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Have We Resolved The Issues Related to International Capital Structure? : Empirical Evidence from The OECD Countries

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

Joon-Young Song.

December 2004

Dedication

This dissertation is dedicated

to my parents, Suk-Kwan Song and Keun-Hee Ryoo,

to my parents-in-law, Duk-Hwan Kim and Im-Kyu Lee,

and to my beloved wife, son, and daughter, Ji-Hyun Kim, In-Chang and Ji-Eun Song

Their faith, dedication, encouragement, and love made it all possible. I also dedicate my work to the rest of my family who provided me with endless love and support for all that I have accomplished.

Acknowledgments

I would like to express my appreciation to all faculty in the Department of Finance for encouraging me to complete my academic training. I am also thankful to my colleagues for their support and care and to anonymous participants at several conferences where the earlier version of this dissertation was presented for their constructive suggestions. Special thanks go to my committee chair, Dr. Philippatos, and to the dissertation committee members, Dr. DeGennaro, Dr. Collins, and Dr. Chang. Without their encouragement, assistance, and constructive comments, the dissertation would not have been completed. Additionally, I thank the Department of Finance and the University of Tennessee for financial support throughout the Ph.D. program.

Abstract

I report that most cross-sectional deviations in international capital structure are caused by the heterogeneities of firm-, industry, and country-specific determinants rather than the influence of legal-institutional differences such as legal environment. In particular, most variations in international capital structure originate in the heterogeneity of firm-specific characteristics. Although the legal environment representing creditor protection could explain some differences in international capital structure, this evidence is at best only suggestive. However, the legal system, in general, seems to have a rather indirect effect on firm leverage through a conduit of firm characteristics. I do not find clear evidence to support that the indirect influence of the legal environments on leverage behavior is identifiable enough to prove a meaningful interaction between macroeconomic situations and the quality of legal protection underlying legal classification.

If the heterogeneities at the level of firm, industry, and country levels are controlled for, the English common-law countries surprisingly appear to rely highly on debt-leverage, whereas the German civil-law countries are likely to be least levered. This finding is contrary to a "received wisdom" associated with international capital structure. The heterogeneities appear to be related to a sample bias inherent in international databases. In particular, collateral value of assets, firm size, and debt-related tax shield benefit are generally viewed as the most influential factors in determining corporate leverage decision.

Most of the variations in international capital structure can be ascribed to the heterogeneity of firm characteristics, rather than the macro economic factors once unobserved heterogeneous time-variant effects are taken into account. The stylized relationships between firm-specific determinants and leverage ratios are not valid across international capital structure over time. I also find significant difference in the speed of convergence of actual capital structure toward target level across different legal environment under a dynamic setting. Thus, legal factors seem to play a significant role in deciding the speed of adjustment in leverage.

Key Words: International Capital Structure, Firm Heterogeneity, Legal Origins, OECD Countries

Table of Contents

Table of Contents -*Continued*

List of Tables

Chapter 1: Introduction

1.1 Overview and Motivations

During the past several decades, there have been numerous attempts to validate or disprove the findings of Modigliani and Miller (1958, 1963) on capital structure, using both U.S. and international data. Although most studies in this area have focused primarily on U.S. firms. Only a few recent studies, however, have involved comparative analyses of an international scope. Why have very few studies used cross-country comparisons to test theories of corporate financial leverage? One of the reasons is the incompleteness of international databases. Most international databases do not contain enough cross-sectional or time-series data of firms in the world. Consequently, the lack of complete data has long been a serious obstacle to progress in international comparison of capital structure, and thereby has prevented earlier related studies from establishing more comprehensive conclusions and answering puzzles raised in international capital structure. Therefore, many important questions associated with international capital structure seem to be left either partially or completely unanswered.

One important question is whether the stylized determinants of capital structure, such as firms' profitability, their size, and other financial factors at the firm level are valid for both U.S. and foreign firms. Even though the stylized relationships between firm-specific determinants and corporate financial leverage ratios proxied for capital structure seem to hold for many countries as common regularities, they do not explain why leverage ratios differ across countries. Cross-country variations in capital structure have long been

understood in terms of a "conventionally received wisdom." Some previous works, which rely on the differences in financial systems, have classified countries by the size and power of their banking sectors versus capital market sectors.[1] In this vein, Borio (1990) categorizes the former group as "high leverage" and the latter group as "low leverage" countries. Similarly, Rutherford (1988) concludes that firms in the countries that might be conceived as "bank-oriented" economies, i.e., Germany, France, and Japan are more "highly-levered" than firms in "market-oriented" countries such as the U.S., the U.K., and Canada. These findings may well constitute what we euphemistically call "received wisdom," that is, firms in the "bank-oriented countries" are more levered than those in the "market-oriented countries." Contrary to the studies along this line, however, Kester (1986) reports that when leverage is measured on a market-value basis and adjusted for accounting reserves and liquid assets, there are no significant differences in leverage between the United States and Japan, beyond that which can be explained by several firm-specific variables.

Additionally, recent literature has employed proxy variables for institutional and legal differences across countries. Several studies have proposed the possibility that a country's institutional arrangements and the quality of its legal system could affect decisively corporate financial leverages. Rajan and Zingales (1995) argue that at an aggregate level, firm leverage is more homogeneous across the G-7 countries[2] than

[1] This classification bifurcates countries into two large groups "continental Europe and Asia" with Bank-oriented" (e.g., Germany, France, Italy, Japan, etc.) and "Market-oriented" countries (e.g., the U.S., the U.K., Canada, etc.). Simply put, this classification focuses on "Anglo-American "cultures vs. the rest of the World.

[2] The G7 countries are Canada, France, Germany, Japan, Italy, United Kingdom, and United States.

previously thought. Furthermore, they claim that some variations could be attributed to institutional differences including accounting practices[3], if they exist.

