are added to the regression equation in addition to Initial leverage. Surprisingly, initial leverage ratios have the largest single effect on a firm's future leverage ratios even when control variables are included in the model. Adjusted R^2 of the regression analysis increases from 48% to 53 % after including control variables in the model. Most of the variation in leverage ratios among private firms can be explained by the initial leverage ratios. Including time varying determinants in the regression analysis increases the adjusted R^2 by 5% only. For the second sample—including both private and public firms—for a one standard deviation increase in the initial leverage ratios, future leverage ratios increases by 11%. Initial leverage ratios can explain 25% of the variation in leverage ratios. In the fourth column, when control variables are included, initial leverage ratios have the greatest single effect on firms' future leverage ratios.

Among the control variables, Firm size is not a significant determinant of leverage ratios of private firms but is significantly positively related to leverage ratios of public firms. Large firms are usually more diversified and have lower risk of bankruptcy. So, large firms can afford to borrow more than the small firms. However, private firms regardless of the firm size may have to rely on debt as they have limited access to external market. The proportion of tangible assets has a significant effect on future

leverage ratios for both private and public firms. Tangibility of assets is positively related to Leverage because fixed assets serve as collateral for loans. In the event of default, these assets could be sold to recover the loaned money, which reduces the agency cost of debt.

High-growth firms are more likely to use equity to maintain flexibility for financing future investments. For private firms, sales growth is significantly positively related to leverage. Sources of financing for private firms are limited; this could lead private firms to use more leverage, resulting in a positive relationship between growth and leverage ratios. However, when public firms are included in the sample, the relationship becomes insignificantly positive. Public firms have greater access to the public equity market and do not have to rely on debt to finance expansion. Profitability is significantly negatively related to leverage. For one standard deviation increase in profitability, leverage decreases by 4%. Degryse et al. (2011) also find that small and medium sized enterprises leverage is significantly negatively related to profitability and positively related to the future growth.

Industry median leverage and firms future leverage ratios are significantly positively related in both samples. Cash flow volatility is significantly negatively related to Leverage for private firms. The regression result shows that, for one standard deviation increase in Cash flow volatility, leverage decreases by 1% for private firms. However, when public firms are included in the sample, the relationship turns significantly positive. The cost of debt and bankruptcy risk is high for private firms (Badertcher et al., 2015). Public firms, on the other hand, have relatively low costs of debt and greater access to the public equity market. This allows public firms to assume more risks than private firms.

Age is significantly positively related to Leverage in both samples. Old firms have higher leverage ratios than the young firms.

The correlation coefficient of the indicator variable *private* firms is significantly positive, which means that private firms have significantly higher leverage than public firms do. This result is consistent with the findings in Goyal et al. (2011) and Brav (2009) that private companies rely heavily on debt financing, have higher leverage ratios, and tend to avoid the external equity market.

[Insert Table 3 around here]

4.2 Variance decomposition of leverage

An analysis of covariance (ANCOVA) is performed to identify the factors that contribute most to the variation in leverage ratios. Regression analysis shows that an unobserved factor is missing from the current model, which may be keeping the leverage ratios constant over the long term. This analysis compares the firm-specific effect and the traditional capital structure determinants to evaluate the contribution of each factor in the variation among the leverage ratios. The analysis is based on the following regression model:

$$Leverage_{it} = \alpha + bX_{it-1} + \eta_i + \nu_t + \varepsilon_{it} \qquad (2)$$

Where α is the constant, X represents 1-year lagged control variables, ν_t is the time-fixed effect, η_i is firm fixed-effect, ε_{it} is the random error term, i indexes firms, and t indexes year.

Table 4 reports the result of the ANCOVA. Each column in the table represents a separate model specification in combination with traditional capital structure determinants and firm-specific effects. The numbers in the body of the table (except the

last row) show the percentage of the variation in leverage ratios that can be explained by a factor in the model specifications. To obtain this figure, we calculate the partial sum of the square of every model and normalize the effect for each factor. The last row of the table reports the adjusted R-square of the model, which indicates the percentage of the variation in leverage ratios that can be explained by the model.

The adjusted R-square corresponding to column (a) shows that 72% of the variation in leverage ratios can be explained by that particular model. Since only firm-specific effects are taken into consideration, the total variation in leverage ratios is attributable to the firm effect only. This is consistent with the regression result that an unobserved factor explains a significant fraction of the variation in leverage ratios. The adjusted R-square corresponding to column (b) shows that 8% of the variation in leverage ratios can be explained by the time effects. Column (d) shows that traditional capital structure determinants can explain 31% of the variation in leverage ratios. When firm-specific effects are included in the model, the adjusted R-square increases to 81%, implying that most of the variation in leverage ratios can be explained by the firm-specific effects. Time varying factors explain only a small portion of the variation in leverage ratios.

Our results are analogous to those in Lemmon, Roberts, and Zender (2008), who find that most of the variation in leverage ratios is cross-sectional, rather than time-series, variation. Finding that firm fixed effects alone can explain 60% of the variation in leverage ratios for US firms whereas only 1% of the variations in leverage ratios can be explained by time varying factors, they conclude that an important unobserved factor is missing from the existing model and that this factor has more explanatory power than any other traditional capital structure determinants.

[Insert Table 4 around here]

4.3 Speed of adjustment

The empirical evidence regarding the speed at which firms make adjustments toward their target leverage ratios is mixed. Some studies such as Hovakimian, Opler, and Titman (2001) and Flanery and Rangan (2006) find very quick adjustment speeds, whereas others, including Fama and French (2002) and Huang and Ritter (2005), find very low speeds. We examine below how private firms adjust to their target leverage ratios and compare them to the adjustment speeds of public firms. The speed of adjustment towards the target leverage ratio is estimated using the following standard partial adjustment model:

$$L_{i,t} - L_{i,t-1} = \alpha + \gamma(L^*_{i,t} - L_{i,t-1}) + \varepsilon_{it} \qquad (3)$$

Where, $L_{i,t}$ is the leverage ratio of firm i in year t, and $L^*_{i,t}$ is firm i's target leverage ratio. γ measures the speed of adjustment of the observed leverage ratio toward the target. The target leverage ratio is unobservable and is measured using the following equation:

$$L^*_{i,t} = bX_{it-1} + \eta t + \nu_t + \varepsilon_{it} \qquad (4)$$

Where X_{it-1} is a vector of firm characteristics determining a firm's leverage ratio, ηt captures the individual firm effects, ν_t is the time effect, and ε_{it} is the error term.

Private firms cover almost 5% of their target leverage every year, whereas public firms cover approximately 10%. Thus, assuming a constant speed of adjustment, a private firm needs 13 years to cover up the deviations between the target leverage and the observed leverage ratios. The estimated time needed to cover up the deviation for public firms is six years. Including the firm fixed effect in the model increases the adjustment

speed of private firms to 14% and that of public firms to 16%. Private firms have a slower adjustment speed than public firms, consistent with their high costs of adjustment. This result is consistent with previous studies: Goyal et al. (2011) and Brav (2009), among others, find that private firms have a slower adjustment speed than public firms.