A rapidly growing literature, originating with La Porta, Lopez-De-Silanes, Shleifer, and Vishny (henceforth LLSV, 1997, 1998, 1999[4], and 2000), has demonstrated the importance of the legal system for firms' financial decisions, such as capital structure, dividend policy and ownership concentration. LLSV (1997) argue that the differences in legal origin or system may affect the external financing of a firm, and thereby capital structure in macroscopic terms.[5] They suggest that the differences in the nature and effectiveness of financial systems and institutional factors around the world can be traced in part to the differences in investor protections against expropriation by insiders, as reflected by legal rules and the quality of their enforcement. In effect, legal rules protecting investors and the quality of their enforcement differ greatly and systematically across countries. These rules vary systematically with legal origin, which is English common-law, French, German, or Scandinavian civil-law. Along the possible link between the legal environment and corporate financial decisions, LLSV (1997) hypothesize that English Common-law countries with stronger legal protection of investors would have larger aggregate liabilities than do German, Scandinavian, and

[3] For example in Germany the amount of liabilities may be exaggerated because a portion of earnings is reserved for an item of "other liabilities" in the financial balance sheet.
[4] This refers to La Porta, Lopez-De-Silanes, and Shleifer (LLS).
[5] La Porta, Lopez-De-Silanes, Shleifer, and Vishny (1997) find that there are large systematic differences between countries from different legal origins in the size and breadth of their capital markets. Specifically, they classify countries around the world into four groupings: English Common-law, French Civil-law, German Civil-law and Scandinavian Civil-law Origins. La Porta, Lopez-De-Silanes, Shleifer, and Vishny (1998) emphasize the importance of the legal system in a country as explanatory variable for the modes of external financing. These differences in legal system include the extent of creditor and equity holder protections across countries, and they matter for financial markets such as equity and bond markets. They try to assess the ability of firms in different legal environments to raise external finance through either debt or equity. Therefore, these differences may be possible explanations for the cross-country variations in capital structure.

French civil-law countries. Since the countries in the English common-law system and in the civil-law systems overlap the "market-oriented" or "Anglo-American" countries, respectively, their argument is contrary to the conventionally received, prevailing view on international capital structure.

In a more recent paper in the comparative analysis of international capital structure, Booth, Aivazian, Demirgüç-Kunt, and Maksimovic (henceforth BADM, 2001) attempt to justify several firm-specific variables and institutional factors using firm-level data. Analyzing capital structure choices of firms in 10 developing countries, they infer that debt ratios seem to be affected in the same way across countries. They also, however, present evidence that there are persistent differences across countries, implying that specific country factors are at work. They also conjecture that institutional differences do not seem important, even if theory and common sense would suggest otherwise. In one of their more recent extensive works, Booth, Demirgüç-Kunt, and Maksimovic (BDM, 2003) investigate the possible links between firm size and financial or legal institutions. They argue that firm size is positively related to the size of the banking system, and the efficiency of the legal system. Although BDM (2003) do not provide what the relationship between firm size and institutional factors across countries means in the context of capital structure, they do explore the possible influence of institutional factors on the firm-specific attributes.[6]

In contrast to BADM (2001), Giannetti (2003) argues that the skepticism associated with the influence of institutions on capital structure may be due to the bias induced by

[6] See Demirgüç-Kunt, and Maksimovic (1998) for the relationship between legal/financial system and firm growth.

the samples used in previous papers of large listed companies. Using a concept of "firm-fixed effects or core leverage)"[7] to control for the bias, Giannetti shows that institutions are responsible for the cross-country differences in capital structure.

The previously reviewed studies associated with international capital structure have several restrictions. Generalizing their findings reveals how the studies support the "received wisdom" and lack serious consideration of variables that might affect capital structure choices. As Rajan and Zingales (1995) hint, "conventionally received wisdom" might be the outcome caused by data limitations. Some of the previous works using data from the Organisation for Economic Co-operation and Development (OECD) employ the ratio of non-equity to assets as the leverage ratio because it is the only measure of leverage that can be reported for all OECD countries. Therefore, various studies that infer cross-country differences in capital structure may well be constrained by the method of how one defines "leverage."[8]

Most previous studies emphasizing the role of macro-institutional or legal environment to explain the variation of international capital structure tend to make light of firm-specific characteristics and business risk. Even though the heterogeneities inherent in firm characteristics or business risk are taken into account along with institutional factors, the proxy variables for those attributes are usually treated as separate groups of variables. In other words, the influences of firm-specific variables on capital

[7] It represents the share of leverage that cannot be explained by time-varying firm characteristics.
[8] The conventionally accepted measure, debt-to-equity ratio does not lend itself easily to use with international data, although some researchers-namely Rajan and Zingales (1995)-employ several kinds of leverage ratios.

structure are measured independent of other kinds of variables, such as financial systems, legal environment, and other macro-institutional factors. Rajan and Zingales (1995) argue that institutional environment could differentiate the capital structure choice across countries, and firm leverage is fairly similar across the G-7 countries. Nonetheless, they do not provide a unified analysis of the two categories of variables, and hence do not present the more fruitful results that they could have produced.

In the same vein, excluding firm-specific variables LLSV (1997) concentrate exclusively on country-specific macro variables, such as GDP, GDP growth, etc., and legal systems. Therefore, they implicitly assume that firm-specific variables are treated as a given. The studies emphasizing macro variables or considering various variables separately in the models may fail to capture an important possibility: the influence of firm-specific attributes on capital structure could be significantly at work even in the presence of institutional variables, and might be closely related to other macro-institutional variables. For example, LLSV (1997) cannot find evidence consistent with their hypothesis. As will be analyzed in this dissertation, their failure seems to be due to the lack of full consideration of potential variables which might affect the variation in international capital structure. BADM (2001) also do not consider other various variables that are known as effective determinants of capital structure in a unified analytical framework. Indeed, to understand whether institutional arrangements do matter in explaining cross-country differences in capital structure, not only must the heterogeneity in firm characteristics and business risk be taken into account, but it also should be combined with institutional factors.

Giannetti's (2003) work most closely resembles my research in terms of the empirical approach. However, Giannetti does not have a sufficiently large sample of countries to generalize his findings regarding legal rules because 6 of the 8 sample countries belong to the French civil law origin. Therefore, his study displays a limitation that it cannot fully explore the potential role of the differences in legal system in explaining the variations in international capital structure. Moreover, in Giannetti's study, firm characteristics are incorporated into his models as time-varying determinants, while institutional factors are used as time-invariant variables. Although the correlations between leverage and institutional factors are analyzed after time-varying variations caused by firm-specific variables are taken into account (i.e., firm-fixed effects), two categories of variables are employed in separate models. Consequently, he can only say that financial decisions are subject to institutional constraints. However, he cannot comment on the extent to which financial leverage is affected by institutional environments.