[Insert Table 5 around here]

5. Conclusion

This study analyzes the capital structure of private firms using a dataset covering 1980 to 2014. Trends in leverage ratios show that the leverage ratios of private firms remain stable over the long term. High-leverage firms and low-leverage firms remain as such even 20 years after the initial observation period. Moreover, the leverage ratios of private firms exhibit greater persistence than do those of public firms. Private firms have significantly higher leverage than do public firms. Unobserved factors explain more than twice the variation in leverage ratios explained by traditional capital structure determinants. Among the time varying determinants, profitability and cash flow volatility are significantly negatively related to future leverage ratios, whereas industry median leverage, tangibility, and sales growth are significantly positively related to leverage. Old firms have higher leverage ratios than young firms do, and private firms' adjustment speed towards their target leverage is slower than that of public firms.

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Figure 1: Trends in book leverage ratios of private firms

The sample firms include unlisted firms obtained from the Nikkei-NEEDS Financial Quest database for the period from 1980 to 2014. The graph shows average book leverage ratios of four portfolios over a period of 20 years. The left panels present graphs for the total sample, and the right panels present graphs for survivor firms. First, we rank firms based on their leverage ratios and divide the result into four equal portfolios: very high, high, medium, and low. The starting period is denoted as 0. We observe the average leverage ratios of each portfolio without changing any of the constituents in the following 20 years. This process is repeated for every year for the total sample, and the final result is the average of these 35 sets of averages across the event time. Survivor firms must have 20 years of continuous leverage data. Thus, we repeat the process for survivor firms until 1994 and average these 15 sets of averages across the event time. Finally, the event time averages are plotted in a trend line on the graph.

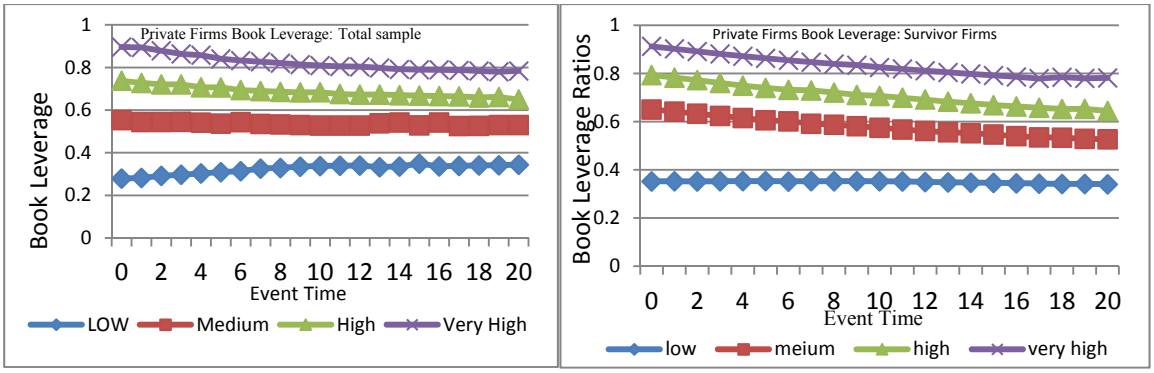

Figure 2: Trends in book leverage ratios of public firms

The sample consists of all non-financial firms listed on the First Section of Tokyo Stock Exchange for the period 1980 to 2014.The graph shows average book leverage ratios of four portfolios over a period of twenty years. Left panels present the graphs for total sample and right panels present the graphs for survivor firms. To get the figure, at first we rank firms based on their leverage ratios and divide it into four equal portfolios- very high, high, medium and low. The starting period is denoted as 0. We observe the leverage ratios of each portfolio without changing any of the constituents in the following twenty years. This process is repeated for every year for total sample and final result is the average of these 35 sets of averages across the event time. Survivor firms must have 20 years continuous leverage data. Thus, we repeat the process for survivor firms until 1994 and average these 15 sets of averages across the event time. Finally, the event time averages are plotted in a trend line on the graph.

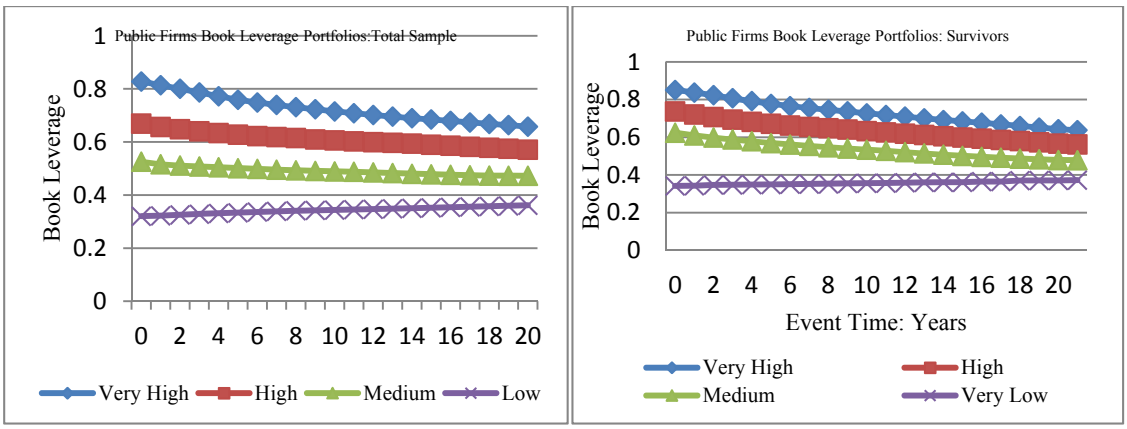

Table1: Descriptive statistics

The sample consists of 20,806 private firm observations and 35,717 public firm observations from 1980 to 2014 obtained from Nikkei-NEEDS Financial Quest. We match every private firm to a public firm that is similar in terms of assets and in the same Tokyo Stock Exchange industry classification. The resulting sample is labeled "matched public firm sample." Test statistics for the t-test of the differences in leverage ratios and firm characteristics between private and public firms are given in the subscript, with ***,**, and * indicating statistical significance at the 1%, 5%, and 10% levels respectively

Variable	Private firms Mean (1)	Public Firms Mean (2)	Matched public firms Mean(3)	T-test of differences in mean (1)-(2)	T-test of differences in mean (1)-(3)
Book Leverage	0.62	0.55	.56	0.07***	0.06***
				(3.41)	(3.87)
Log TA	9.66	10.93	9.52	-1.27***	-0.14
				(-27.19)	(-.18)
Tangibility	0.45	0.26	0.28	0.20***	0.17***
				(17.25)	(15.65)
Sales g	0.02	0.02	0.02	-0.00	-.003
				(-0.43)	(-.22)
Profitability	0.03	0.04	0.04	-.01***	-.01***
				(2.35)	(-2.85)
Volatility	0.01	0.02	0.03	-0.01***	-0.02***
				(-2.8)	(-4.31)
Age	51	55	57	-4.00***	-6.00***
				(-2.65)	(-2.44)
Observations	20,806	35,717			

Table 2. The propensity score matched sample

The sample consists of 20,806 private firm observations and 35,717 public firm observations from 1980 to 2014, obtained from Nikkei-NEEDS Financial Quest. The table presents the differences in leverage ratios between private firms and their propensity score-matched public firms. We match private firms to a public firm using the nearest neighbor. In model 1, the variables we use to match are *Profitability* and *Firm size*. In model 2, the variables we use to match are *Firm size, Profitability,* and *Tangibility.* In model 3, the variables we use to match are *Profitability, Firm size, Tangibility, Sales growth, Industry median leverage and Cash flow volatility.* Superscripts ***, **,* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Model 1	Model 2	Model 3
Book Leverage	0.05***	0.07***	0.06***
	(24.71)	(21.24)	(26.85)

Table 3: Effect of initial leverage on future leverage

Private firm sample includes all private firms in the Nikkei-NEEDS Financial Quest database for the period from 1980 to 2014. Public firm sample includes all non-financial firms listed on the TSE First Section for the same period. The table presents standardized regression coefficients from the panel OLS regression of book leverage on two different specifications. The scaled regression coefficients indicate the percentage change in book leverage ratios for one standard deviation changes in the independent variables. Year fixed effect indicates whether calendar year fixed effects are included in the model. Adjusted R^2 measures the percentage of variation in leverage ratios that can be explained by each model specification. For example, R^2 corresponding to column one shows that 48% of the variation in leverage ratios can be explained by initial leverage ratios only. T-stats presented in parentheses are computed using standard errors robust to clustering at the firm level.

	Private Firms		Public and private Firms	
Variable	Coefficients	Coefficients	Coefficients	Coefficients
Initial Leverage	0.16***	0.16***	0.11***	0.10***
	(31.15)	(27.20)	(29.94)	(25.85)
Log TA		0.01		0.01***
		(1.49)		(5.88)
Tangibility		0.02***		0.02***
		(5.59)		(10.19)
Sales g		0.01***		0.00
		(7.98)		(0.98)
Profitability		-0.04***		-0.05***
		(-6.82)		(-11.73)
Cash Flow		-0.01*		0.03*
Volatility		(-1.75)		(1.65)
Age		0.02***		0.03***
		(3.15)		(9.19)
Industry med.		0.03***		0.04***
Lev.		(6.81)		(9.94)
Private				0.02***
				(3.33)
R^2	48%	53%	25%	38%
Observations	20,806	20,806	56,523	56,523

Table 4: Variance decomposition analysis

Private firm sample includes all private firms in the Nikkei-NEEDS Financial Quest database for the period from 1980 to 2014. Public firm sample includes all non-financial firms listed on the First Section of Tokyo Stock Exchange for the same period. The table presents the variance decompositions for various model specifications. We calculate the partial sum of the square for each model specifications and normalize the effect of each factor by dividing it by the total sum of the square of the model. Thus, the sum of all the effects in a column will be 1. Firm FE are firm fixed effects and Year FE are calendar year fixed effects. The adjusted R^2 at the bottom of the table shows how much of the variation in leverage ratios can be explained by a particular model. For example, R^2 corresponding to column (d) shows that 31% of the variation in leverage ratios can be explained by this model specifications. The numbers in the body of the table indicate the sum of the square explained by each factor. For example, in column (d), 19% of the variation in leverage ratios can be explained by the factor Profitability.

Book Leverage	(a)	(b)	(c)	(d)	(e)
Firm FE	1.00		0.82		0.80
Year FE		1.00	0.18	0.29	0.05
Log TA				0.01	0.01
Tangibility				0.03	0.03
Sales g				0.00	0.00
Profitability				0.19	0.03
Cash Flow Volatility				0.00	0.01
Industry med. Lev.				0.44	0.06
Age				0.03	0.01
Adj. R^2	72%	8%	78%	31%	81%

Table 5: Adjustment speed of private and public firms

Private firm sample includes all private firms in the Nikkei-NEEDS Financial Quest database for the period from 1980 to 2014. Public firm sample includes all non-financial firms listed on the First Section of Tokyo Stock Exchange for the same period. This table reports adjustment speeds of private and public firms, measured using OLS and with firm fixed effects later included in the model.

	OLS	Fixed	Observations
Private Companies	5%	14%	20,806
Public Companies	10%	16%	35,717

Chapter 5

The Announcement Effect of Cash Dividend Changes on Share Prices: Evidence from Dhaka Stock Exchange

Abstract

This paper investigates the announcement effect of cash dividend changes on share prices listed on the Dhaka Stock Exchange. Standard event study methodology is used to investigate the effect of an event window of -3 to + 3 days relative to dividend announcement date. Cumulative abnormal returns (CAR) have also been measured for a 41 days window around announcement date. This study finds that shareholders earn only normal return on the announcement of dividend increases and no changes. However, a significant positive abnormal return is observed in the preannouncement period for a dividend increase which indicates some kind of information leakage before the announcement is actually made. The announcement of dividend decrease results in a significant negative abnormal return on the announcement day and persists even twenty days after the announcement. Significant abnormal returns following dividend decrease announcement reveal DSE is not semi-strong form efficient market.

Keywords: Cash dividend, announcement effect, abnormal returns, information signaling.

1. Introduction

Dividend policy is perceived as a puzzle in corporate finance. Ambiguity still exists about the motivation behind dividend payment by companies and preference of dividend by investors. Generally, companies pay dividends to shareholders as a reward for their investment and attract potential investors to the company. Alternatively, companies can reinvest the money which also increases the return to shareholders in the form of capital gain. Tax on the dividend is often higher than the tax on capital gain. From the shareholders perspective dividend should be less preferable to capital gain as it reduces the wealth of investors. Regardless of the disadvantage associated with dividend payment, companies continue to pay dividend and investors prefer to receive the dividend.

To solve the puzzle of dividend payment, many financial economists have looked into the reactions of the stock market on the announcement of a dividend. Early empirical evidence shows that dividend payment has a profound impact on share price (Pettit, 1972; Aharony and Swary, 1980). On the announcement of dividend increase share price increases and vice versa. The rationale behind such reactions in the stock market has been explained by two prominent hypotheses. One is information signaling hypothesis and the other is free cash flow hypothesis. According to information signaling hypothesis ((Battachrya, 1979), dividends could be used as a tool to reduce the information asymmetry between shareholders and managers. When a dividend is increased it sends a signal to the shareholders about managers` positive (negative) expectation of firms` future earnings. Therefore, share price increase (decrease) following the dividend increase (decrease) announcement. Free cash flow hypothesis ((Jensen, 1986), on the other hand, considers dividend as a mechanism to reduce agency problems between shareholders and managers. When free cash flows are available to managers, they tend to overinvest to maximize

their own interests. The increase in dividend decreases the cash flows available to managers, leading to a positive impact on share price.