As will be discussed later, most previous studies are at odds with the relations between corporate leverage decision and institutional variables. This is somewhat related to the lack of comprehensive and complete analyses. A serious problem is the limited knowledge of the dependency between institutions or between institutions and firm characteristics. In other words, some of institutional arrangements, such as macro economic factors or legal environments, are themselves influenced by the development of other institutions. It is unlikely that the legal and financial institutions develop independently at the country level. Therefore, the relations could vary depending on how and what institutional variables are incorporated in the models used in the previous

studies. As such, prior studies do not provide us with an answer to the following debate: some argue that firm-specific attributes may account for the most cross-country variations in international capital structure, while others claim that country-specific macro variables and legal origins are more critical in explaining differences in international capital structure. What kinds of variables are more influential when all categories of variables are taken into account together? Furthermore, how do the variables identified in previous studies work to explain the variation in international capital structure? In fact, although it is generally believed that a firm's capital structure choice may be affected by a wide variety of variables, no study attempts to answer such a question. Answering this question will enable us to draw a more complete picture of the comparative analyses of international capital structure.

In addition, it should be noted that few prior related studies investigate time-series data of firms in analyzing the cross-country comparisons of international capital structure. The reason is due, in part, to data limitations. In fact, the findings from cross-sectional data cannot be guaranteed to remain valid over time. For instance, it is well established that leverage is positively related to firm size when using cross-sectional data. However, if large firms in a particular country tend to rapidly reduce using debt financing over time, the relationship between leverage and firm size could be negative when variations across both time and units are taken into account. Therefore, pooled time-series and cross-sectional information contained in data needs to exploit the robustness of the evidence derived from cross-sectional analyses.

1.2 Research Questions and Concluding Remarks

The prospective goal of my research is to supplement several issues associated with incompleteness described in the literature review above. More specifically, my research aims to answer the following questions:

1) Are there significant differences in cross-sectional and time-series capital structures across legal origins and countries? If so, what factors drive these significant differences?
2) Do institutional arrangements indeed matter for corporate financial leverages? And do those attributes work uniformly across countries?
3) Can the stylized relations between capital structure and several firm- and industry-specific variables obtained from the cross-sectional data of U.S. firms be generalized for international capital structure? Are the relationships valid over time?
4) What are the significant determinants of variations in international capital structure in a dynamic setting that allows adjustment of capital structure to target levels over time? In particular, are there significant differences in the speed of convergence toward target levels across legal environments?

My research attempts to clarify and provide answers to the above questions as follows:

First, I examine the relations between various levels of variables and capital structure across countries. My work is comprehensive in that the samples include firms from all OECD countries[9], and the potential determinants of capital structures are analyzed and compared with respect to four possible levels of determinants that include firm-specific, industry-specific, and institutional arrangements all of which are country-specific variables and legal systems under a unified analytical frame. Industry-specific variables proxy for business risk as in previous studies. As proxies for legal origins, I adopt the legal classification articulated in LLSV (1997) for two reasons. 1) The classification corresponds to these cited by "conventionally received wisdom," 2) It is comprehensive enough to serve as possible proxies for the differences in legal environments. Moreover, almost all of OECD countries constitute a subset of the 49 countries analyzed in LLSV (1997). I also attempt to verify whether the "generally received wisdom" is really valid. In other words, I examine statistically whether German civil-law countries or bank-oriented countries are more highly levered than other countries or legal groups. I also utilize a measure of "standard partial coefficients" for direct comparability of several categorized determinants of capital structure. Accordingly, unlike previous studies, I avoid drawbacks that originate with separate analysis of the effects of firm characteristics and institutional attributes on corporate financial decision.

Second, I investigate whether the seemingly apparent variations in financial leverage across countries, such as GDP, GDP growth, the developmental phase of banking industry and stock market, debt-related tax shield effects, personal taxation on equity investment, and legal protection of creditors' rights, are truly attributable to the

[9] Iceland among the 30 OECD member countries is omitted due to lack of complete data.

differences in institutional determinants. Common sense would suggest that institutional environments are more likely to influence capital structure by combining with firm- or industry-specific characteristics, rather than by directly affecting capital structure. In addition to direct influences of each category of determinants on capital structure, the indirect effects of possible interactions between individual categories of variables on capital choices are also investigated.

Third, I construct a panel model to capture information aggregated in cross-sectional data that might have been looked over in cross-sectional analyses employed primarily in most previous studies. One may uncover differences in capital structure across countries that may be caused by time-varying changes as well as cross-sectional changes in the possible determinants. The results from the pooled time-series and cross sectional model are compared with those from the cross-sectional model.

Fourth, my dissertation also attempts to investigate how the inferences derived from the static analyses hold under a dynamic framework allowing adjustment of capital structure over time. This dynamic analysis assumes that the observed capital structure are more likely to deviate from certain target levels set by each firm. Therefore, it is interesting to examine how the various factors work in the adjustment process of actual capital structure toward to target level across countries.

In answering these four research questions, I briefly offer several noteworthy findings: first, as suggested by "conventionally received wisdom," I confirm that when leverage is measured by the ratio of liabilities-to-assets (hereafter, referred to as liability-leverage), the liability-leverage of the German, French, and Scandinavian civil-law

countries are significantly higher than the respective ratios of the English common-law countries. However, when some firm-, industry-, and country-specific factors are accounted for, I surprisingly discover that the English common-law countries appear among the highest levered countries on the basis of the ratio of debt-to-capital (henceforth, referred to as debt-leverage)[10], although the differences are not statistically significant. This is, of course, contrary to the "received wisdom." In short, the overall inference is that there is no significant difference in leverage ratios among the legal origin groupings beyond those explained by the firm-, industry-, and country-specific factors employed as control variables. Put differently, legal classification is not as strong an explanatory variable as expected. Even though the legal factors seem to have some indirect influence on corporate leverage decisions, they are at best only suggestive.

Second, collateral value (COL) and firm size (SIZE) appear to have the most powerful influence on leverage. Also, once unobserved heterogeneous time-variant effects are taken into account, most of the variations in international capital structure are attributable to the heterogeneity of firm characteristics, rather than macro economic factors. More specifically, collateral value of assets (COL) proves to be of the most importance in determining capital structure.

Third, most firm-specific characteristics identified in previous studies, as correlated in the cross-sectional data with firm leverage in the U.S., are similarly correlated in other countries as well, whereas the stylized relationships between firm-specific variables and leverage obtained from the cross-sectional data may not hold across countries over time.

[10] This is the same as the ratio utilized in Rajan and Zingales (1995). Capital=debt+equity

Fourth, under a dynamic framework incorporating the process of adjustment of an observed capital structure to target level, I document that significant differences in the speed of adjustment of capital structure across legal origins are found, even after controlling for the heterogeneities of all variables. The German group appears to adjust its capital structure to target levels relatively slowly, whereas the English group adjusts its observed leverage to target levels relatively swiftly. It can be inferred that convergence of observed capital structure toward target level could be affected by legal environments. Besides these main findings, this dissertation reports many new results on firm leverage behavior in OECD countries.

The remainder of the paper proceeds as follows: Chapter 2 provides the description of the database and data structure along with data sources. Chapter 3 discusses several models adopted in this study. In Section 4, I review the main theoretical framework containing institutional determinants such as legal systems and country-specific factors (macro financial institutions), firm-specific determinants, and industry-classifications affecting capital structure. Also, hypothetical explanations associated with my research questions are also presented in Chapter 4. Preliminary analyses and the main results are presented in Chapter 5 and 6, respectively. Chapter 7 concludes my dissertation.

Chapter 2: Data and Sources

The primary source of data used for this study consists of various financial items, including balance sheets (B/S) and income statements (I/S), from listed firms in all 30 OECD member countries.[11] The data are extracted from MERGENT™ [12] that maintains financial data on more than 20,000 non-U.S. companies in over 100 countries as well as over 15,000 U.S. public companies. My data set employs samples over the most recent 9-year period (1994-2002). My data set consists of 14,685 firms after excluding firms in the financial industry. Since there are some firms for which debt figures are not available in the database, leverage ratios specified by the liabilities-to-total assets ratio and the debt-to-capital[13] ratio are calculated for 14,582 and 13,779 firms among 14,685 firms, respectively. These data sets are referred to as "overall data."

Since firms in my sample data have different fiscal years, an adjustment is applied to the classification of firms' fiscal years to provide more accurate empirical work. If the date of preparation of financial statements for a firm is prior to June, its year is stamped as one-year prior to its fiscal year. Firms whose financial statements are made after June are stamped as their fiscal years. In an attempt to isolate the analysis from the potential reverse causality that exists between the independent and dependent variables, most empirical studies on capital structure employ time-lagged independent variables, to

[11] Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States. Iceland is excluded from my data set because of lack of complete data.

[12] This database is the CD-Rom version of the Moody's manuals. I would like to thank Mergent, Inc. for the facilitation of this database.

[13] Debt+equity.

obtain smoothed series of the variables. Thus, in order to mitigate possible simultaneity bias, the entire sampling period is divided into three sub-periods: 1994-1996, 1997-1999, and 2000-2002 to create cross-sectional data sets. The dependent variables, i.e., the leverages, and non-debt tax shield (NonDTS), are measured during the sub-period of 1997-1999. The indicator of expected future growth opportunities (GRW) is calculated over the sub-period of 2000~2002. The basic idea here is to use realized values as proxies for future growth opportunities when the capital structure decisions are made. The variables used as indicators of profitability (PROF), size (SIZE), and collateral value of assets (COL) are averaged over the sub-period of 1994-1996. The standard deviation of net income (VAR) is calculated over the entire sample period to obtain better estimates. Time lag- and time lead-adjusted data are labeled "cross-sectional data." [14] The cross-sectional data sets used in the regression models for the liability-to-total asset ratio and the debt-to-capital ratio contain effective observations of 8,840 and 8,275, respectively. Panel regression models are used here for the pooled time-series and cross sectional analyses. The panel is unbalanced, and therefore, the observations (NxT) are even less than the number of total cross units or firms (N) in the cross-sectional data times 9 years (T). This data set is referred to as "panel data."

As shown in Panel C, Table 1, the industry classification is a modified version of Kenneth R. French's 12-industry portfolios; the financial industry (6000~) is dropped from the sample; the mining industry (1000, 1400) is added to the industries of energy oil, gas, and coal extraction and products (Oil_Gas); the communication industry, the

[14] I also performed the same regression analysis with no time lag- and lead-adjusted cross-sectional data, and found less goodness of fit.

utility industry, and the transportation industry including water and gas supplies (4000,4400, 4500, 4600) are merged into the regulated industry; the chemical and construction industries are combined together; and additional Standard Industrial Classification (SIC) codes (1500,1600, 1700) belonging to the construction industry, which are included in construction industries in Bradley et al.(1984), are added here in my analysis. Although the chemical and construction industry are merged, it is unlikely to pose a serious bias because the two industries have similar leverage ratios in the U.S (Bradley et al., 1984).

Data sources for several variables associated with institutional determinants are presented in Panel E of Table 1. GDP data over the period 1979-2001 are obtained from SourceOECD statistical database and the IMF (International Monetary Fund)'s International Financial Statistics (IFS). GDP of countries are converted to US dollar for direct comparability.[15] Stock Market capitalization/GDP as a proxy for the size of equity market in a given country is the stock market capitalization divided by GDP. These ratios are from World Bank, but some GDP data are from SourceOECD statistical database. Values for cross-sectional analyses are 1990-2002 averages with a few exceptions.[16] Bank assets /GDP is the summation of all assets of domestic banks in a given country divided by GDP.[17] Tax data are obtained from various sources. Corporate tax rates are from John Graham, "The International Handbook of Corporate and Personal Taxes" and

[15] Exchange rate between US dollar and national currency of each country as of the end of year is applied.
[16] 1994-2002 for Czech Republic and Slovak Republic, and Ireland, 1993-2002 for Poland, and 1991-2002 for Hungary.
[17] Some authors use "bank credit/GDP" as a proxy for the size of the banking sector. (e.g., BDAM, 2001) is the claims of the deposit money banks divided by GDP obtained from IMF, International Financial Statistics (IFS). Bank credit is the summation of IFS lines 22a through 22f. Although these values for all OECD countries are obtained, they are not employed here because claims of deposit banks does not seem to represent the size of the banking sector in a given country, and because the variable shows less goodness of fit than the index measured by all asset of banking industry.