The objective of the study is to find out how stock price reacts to the announcement of dividend for companies listed on the Dhaka Stock Exchange. This study will shed light on whether dividend could be used as an effective tool to reduce the information asymmetry between shareholders and managers for DSE listed companies.

Focus of empirical studies has been the developed market, particularly the US. As an emerging market, Bangladesh has different institutional settings which make the announcement effect not as clear as in the US. There are some unique institutional characteristics that make DSE an interesting market to examine the announcement effect of cash dividend changes on share prices.

First, the ownership structure of Bangladeshi listed companies is concentrated at the hand of a single family or large individual investors. These owners mainly represent the board and also decide over other members of the board. As a board member, they have access to inside information. If the concentrated ownership reduces the information asymmetry between shareholders and managers, dividend announcement is not expected to have a significant effect on share price. Moreover, these insiders could use the price sensitive information even before the announcement is made. In such a case, the share price is expected to increase following dividend increase announcement when accompanied by significant insider buying and share price could fall even in the case of dividend increase announcement when accompanied by unusually intense insider selling prior to dividend announcement (John and Lang, 1991).

Second, because of concentrated ownership agency conflict between managers and shareholders is not significant for the Bangladeshi companies. While concentrated ownership ensures

manager cannot misuse the firm's resources, it does not ensure minority shareholder's right would be protected (Shliefer and Vishney, 1997). In the family controlled Bangladesh listed companies agency conflict between minority shareholders and controlling shareholders is more notable (Farooque et al. 2007). As minority shareholders' protection is poor in Bangladesh, a positive relationship between the announcement of dividend changes and share price is expected.

Third, dividend policy of the Bangladeshi listed companies is not stable. Companies in developed country follow a stable dividend policy, once the dividend is increased companies rarely cut the dividend. In contrast to the developed country, Bangladeshi companies are found not very cautious about the likely impact of changing dividend every now and then. Many of the companies change dividends every year. Chen et al. (2002) have found that variability in dividend payment reduces the information content of dividend announcement.

Standard event study methodology is used to investigate the announcement effect of cash dividend changes on share prices for an event window of -3 to + 3 days relative to dividend announcement date. The study finds that announcement of dividend increase does not produce a significant abnormal return on the announcement day. However, CAR (-20,-1) reveals that investors earned a significant positive abnormal return in the pre-announcement period which indicate some kind of information leakage into the market before the announcement is actually made. Dividend decrease is associated with significant negative reactions on the announcement day. No significant abnormal return is observed in the preannouncement period although negative abnormal return persists even twenty days after the announcement is made. Regression analysis of CAR on dividend change reveals market reactions is positively related to the dividend change. The study shows that information content of dividend has a little explanatory

power for an emerging market like Bangladesh.

This paper is organized as follows. Section two presents the literature review, section three describes institutional details of listed companies, section four describes data and methodology followed by descriptive statistics in section five, section six examines the empirical results and section seven concludes.

2. Literature review

Dividend policy has been considered an important tool to reduce information asymmetry between shareholders and managers. Bhattacharya (1979), Miller and Rock (1985) developed the signaling model based on the assumption that dividend sends a signal about the quality of firms to outside investors which the lower quality firms find too costly to imitate. Several empirical studies have been conducted to find out if dividend really conveys any information about firm`s future cash flows. In a pioneering study, Petitt (1972) finds that market value of security is positively related to the announcement of dividend changes. Market is reasonably efficient since most of the changes in share prices occur around the announcement date with most significant changes in prices occurring on the announcement date. Charest (1978) finds that significant abnormal return is observed in the months following changes in dividend announcement. Stocks prices underreact to the announcement of dividend changes. Aharony and Swary (1980) examine the changes in dividend announcement which is made on a different date than earnings announcement. They report that cash dividend changes provide more information beyond that already included in corresponding quarterly earnings announcement. Announcement effect is consistent with information signaling and they support market is semi-strong form of efficient. Asquith and Mullins (1983) find significant positive abnormal return at dividend initiation announcements. Bajaj and Vijh (1990) report significant positive abnormal

return around the announcement date. Nissim and Ziv (2001) find strong positive relation between dividend changes and future earnings, profitability, and abnormal earnings. Liljeblom, Mollah, and Rotter (2015), Lee (2010) find evidence on dividend signaling in Nordic and Singapore markets respectively. Evidence in support of signaling hypothesis is also found in the study of Woolridge (1982), Healy and Palepu (1988), Denis et al. (1994).

However, some contrasting evidence has also been reported. According to Watts (1973) the information content of dividends can only be trivial. Gonedes (1978) states that dividend does not reflect any information beyond that already reflected in contemporaneous income signals. Benartzi, Michaely and Thaler (1997) also do not find any evidence for the information content of dividend about firm's future earnings although market reacts positively (negatively) to the dividend increase (decrease) announcement. DeAngelo, DeAngelo, and Skinner (2004) consider dividend changes are related to lagged earnings.

According to Easterbrook (1984) dividend payment may help align the interest of managers and shareholders by decreasing the cash flow available to managers for discretionary use and provide protection against the self -interested actions by the management. Lang & Litzenberger (1989) find evidence in support of free cash flow hypothesis. Cheng (2008) report evidence in consistent with free cash flow hypothesis in Hong Kong. Kato, Loewenstein, and Tsay (2002) do not find evidence for either free cash flow hypothesis or dividend clientele effect in Japan.

Empirical evidence is also mixed in case of emerging markets. Chen, Liu, Huang, (2009) find that the cash dividend changes do have a considerable influence on share prices in China. Al-Yahyaee et.al (2011) provide evidence that information signaling holds true using Omani data. In contrast, Chu (1997) found that Cash dividend does not have a strong effect on stock return for

Taiwan`s stock market. Bhattacharya, Daouk, and Jorgenson (2000) report that prices do not react to dividend announcement for stocks listed on the Mexican stock exchange. There have been very few studies related to the announcement effect of cash dividend changes in Bangladesh. Evidence indicates that dividend policy does not signal any information to shareholders of Bangladeshi companies (Uddin and Chowdhury, 2005). Lack of announcement effect of dividend on the share price indicates that the DSE is informationally inefficient. Previous studies on the test of market efficiency on the DSE also provide evidence that the DSE is an inefficient market. Mollik and Bepari (2009) and Mobarek (2008) provide empirical evidence that stock prices do not move randomly, which rejects the weak form efficiency of DSE.