PricewaterhouseCoopers, "Corporate taxes: worldwide summaries." Personal income tax rates on dividends, capital gains, and interests are collected from OECD, "Taxation and household saving: Country Surveys," OECD, "Tax Ratios: A Critical Survey," and PricewaterhouseCoopers, "Individual taxes: worldwide summaries." Since my sample data begin in 1994, all tax rates with a few exceptions are obtained as ones effective as of the beginning of 1994. Legal Groupings of OECD countries follow exactly La Porta et al. (1998). All variables employed in this study are described in panels A-D of Table 1. More details on the variables are provided along with some related issues in another separate section.

Chapter 3: Models

The models employed in my study are constructed under both static and dynamic frameworks. Cross-sectional regression and panel regression models are developed in the context of a static setting. An equation system containing distributed-lag equations is employed under the dynamic setting. The static and dynamic models are estimated by the Ordinary Least Squares (OLS) and non-linear OLS method, respectively.

3.1 Static Models

3.1.1 Cross-sectional regression models

Cross-sectional regression models are employed to investigate whether variations in international capital structure survive even after controlling for the heterogeneities caused by firm, industry, and legal variables. Thus, the main regression model has several different specifications as the four categories of independent variables, firm, industry, macroeconomic variables, and legal origins are sequentially incorporated into the model. The initial specification of my cross-sectional regression model is

$$\text{Specification 1: } L_i = \alpha_0 + D^g + \varepsilon_i \qquad (1)\text{-a}$$

$$L_i = \alpha_0 + \sum\nolimits_g \beta_g D_i^g + \varepsilon_i \qquad (1)\text{-b}$$

where, L_i and D_i^g denote the leverage ratio of firm *i* and the dummy variable of the legal group to which firm *i* belongs. D^g in equation (1)-a is an index that stands for the extent of legal protection of investors' rights as suggested by LLSV (1997). The index has whole numbers ranging from 1 to 4 according to ascending order of the quality of legal protection (E>S>G>F). Thus, the index for the English common-law countries with high quality of legal protection is 4, while that for the French civil-law countries with low quality of legal protection is 1. The English common-law group is incorporated into the model as a reference for legal group dummies when pairwise *t*-tests of mean differences between legal groups are performed using equation (1)-b.

$$\text{Specification } 2: L_i = \alpha_0 + \mathbf{X}_i^c \boldsymbol{ß}_c + \sum\nolimits_g \beta_g D_i^g + \varepsilon_i \tag{2}$$

$$\text{Specification } 3: L_i = \alpha_0 + \sum\nolimits_s \beta_s D_i^s + \mathbf{X}_i^c \boldsymbol{ß}_c + \sum\nolimits_g \beta_g D_i^g + \varepsilon_i \tag{3}$$

$$\text{Specification } 4: L_i = \alpha_0 + \mathbf{X}_i^f \boldsymbol{ß}_f + \sum\nolimits_s \beta_s D_i^s + \mathbf{X}_i^c \boldsymbol{ß}_c + \sum\nolimits_g \beta_g D_i^g + \varepsilon_i \tag{4}$$

where $\mathbf{X}_i^c$ is a row vector of country-specific variables, [GDP GDPGRW BANK STKMKT DTS Miller-DTS][18], and $\boldsymbol{ß}_c$ is a column vector containing the corresponding coefficients. D_i^s is industry dummy variable of the industry classification of firm *i*. In the specification (4), $\mathbf{X}_i^f$ is a row vector of firm characteristics, [PROF NonDTS GRW VAR SIZE COL], and $\boldsymbol{ß}_f$ is a column vector containing the corresponding coefficients.

[18] GDP=natural log of GDP in US dollars. GDPGRW=annual growth rate of GDP. BANK=the ratio of assets of banking sector to GDP. STKMKT=the ratio of stock market capitalization to GDP. DTS=corporate tax rate applicable to ordinary income. Miller-DTS=Miller's tax advantage of interest over dividend income.

Specifications (1) to (3) enter groups of variables separately. Specification (2) considers country-specific variables as well as legal dummy variables. Specification (3) is estimated including industry dummy variables, and specification (4) is the full model. Time-varying variables such as firm- and country-specific variables are averaged over the entire sample period. As in specification (1), the term of dummy variables representing legal origin $\sum_g \beta_g D_i^g$ in specifications (2)-(3) is replaced with the term of legal group index D^g. The English legal group and the manufacturing industry are used as reference variables when legal and industry dummy variables are incorporated in the models. Since the main purpose of the cross-sectional regression analyses is to examine whether the legal institutions are effective variables in explaining the cross-country differences in capital structure choice, other sets of variables are considered control variables for adjusting for the heterogeneities across firms, industries, and countries that are ultimately believed to be inherent in international databases.