3. Institutional details of the market and listed companies

Dhaka Stock Exchange which was established in 1954 is the largest stock exchange in Bangladesh. The total number of tradable securities stands at 511 as on June 2012. Of the total listed securities, there are 238 companies, 41 mutual funds, 8 debentures, 221 treasury bonds and 3 corporate bonds. As shown in Table 1, the level of development of Dhaka stock exchange is only comparable with regional markets such as Colombo or Karachi Stock exchanges. Compared to the developed stock markets, Dhaka Stock Exchange is featured with less number of stocks and is less liquid. Table 2 shows that market capitalization, turnover, initial public offerings were growing before it stumbled in 2011 after the market crash of 2010.

Based on ownership structure, companies listed in the DSE can be divided into two broad categories such as family and non-family owned companies. In family-owned companies, a large number of shares are at the hand of a single family or large individual shareholders followed by institutions and individual investors. There is few non-family owned companies where either

government or individual investors are the major shareholders. In the case of multinational companies (MF) parent company owns the largest number of shares. In the family owned companies, individual investors are the minority shareholders who are often expropriated by controlling shareholders because of the weak regulatory environment and property rights. Unlike developed market, there is an absence of market-based monitoring and control measures, ownership-based monitoring and control have been established as a core governance mechanism in Bangladesh (Farooque et al. 2007).

[Insert Table 1 around here]

[Insert Table 2 around here]

4. Data and methodology

This study includes all companies listed on the Dhaka Stock Exchange that announce dividends in the sample period from 2001 to 2011. We consider the announcement of cash dividend only, eliminating those accompanied by stock dividends, splits or right share issues. Companies that do not have sufficient trading data are also excluded from the sample. Table 3 shows the number of companies that announced cash dividend, stock dividend or declared no dividend. Table 4 shows the number of companies that declared only cash dividend grouped into three dividend classes; companies with positive, negative and no change in cash dividend. Based on the sample selection criteria, the resulting sample consists of 625 observations: 265 dividend increases, 112 dividend decreases and another 248 no change in the dividend. Data on the announcement date of the cash dividend, daily stock price and DSE general index (DGEN) has been collected from the DSE database.

A standard event study methodology is used to investigate the announcement effect of cash

dividend changes on share prices. Market-adjusted abnormal returns over a 3-day window are used to measure the announcement effect. Since the DSE is less efficient and less liquid, market adjusted cumulative abnormal returns are also measured over 3-day (-1 to +1) and 41-day (-20 to +20) windows surrounding dividend announcement date.

[Insert Table 3 around here]

[Insert Table 4 around here]

Abnormal return is calculated as the difference between actual stock return and market return. DSE general index, a price-weighted index that includes all tradable stocks, is used as a proxy for market return. Daily return and abnormal return is averaged across all companies in each dividend class over the event window. Cumulative abnormal returns are calculated by summing up the abnormal return over the specific event window periods.

Regression analysis has also been done to assess the effect of dividend change on the share price. Cumulative abnormal returns (CAR) calculated on a 3-day window (-1 to +1) has been used as a dependent variable and change in dividend as an independent variable. To examine the announcement effect of companies classified on the ownership structure, CAR is used as dependent variable while dividend, family dummy and a dividend response variable are used as independent variables. Regression model that has been used is as follows –

$$\mathrm{CAR_I} = \alpha + \beta(\Delta dividend) + \varepsilon_i \quad (1)$$

$$\mathrm{CAR} = \alpha + \beta 1(dividend) + \beta 2(dividend * family\ dummy) + \beta 3(family\ dummy) + \varepsilon_i \quad (2)$$

5. Descriptive statistics

Table 5 shows the descriptive statistics of dividend declared by the companies classified on the shareholding structure. Wide variation exists in the amount of dividend declared by listed

companies. In the year 2011, listed companies declared cash dividends ranging from 5% to 600% of par value. Companies are also found to declare dividend cut up to 75% of previous year's dividend. Multinationals and local companies from banking, financial institutions, fuel and power, pharmaceuticals, cement sector are among the highest dividend paying companies. The average change in dividend during the period 2001-11 is approximately 21.80% with a standard deviation of 56.25%. The number of positive changes in dividend is larger than the number of negative changes. When companies are categorized based on the ownership structure, non-family owned companies are found to have a larger variation in dividend change than a family owned companies. The number of positive changes is found to be higher in the case of family owned companies than non-family owned companies. Average dividend and variation in dividend change are found to be larger for non-financial institutions (NFI) than the financial institution (FI). Multinational companies (MF) are found to declare more dividends and also have larger variation in dividend than non-multinational companies (NMF).

[Insert Table 5 around here]

Table 6 shows the payout ratios of the companies classified on the shareholding structure. Payout ratios are measured as the percentage of earnings companies are paying out as dividends. Average payout ratios of DSE listed companies are .48 with a maximum payout ratio of 1.37 and minimum of .04 and standard deviation of 26.75%. There exists a little difference between the payout ratios of family owned and non-family owned companies. The average payout ratio for family owned companies is 0.49 and for non-family owned companies is 0.47. Average Payout ratio of financial institutions is found to be lower than that of the non-financial institution.

[Insert Table 6 around here]

6. Empirical results

6.1 Announcement effect of dividend change for an event window of -3 to +3 days

Table 7 shows the daily average abnormal return (AR) earned by investors in a 7-day window surrounding dividend announcement (AD). Dividend changes are presented in three groups; dividend increase, dividend decrease, and no change.

Abnormal returns associated with the announcement of dividend increase are found to be insignificant over the event window -3 days to + 3 days relative to the announcement date. Of the companies that announce a dividend increase, 47% have a negative stock price reaction, 38% have a positive stock price reaction and the remaining 14% have a neutral stock price reaction. Shareholders earning only normal return on the announcement day for dividend increase announcement are quite contrary to the expectation and inconsistent with the signaling hypothesis.

Panel B shows, shareholders of companies that decreased dividend earned a significant negative abnormal return, which is consistent with the signaling hypothesis. Among the companies announcing a decrease in the dividend, 23% have positive stock price reactions, 72% have negative stock price reactions and remaining 5% have neutral stock price reactions. Abnormal returns associated with the announcement of decrease in dividend are larger than the announcement of increase or no change in the dividend. The result is consistent with Pettit (1972), Charest (1978), Aharony and Swary (1980), Nissim and Ziv (2001). Negative reaction to dividend decrease clearly signifies investors demand cash dividend.

Panel C shows that shareholders of companies that did not change dividend realized

negative abnormal return. Of the companies that kept the dividend unchanged, 50% have a negative stock price reaction, 42% have a positive stock price reaction and the remaining 8% have a neutral stock price reaction. Although the AR is not statistically significant on the announcement day, it is statistically significant on AD+ 1.

[Insert Table 7 around here]

6.2 Cumulative abnormal returns

Table 8 shows cumulative abnormal return earned by investors for four different event windows. CAR (-20, +1) is calculated by summing up the abnormal return from 20 days before the announcement through 1 day after the announcement. CAR (-20, -1) is calculated by summing up the abnormal return from 20 days before the announcement through 1 day before the announcement. CAR (-1, +1) is calculated by summing up the abnormal return of 1 day before the announcement and 1 day after the announcement. CAR (+1, 20) is calculated by summing up the abnormal return from 1 day after the announcement through 20 days after the announcement.