I also consider potential differences in the sensitivities of corporate financial decisions to firm-, industry-, and country-specific variables across legal regimes as another source of heterogeneity. For example, as will be discussed in more detail in the next section, the rationale behind the sensitivity of leverage to firm-specific variables is obvious. Even after controlling for the heterogeneities at the firm level, some of the variations in international capital structure might be ascribed to the different reactions of capital structures across legal regimes to changes in firm-specific variables. It could be inferred that the different reactions, if any, are closely related to the differences in legal

environment. The specification to capture this possibility is presented in equation (5) below:

Specification 5:

$$L_i = \alpha_0 + \mathbf{X}_i^f \boldsymbol{ß}_f + \sum_s \beta_s D_i^s + \mathbf{X}_i^c \boldsymbol{ß}_c + \sum_g \beta_g D_i^g + \sum_f \sum_g \beta_{f*g} X_i^f D_i^g + \sum_s \sum_g \beta_{s*g} D_i^s D_i^g + \sum_c \sum_g \beta_{c*g} X_i^c D_i^g + \varepsilon_i \quad (5)$$

where $X_i^f D_i^g$ is the interaction term to capture potentially different sensitivities of leverages to firm-specific variables across legal groups. $D_i^s D_i^g$ and $X_i^c D_i^g$ are the interaction terms between industry-specific variables and legal groups, as well as macroeconomic variables and legal groups, respectively. Accordingly, β_{f*g}, β_{s*g}, and β_{c*g} are the estimated coefficients of the interaction terms of the above three combinations of the groups of variables. It is important here to clarify the meaning of a significant coefficient for an interaction term. For example, a significant coefficient of interaction term, profitability*German group (i.e., $X_i^f D_i^g$) means that the reaction of leverage to profitability in the German group differs significantly from that in the reference group (i.e., the English group).[19]

[19] Let an estimated coefficient of profitability be $\beta_{prof} \in \beta$, a vector of coefficients from equation (5). Also, let β_{prof}^G be an estimated coefficient of interaction term, X_{prof} * German legal group. When specification (5) is run using the English legal group as a reference group, β_{prof} is a partial coefficient of profitability of the English legal group. Thus, $(\beta_{prof} + \beta_{prof}^G)$ is the partial coefficient of profitability of the German legal group. Therefore, it partly depends on the magnitude of β_{prof}^G whether there is significant difference in the impacts of profitability on leverage between the German group and the reference group, the English group here. For the comparison between German group and another legal group (e.g., the French legal group)

In addition, firm-specific variables and macroeconomic variables, excluding dummy variables are converted into units of standard deviations to compare the relative influences of the variables on leverages. This variant of the model is designed to standardize the different units by which the variables are measured. For instance, since the variables of GRW and VAR are measured as the percent changes in total assets and standard deviation of the percent changes in net income, the estimated coefficients of the variables will be very small in the estimated regression models. However, this small number of estimated coefficients does not mean that the explanatory power of the variables is negligible. The specification used to measure the hierarchical influences of the variables is given as follows:

$$\text{Specification } 6: L_i = \alpha_0 + \mathbf{X}_i^f \, \mathbf{ß}_f^* + \mathbf{X}_i^c \, \mathbf{ß}_c^* + \varepsilon_i \qquad (6)$$

where, β^* is called "standard partial coefficient" of the variable incorporated in the model. β_j^* for a particular variable X^j is equal to $\hat{\beta}_j \, \sigma_j / \sigma_L$, where $\hat{\beta}_j$ is the estimated coefficient obtained from the original regression equation, that is, $L_i = \alpha_0 + \mathbf{X}_i^f \, \mathbf{ß}_f + \mathbf{X}_i^c \, \mathbf{ß}_c$ Therefore, the standard partial coefficient β_j^* indicates that when there is 1 standard deviation change in X^j, there will be β_j^* standard deviation changes in leverage L.

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which is not a reference group, it depends on the distance of $|(\beta_{prof} + \beta_{prof}^G) - (\beta_{prof} + \beta_{prof}^F)| = |\beta_{prof}^G - \beta_{prof}^F|$, where a partial coefficient of profitability of the French legal group is $\beta_{prof} + \beta_{prof}^F$. Refer to Table 9.

3.1.2 Panel regression model

Most of the previous literature concentrates on cross-sectional analyses by averaging variables over the sample period so that they may reduce the measurement error caused by random year-to-year fluctuations in the variables. As a trade-off, however, this cross-sectional regression analysis using aggregate time series is inherently subject to the omitted variable problem.[20] By using panel data methodology, I aim to rectify one specific shortcoming, namely, the potential heterogeneity in the variables over time. Thus, the panel models are confined to regressing leverages on time-varying variables[21]. The panel model adopted here differs from the pooled OLS. Unconditional pooling (i.e., the OLS using all observations of cross-sectional units through the time) may lead to serious bias unless both cross-sectional and time-series analyses of covariance indicate homogeneity of regression coefficients. Therefore, in general, panel regression analysis that allows "varying" intercepts is more appropriate than the pooled OLS regression. My panel regression model is based on the two-way error component (fixed-effects) model specified as follows:

$$\text{Panel Model: } L_{i,t} = \alpha_0 + \mathbf{X}^{f}_{i,t}\,\mathbf{ß}_f + \mathbf{X}^{c}_{i,t}\,\mathbf{ß}_c + u_i + \nu_t + \varepsilon_{i,t} \qquad (7)$$

[20] Murphy (1985) points out the problems of cross-sectional regression analysis.

[21] As BADM (2001) pointed out, tax-related variables such as DTS and Miller-DTS and other industry and legal origin-related variables have single values for all years of the sample period, and hence act like dummy variables in the time series estimates when identifying each firm. Therefore, those variables cannot be used in the "fixed-effects" model that is employed in this study. Moreover, since the primary goal of the panel model is to retrieve time-series information aggregated in the cross-sectional data, the model specified in equation (7) is a parsimonious model to conduct the goal.

where u_i denotes an unobservable effect of individual cross-unit, v_t denotes the unobservable effect of time, and $\varepsilon_{i,t}$ is the remainder stochastic disturbance term.[22]

3.2 Dynamic Model

Although cross-sectional and panel models have been considered so far, these models exhibit some drawbacks. The results from the cross-sectional models are weakened by the validity in leverages introduced by firms following dynamic optimal behavior. The panel model ignores the fact that the theory of capital structure does not propose to explain the observed difference in leverage, but rather the difference in the optimal leverage across firms. In other words, it does not consider that actual leverage ratios of firms may deviate from the targeted leverage ratios. Therefore, to be precise, it is the relation between the possible explanatory variables and target leverage ratio, not the observed ratios, which should be emphasized in the analysis. A parsimonious dynamic model is found in Heshmati (2001), which is based on geometric lag-distributed characteristics. Following Heshmati (2001), I develop my dynamic model, shown as equation (8) below: Let $L^*_{i,t}$ denote the target leverage ratio for firm *i*, at time *t*.