Cumulative abnormal return (-20, -1) shows that shareholders earned a significantly positive abnormal return for dividend increase announcement during this period while the abnormal return for dividend decrease and no change remain insignificant. CAR (-20, +1) turns less significant for dividend increase announcement. But CAR (-20, +1) becomes significantly negative for dividend decrease and no change respectively. Significant positive abnormal return is earned by investors before the dividend increase announcement date which indicates some kind of information leakage before the announcement is actually made. CAR (-1, +1) reveals that shareholders earned only normal return in two days surrounding

dividend increase announcement date. As expected, CAR earned by investors for dividend decrease announcements is significantly negative at 1% level during this period indicating market reacts sharply on the announcement day. Highly significant abnormal return around the announcement date suggests there was no information leakage before dividend decrease announcement. CAR for no change in dividend announcement is insignificantly negative.

CAR (+1, 20) shows that shareholders earn a normal return in the following twenty days of dividend increase announcement. However, significant negative abnormal return for dividend decrease group remains persistent even twenty days after the announcement. Abnormal return for no change in dividend groups turns to be significantly negative in the 20 days after the announcement indicating market underreacts when no change in dividend announcement is made.

[Insert Figure 1 around here]

[Insert Table 8 around here]

6.3 Sub-period analysis

To find out whether the result is consistent over time, total sample is divided into two equal subsamples from 2001-05 and from 2006-2011. Table 11 shows the daily average abnormal returns associated with the announcement of a change in the dividend in two equal subperiods. In the first subsample, the announcement of dividend generates significant negative abnormal return only in the case of dividend decrease announcement. The announcement of a dividend increase and no change in dividend are not evident with a significant abnormal return. In the second subsample, the announcement of dividend decreases and increases lead to a significant negative abnormal return on the announcement day. Significant negative abnormal returns associated with the announcement of an increase in dividend could be related to the

market downturn that started from 2010. The announcement of dividend generated a positive abnormal return in only 27% and 19% of the cases in 2010 and 2011 respectively. No change in dividend announcement results in only normal return on the announcement day although the return is significantly negative the following day.

[Insert Table 9 around here]

6.4 Regression analysis of announcement day returns on dividend change

To find out the relation between changes in share prices and changes in dividends, this study used two models. In the Model 1, the cumulative abnormal return is regressed on the annualized change in the dividend. The regression equation is as follows.

$$\mathrm{CAR_I} = \alpha + \beta(\Delta dividend) + \varepsilon_i$$

CAR has been calculated by summing up the abnormal returns of each security for a 3-day event window (-1 to + 1) around the dividend announcement date. Change in dividend is calculated as the difference between current dividend and last period's dividend divided by last years' dividend. Regression result reported in the first column of table 10 shows beta value is significantly positive at 1% level, meaning positive relationship exists between the change in dividend and cumulative abnormal returns. F ratio is quite high and significant, which implies that dividend change is a significant factor in explaining CAR. The result is consistent with both signaling and free cash flow hypothesis.

However, event study results partially support information signaling as the normal return is observed around dividend increase announcement. Could this be related to the concentrated ownership pattern of Bangladeshi companies? In Bangladeshi companies, a large percentage of shares are owned by a family or single individual investor. Amihud and Li (2006) argue that

more institutional ownership reduces the impact of dividend signaling and find that the dividend response coefficient with regard to institutional holding is negative. Following the hypothesis of Amihud and Li (2006), family ownership is assumed to reduce the impact of announcement effect as family members hold a larger portion of stock and also have more access to information. In the model 2, CAR is regressed on dividend, interaction of dividend and family dummy and a family dummy variable.

$$\text{CAR} = \alpha + \beta 1(dividend) + \beta 2(dividend * family\ dummy) + \beta 3(family\ dummy) + \varepsilon_i$$

β1 measures the effect of a change in the dividend on the CAR, β2 measures whether the dividend response coefficient is increasing significantly for family-owned companies and β3 measures whether CAR is higher for the family-owned companies.

[Insert Table 10 around here]

Regression results reported in the second column of the table show that announcement of dividend change and share price are significantly positively related. Change in dividend has a positive impact on CAR at 1% significance level. The coefficient of the family dummy and dividend response coefficient is found to be insignificant meaning dividend announcements do not result in any differences in announcement effect between family-owned firms and non-family-owned firms.

6.5 Robustness check

In this section, mean adjusted cumulative abnormal returns have been calculated instead of market adjusted cumulative average returns to check the robustness of the previously found

results. The justification of using mean adjusted abnormal returns is to observe the effect on event day compared with the securities` performance over a specified period of time. To calculate the mean adjusted abnormal returns, last three months average returns (90 days) have been deducted from the security returns. The effect of a change in dividend on security's returns remains same after using mean adjusted abnormal returns. Decrease in dividend is found to be associated with negative CAR but there is no statistically significant effect of either positive or no change in the dividend. Table 10 shows the cumulative abnormal returns of -1 to +1 days around announcement day after the increase, decrease and no change in dividend announcement by the companies. The amount and significance of results are very close to those using market risks adjusted abnormal returns. Though not reported in the table, similar kind of effect is found when different timeframes are used to calculate mean adjusted returns or different windows are used to calculate cumulative abnormal returns.

[Insert Table 11 around here]

7. Conclusion

This study examines the announcement effect of cash dividend changes on share prices for companies listed on the Dhaka Stock Exchange for the period of 2001-11. Standard event study methodology is used to investigate the abnormal return around the announcement date. Contrary to the signaling hypothesis, this study does not find that announcement of dividend increase is associated with positive abnormal return. However, consistent with the signaling hypotheses, the announcement of dividend decrease is found to be associated with a significant negative abnormal return. Regression coefficients provide evidence that announcement of a change in dividend is positively related to CAR. Shareholders earn sufficient positive abnormal return

before the announcement of dividend increase actually takes place and also they realize sufficient negative abnormal return even twenty days after the dividend decrease announcement is made which goes against the semi-strong form of market efficiency. Information leakage, variable dividend policy could be the possible reasons that the dividend signaling hypothesis does not hold for Bangladeshi companies.