[22] After conducting Hausman's *m* test (Hausman, 1978) for random effects and F-test for no fixed-effects, those two null hypotheses are rejected at the conventional levels of significance. In the above model, equation (7), the assumptions for consistency and efficiency of OLS estimator are as follows: i) the unconditional mean of the error term is zero, $E(\varepsilon_{i,t}) = 0, \forall i$ ii) no cross-sectional correlation, $E(\varepsilon_i, \varepsilon_j), \text{if } i \neq j$ iii) no cross-sectional heteroskedasticity and no autocorrelation over time, $E(\varepsilon_i, \varepsilon_i') = \sigma_\varepsilon^2 I, \forall i$. If the u_i and v_t are assumed to be fixed parameters to be estimated and the remainder stochastic disturbance is $\varepsilon_{i,t} \overset{i.i.d}{\sim} N(0, \sigma_\varepsilon^2)$, then equation (7) represents a two-way fixed-effects error component model

$$L^{*}_{i,t} = f(\mathbf{X}^{f}_{i,t}, D^{s}, \mathbf{X}^{c}_{i,t}, D^{g}) \quad (8)$$

The target leverage is a function of time variant firm ($X^{f}_{i,t}$)- and industry (D^{s})-specific variables, macroeconomic variables ($X^{c}_{i,t}$), and legal origins (D^{g})[23]. This "target leverage function" addresses the fact that a firm adjusts its optimal capital structure (its level of optimal leverage), rather than its observed capital structure according to the levels of various determinants of capital structure. However, since adjustments of actual leverage ratio are costly, the firm may not adjust fully its actual leverage to the changes in the target level at time *t*, but only adjust partially, which is represented as the following "leverage adjustment function," a kind of distributed-lag model

$$L_{i,t} - L_{i,t-1} = \delta_{i,t}(L^{*}_{i,t} - L_{i,t-1}) \quad (9)$$

$$L_{i,t} = (1 - \delta_{i,t})L_{i,t-1} + \delta_{i,t} L^{*}_{i,t}$$

where $\delta_{i,t}$ is the adjustment coefficient representing the magnitude of desired adjustment between two subsequent periods or the rate of convergence of $L_{i,t}$ toward its target level, $L^{*}_{i,t}$. $\varepsilon_{i,t}$ is the statistical noise assumed to have a mean zero and constant variance. The coefficient, $\delta_{i,t}$, indicates a speed of adjustment of capital structure. The speed of adjustment is represented by the restriction on the boundary that $0 \le \delta_{i,t} \le 1$.[24] If $\delta_{i,t}$ =1,

[23] For the sake of brevity, subscription *i* for individual firms is omitted from the binary variables in dynamic models.

[24] Heshmati (2001) puts a constraint $|\delta_{i,t}| < 1$ on the dynamic adjustment function, eq. (9) so that $L_{i,t} \rightarrow$

then the gap between the actual or observed leverage and target leverage at time *t* is entirely filled in within one period. If $\delta_{i,t}$ =0, then the actual leverage is not adjusted to the target leverage even though time goes to infinity. In reality, however, firms are most likely to fall in the range of $0 \le \delta_{i,t} \le 1$. Following Heshmati (2001), the speed of adjustment $\delta_{i,t}$ is built up as a function of several underlying variables affecting adjustment costs.

$$\delta_{i,t} = g(\mathbf{Z}^{f}_{i,t}, D^{s}, \mathbf{Z}^{c}_{i,t}, D^{t}, D^{g}) \tag{10}$$

where $\mathbf{Z}^{f}_{i,t}$ is a vector of firm-specific variables determining the speed of adjustment, rather than being directly affected by the capital structure. A new variable introduced in the model is the gap between target leverage and observed leverage. It is straightforward that the adjustment should be a positive function of the absolute difference between optimal leverage in time *t* and observed leverage at the end of previous period *t-1* (GAP=$|L^{*}_{i,t} - L_{i,t-1}|$). Also, the more profitable the firm is, the greater the availability of internal capital should be. A growing firm may find it easier to change its capital structure by choosing the source and composition of the new financing. Also, once actual leverage of firms deviates from their target level, the gap between the actual leverage and target leverage would be greater for larger firms in terms of absolute amount. In addition, since the adjustment of capital structure involves fixed costs, large firms are more likely

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$L^{*}_{i,t}$ as $t \to \infty$. However, this constraint allows even divergence between target leverage and observed leverage when $L_{i,t-1}$ is greater than $L^{*}_{i,t}$.

to adjust their leverage toward their target more slowly. Therefore, the speed of adjustment is expected to be negatively correlated with firm size. Thus, the vector $\mathbf{Z}^{f}_{i,t}$ is defined as [GAP PROF GRW SIZE]. I include industry and legal dummies to control for the effect of industry-, country-, and legal-specific factors on a firm's speed of adjustment.

As in the panel model, tax-related variables that do not vary with time are dropped from the model. Thus, a set of macroeconomic factors that are expected to affect the adjustment speed $\mathbf{Z}^{c}_{i,t}$ is defined as [GDP GDPGRW BANK STKMKT]. Unfortunately, no extant literature documents the relation between adjustment speed in leverage and macroeconomic institutions. Besides these variables, some economy-wide factors such as like interest rate, money supply, general economic condition, etc. could also affect the adjustment speed in leverage. In my list of variables, I include a set of time-dummy variables D^{t} to capture the potential effects that are common across firms during each period. The entire sample period of 1995-2002[25] is divided into four subperiods of two years each. The subperiod of 1995-1996 is used as a reference in the model. The dummy variables are the same as those defined in equation (8). Like the target leverage function, "adjustment speed function," in equation (10) is also allowed to vary across firms and through time. In my search to identify the mean of the adjustment speed for each legal group, I estimate a restricted version of the dynamic model where adjustment speed function d consists only of a constant term and legal dummy. In summary, I have a system of equations for a dynamic model as follows:

[25] Since the dynamic model needs the time-lagged value of leverage, data used in the model are available only afterward 1995.

$$L_{i,t} = (1-\delta_{i,t})L_{i,t-1} + \delta_{i,t} L^{*}_{i,t} + \varepsilon_{i,t}$$

$$L^{*}_{i,t} = \alpha_0 + \mathbf{X}^{f}_{i,t}\boldsymbol{ß}_f + \sum\nolimits_s \beta_s D^s + \mathbf{X}^{c}_{i,t}\boldsymbol{ß}_c + \sum\nolimits_g \beta_g D^g \qquad (11)$$

$$\delta_{i,t} = \alpha_0 + \mathbf{Z}^{f}_{i,t}\mathbf{a}_f + \sum\nolimits_s \alpha_s D^s + \mathbf{Z}^{c}_{i,t}\mathbf{a}_c + \sum\nolimits_t \alpha_t D^t + \sum\nolimits_g \alpha_g D^g$$

Since the model is non-linear in the parameters, I use a non-linear procedure to estimate the system of equations.