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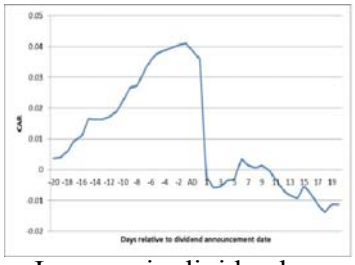
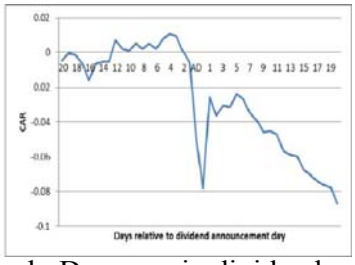
Figure 1: Graphical Presentation of CAR earned during -20 to 20 days relative to dividend announcement date

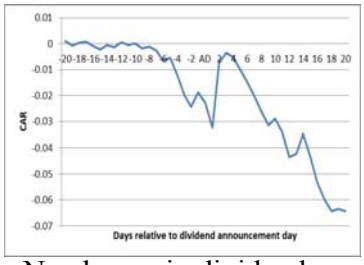
Figure I graphically present how the cumulative abnormal return changes in the period -20 days to + 20 days relative to dividend announcement date. Figure a shows CAR increases before the dividend increase announcement is actually made and unexpectedly falls after the announcement comes. Figure d shows share price falls sharply as expected after the dividend decrease announcement is made. However, share price keeps falling even 20 days after the announcement. Figure c shows for no change in dividend shareholders earn only normal return.



a. Increase in dividend



b. Decrease in dividend



c. No change in dividend

Table 1: Comparison of Dhaka Stock Exchange with other markets

The table compares Dhaka Stock Exchange with other South Asian and global markets. The figures reported in the table are of 2012. The table reveals that Dhaka Stock Exchange is comparable only with some south Asian markets.

Name of Market	Listed Companies	Market Capitalization($mn)	Turnover	% of GDP
Colombo Stock Exchange	287	16974	1679.1	28.4
Dhaka Stock Exchange	238	29839.3	19501.65	26.27
Karachi Stock Exchange	573	43443.71	11251.77	18.85
Bombay Stock Exchange	5191	1263335.5	110345.9	64.89
Tokyo Stock Exchange	2304	3478831.5	3463095	58.13
London Stock Exchange	2767	3396504.9	2194257	139.56

Table 2: Market capitalization, turnover, and IPO of Dhaka stock exchange

This table shows the time series facts about Dhaka Stock Exchange with respect to the number of securities, market capitalization, transaction, and IPO.

Years	2007	2008	2009	2010	2011
No. of Securities	350	412	415	445	501
Annual Growth (%)	12.90	17.71	0.73	7.23	12.58
Market Capitalization ($mn)	10822.34	15171.50	27515.22	49667.36	32692.79
Annual Growth (%)	135.28	40.64	82.34	84.32	-25.41
Daily transaction (US$ mn)	19.86	40.97	87.41	232.68	82.99
Annual Growth (%)	377.28	106.89	114.53	171.80	-59.58
Number of IPO	14	12	18	18	14

Table 3: Distribution of dividend

The sample consists of firms listed on the Dhaka Stock Exchange from 2001to 2011. The table shows the number of listed companies, the number of the cash dividend, stock dividend, the joint distribution of cash and stock dividend announced by all companies during this period.

Year	No. of stocks	Cash dividend	Sock dividend	Cash and stock
2001	192	65	10	5
2002	210	74	1	6
2003	210	69	2	13
2004	210	54	2	16
2005	210	51	2	25
2006	210	67	30	27
2007	236	50	30	32
2008	236	64	46	21
2009	236	59	49	27
2010	236	42	43	33
2011	236	30	78	38

Table 4: Distribution of cash dividend

The sample consists of firms listed on the Dhaka Stock Exchange from 2001to 2011. The table shows the number of listed companies, the number of the cash dividend, stock dividend, the joint distribution of cash and stock dividend by all companies.

Year	Cash dividend	Stock dividend	Cash and stock dividend
2001	65	10	5
2002	74	1	6
2003	69	2	13
2004	54	2	16
2005	51	2	25
2006	67	30	27
2007	50	30	32
2008	64	46	21
2009	59	49	27
2010	42	43	33
2011	30	78	38

Table 5: Descriptive statistics of dividend changes

The table shows the descriptive statistics of dividend changes for all companies as well as for companies grouped on the basis of family ownership and other types.

	Mean	SD	Max	Min	Positive change	Negative change
All companies	21.80%	56.25%	600%	-75%	265	112
Family	26.82%	51.98%	376%	-75%	186	81
Non Family	27.21%	65.91%	600%	-75%	79	31
FI	15.75%	29.78%	175%	-70%	65	20
NFI	26.62%	61.26%	600%	-75%	200	92
MF	30.57%	84.55%	600%	-75%	34	16
NMF	14.78%	51.62%	375%	-75%	231	96

Table 6: Payout ratios of companies

The table shows payout ratios of companies based on ownership structure and type of institutions. Average payout ratios of all companies are .48. Payout ratios of family firms are higher than that of non-family firms. Similarly, non-financial institutions have a higher payout ratio than that of financial institutions.

Firm Type	Average	Max.	Min.	STDEV
All companies	0.48	1.37	0.04	26.75%
Family	0.49	1.08	0.19	27%
Non Family	0.47	1.37	0.04	29.28%
FI	0.31	.59	0.16	13%
NFI	0.52	1.37	0.04	27.25%

Table 7: Daily average abnormal returns

The table shows the daily average abnormal return earned by investors in -3 to +3 days relative to dividend announcement date. Panel A, panel B, and panel C show the abnormal returns for the companies that increase, decrease and do not change dividend. Shareholders earn only normal return for dividend increase and no change in dividend. Shareholders earn significantly negative abnormal return for dividend decrease announcement.

	-3	-2	-1	AD	1	2	3
Panel A: Dividend increase							
AR	0.0040	0.0009	0.0019	-0.0043	-0.0037	0.0017	0.0004
t-statistics	0.87	0.25	0.85	-0.84	-0.73	0.43	0.12
Panel B: Dividend decrease							
AR	-0.0002	-0.0078*	-0.0082**	-0.043***	-0.028***	-0.0054	0.0071*
t-statistics	-0.1	-1.88	-2.44	-4.57	-5.4	-0.79	1.88
Panel C: No Change in dividend							
AR	-0.007*	-0.006	-0.0019	-0.0008	-0.0107**	0.0367	0.00904
t-statistics	-2.04	-1.06	-0.25	-0.19	-2.61	1.02	1.37

* indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1% level.

Table 8: Cumulative abnormal returns for different event windows

This table shows cumulative abnormal return earned by investors for different event windows over the period 2001 to 2011. CAR of different event window is presented for dividend increase, decrease, and no change in dividend announcement. CAR (-20, -1) is significantly positive for dividend increase announcement. However, CAR (-1, +1) is insignificant for dividend increase announcement. As expected, CAR (-1, +1) is significantly negative for dividend decrease announcement whereas for no change in dividend it is insignificant.

	Dividend Increase	Dividend Decrease	No Change
CAR (-20, -1)	0.0412	-.0056	-.0188
	(2.845)**	(.818)	(-1.27)
CAR (-20, +1)	0.036	-0.0784	-0.0322
	(1.95) *	(-3.42) ***	(-1.92) *
CAR(-1, +1)	-.0053	-0.0781	-0.0079
	(-.498)	(-6.52) ***	(-1.023)
CAR(+1, 20)	-0.0113	-0.0871	-0.0642
	(-.808)	(-2.46) **	(-2.65) **

* indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1% level.

Table 9: Daily average abnormal returns in two equal sub-periods

The table shows daily average abnormal returns earned by investors in two equal subperiods, from 2001-2005 and 2006 to 2011. Daily average abnormal returns over a 3-day window are shown around the announcement of increase, decrease and no change in the dividend. In the sub-period 2001-2005 shareholders earn only normal return for dividend increase and no change. Whereas a significant negative abnormal return is earned by investors for dividend decrease announcement. In the sub-period 2006-2011shareholders earned a significant negative abnormal return for dividend decrease as well as dividend increase announcement.

Sub sample:2001-2005	-3	-2	-1	AD	1	2	3
Dividend Increase							
Abnormal Return	0.0085	-0.0004	0.0047	0.0078	0.0012	0.0066	0.0034
t-statistics	4.3***	-0.15	1.31	1.22	0.14	1.33	0.73
Dividend Decrease							
Abnormal Return	-0.0006	-0.0089	-0.0079	-0.0284	-0.0302	-0.009	0.0042
t-statistics	-0.23	-1.76	-2.76**	-2.02*	-4.72***	-0.87	0.73
No Change							
Abnormal Return	-0.002	-0.0018	-0.0084	0.0012	-0.0111	0.0784	0.0016
t-statistics	-0.71	-0.32	-0.66	0.19	-1.75	1	0.23
Sub sample 2006-2011							
Dividend Increase							
Abnormal Return	0.0004	0.002	-0.0002	-0.0144	-0.0079	-0.0024	-0.0021
t-statistics	0.05	0.3	-0.08	-2.94**	-1.23	-0.41	-0.43
Dividend Decrease							
Abnormal Return	0.0002	-0.0068	-0.0084	-0.0551	-0.0263	-0.0023	0.0095
t-statistics	0.08	-1.02	-1.41	-4.88***	-3.13**	-0.24	1.82
No Change							
Abnormal Return	-0.0142	-0.0004	0.0108	-0.0077	-0.0148	-0.0076	0.0066
t-statistics	-2.41*	-0.12	1.73	-1.7	-3.12**	-2.49*	0.89

*indicates significant at 10% level, ** indicates significant at 5% level and *** indicates significant at 1%

Table 10: Regression coefficients of market reaction to dividend change

The table shows the regression coefficients of market reaction to the announcement of dividend change. Coefficients of model 1 show how CAR reacts to the announcement of a change in dividend while coefficients of model 2 show how CAR reacts to announcement of dividend change by the family owned companies. For both model 1 and model 2, the dependent variable is 3-day cumulative abnormal returns.

	Model 1	Model2
A	-0.023 (-4.905)***	-0.021 (-3.647)***
β_1	0.018 (2.809)***	0.01 (2.46)***
β_2		0.003 (0.13)
β_3		0.004 (0.22)
R^2	0.01	0.01
F Value	7.89***	8.321***
Observation	625	625

*indicates significant at 10% level, ** indicates significant at 5% level and *** indicates significant at 1%

Table 11: CAR around dividend announcement date using mean adjusted abnormal returns

The table shows the mean adjusted abnormal return earned by investors over a 3-day event window. Mean adjusted cumulative abnormal returns have been calculated instead of market adjusted cumulative abnormal returns to test the robustness of the result. The result is consistent with the market adjusted abnormal returns. Shareholders earn only normal return for increase and no change in the dividend announcement. Whereas significant negative abnormal return is observed for dividend decrease announcement.

	Increase	Decrease	No Change
CAR(-1,+1)	-0.00451	-0.02972	-0.00288
	(-1.2757)	(-5.1516)***	(-1.0331)

Chapter 6

Conclusion

This dissertation includes three essays on corporate financial policy. The first essay is related to the determinants of capital structure. Capital structure is considered to be one of the most puzzling issues in corporate finance. Researchers have long been striving to find out how firms capital structure decisions are made. They have proposed many theories and ideas which mainly relates firm's capital structure to a number of firm specific characteristics. Empirical evidence is mixed in favor of these theories. Lemmon et al. (2008) find that firms leverage ratios remain stable over long term and time varying determinants can explain a small fraction of the variation in leverage ratios. Motivated by Lemmon et al. (2008) study on US firms, this study investigate the capital structure of firms listed on the First and Second section of Tokyo Stock Exchange for the period 1980 to 2014. The study finds that leverage ratios of Japanese firms remain stable over long term. Very high levered firms remain high leveraged and low levered firms remain low leveraged even twenty years after the portfolio is formed. A significant positive relationship exists between initial leverage ratios and firms future leverage ratios. Almost 70% of the variation in leverage ratios can be explained by the unobserved factors that remain constant over long term. Only a small fraction of the variation in leverage ratios can be explained by the determinants derived from traditional capital structure theories. This study also finds institutional settings have an impact on firms future leverage ratios. Keiretsu firms are found to be more highly leveraged than the non-keiretsu firms. Old firms have higher leverage ratios than the young firms.

The second essay is related to the determinants of capital structure of private firms. Private firms have limited sources of financing. They cannot access the public equity market and debt market. Besides costs of issuing debt is also higher for private firms than that for public firms. This essay analyzes the capital structure of private firms using a dataset of Nikkei NEEDS Financial Quest for the period 1980 to 2014. This study finds Private firms leverage ratios remain stable over long term. High levered firms remain highly leveraged and low levered firms remain low leveraged even twenty years after the initial observation period. Private firms leverage ratios exhibit even greater persistence than public firms leverage ratios. Regression analysis shows that firms future leverage ratios are significantly positively related to initial leverage ratios. Some unobserved factors are missing from the existing model that keep the leverage ratios remain stationary over long term. Among the time varying determinants private firm`s leverage ratio is significantly negatively related to profitability and cash flow volatility. Leverage ratio is significantly positively related to firm size, industry median leverage, sales growth and age. Private firms use significantly higher leverage than the public firms. As private firms have limited access to external capital market, they mainly rely on debt financing.

The last essay examines the announcement effect of cash dividend changes on share prices for companies listed on the Dhaka Stock Exchange for the period of 2001-11. Standard event study methodology is used to investigate the abnormal return around the announcement date. Contrary to the signaling hypothesis, this study does not find that announcement of dividend increase is associated with positive abnormal return. However, consistent with the signaling hypotheses, the announcement of dividend decrease is found to be associated with a significant negative abnormal return. Shareholders earn sufficient positive abnormal return before the announcement of dividend increase actually takes place and also they realize

sufficient negative abnormal return even twenty days after the dividend decrease announcement is made which goes against the semi-strong form of market efficiency. Information leakage, variable dividend policy could be the possible reasons why dividend signaling hypothesis does not hold for Bangladeshi companies.