Chapter 4: Determinants of Capital Structure and Related Issues

One of the unresolved issues in the capital structure literature is whether to use the market value or the book value of debt and equity in order to compute the correct measure of leverage. The lack of market values in the database used here confines this research to the use of leverage ratios measured at book values. Nevertheless, I believe that this shortcoming does not hamper the analysis of capital structure.

The reasons for using a book-value measures are as follows: first, the cross-sectional correlation between the book value and market value of leverage is generally very high; thus, the misspecification due to using book-value measures is probably fairly small (Bowman, 1980). Also, previous related studies (Rajan and Zingales, 1995; BADM, 2001) do not find any significant differences in factors correlated with debt to book and market capital. Second, the main cost of borrowing is the expected cost of financial distress in the event of bankruptcy. Financial distress affects the weighted average cost of capital and consequently the optimal capital structure. In such a situation, the value of the distressed firm is closer to its book value. Once the debt has been issued, changes in the market value of that debt do not affect the tax shield effects of debt. Furthermore, if bankruptcy occurs, the accurate measure of debt-holders' liability is the book value of debt and not the market value of debt (Heshmati, 2001). Third, managers set the level of leverage in terms of a randomly selected target ratio measured at book value (Stonehill et al., 1975).

Two kinds of leverage are defined in this dissertation; one is the ratio of non-equity liabilities to total assets (liability-leverage, LIAB/TA), and the other is the ratio of total

debt to capital (debt-leverage, DEBT/CAP) that is defined as total debt plus equity. In fact, the former ratio is not a good indicator of whether the firm is at risk of default, and includes some trade credits irrelevant to long-term financing. Nevertheless, the reason that this ratio is adopted as one of leverage measures is that the ratio is closely related to the "conventionally received wisdom" put forth in the previous section. The latter measure of leverage is probably the best to capture the exact meaning of leverage in that the ratio is free of non-financing (trade-credit) activities (Rajan and Zingales, 1995).

4.1 Institutional Determinants

4.1.1 Legal institutions

Based on historical background and development of the legal system, the methodology of jurists within the legal system, hierarchies of sources of law, characteristics of legal system and so on, comparative legal scholars classify western law[26] into two major contemporary legal families, the civil or Romano-Germanic family and Common law family. The legal nationalism since the fourteenth century made the Romano-Germanic legal tradition change. Especially, codification as an expression of the nationalism eventually led three kinds of national codes, German, French, and Scandinavian Civil Codes. This codification, especially French and German codification which had a far-reaching influence, were introduced into the conquered territories in the colonial era. This codification remains in effect to this day, with revision, in many parts

[26] Over the centuries there have been numerous contacts between the Roman-Germanic family and that of the Common law, and the two families have tended to draw closer together. In that the two families share Christian morality, individualism, liberalism and individual rights, they could be called "western law." In non-western societies, Muslim law, Jewish law, Hindu law, and socialist law can be identified as legal family (David and Brierley, 1978, p.24 and 26).

of Europe and the rest of the World. Borrowing LLSV (1998), I rely principally on a publication of "Foreign Law: Current Sources of Codes and Basic Legislation in Jurisdictions Around the World"(Reynolds and Flores, 1989) to classify OECD countries into the above four legal systems (see, Panel D in Table 1)[27].

LLSV (1998) emphasize the role of the legal system for understanding the variations in financial features across countries because the legal rights given to the owners define the features of securities. They argue that the differences and effectiveness of financial systems around the world can be traced, in part, to the differences in investor protections against expropriation by insiders, as reflected by legal rules and the quality of their enforcement (see, La Porta et al., 1997). They also present some supporting evidence that legal rules protecting investors and the quality of enforcement differ greatly and systematically across countries. In particular, they find that these rules vary systematically with regard to legal origin, which includes English common law, French, German, and Scandinavian civil law systems. One regularity discovered is that common law countries tend to protect both shareholders and creditors the most; in contrast, French civil law countries protect shareholders and creditors the least, and German and Scandinavian civil-law countries are somewhere in the middle. Analyzing various financial issues across countries through a series of their works LLSV (1997, 1998,

[27] Of course, not all scholars agree on this classification. For instance, some argue that French law, seen as a whole, does not seem closer to Italian or Spanish law than it does to German law (David and Brierley, 1978, p. 67). It should be noted that this classification might be controversial within the group of comparative legal scholars. For example, Italy and Greece are categorized into the French Civil law family, while some scholars emphasize significant influence of German civil law on the legal system in those countries (Glendon, Gordon, and Carozza, 1999). Also, the Netherlands which belongs to the French civil law group is classified as a member of German civil Law group in David and Brierley (1978).

1999[28], and 2000) show that differences in ownership dispersion, dividend policy, the extent of development in capital markets, the patterns of external financing, etc. are a function of legal origins because the severity of agency problems differs greatly across legal regimes. As LLSV (1997) suggest, though they do not offer analytical support, it is possible that the relative legal treatment of shareholders and creditors affects capital structure.

Now, I address the possible impact of the legal determinants on the international capital structure discussed in previous related studies.[29]

First, extensive theoretical literature in corporate finance shows that the optimal choice of securities depends on the information available to investors and their ability to monitor compliance and enforce their legal rights (e.g., Diamond, 1991, 1993; Rajan, 1992; Hart and Moore, 1995). Since the amount of information available to investors and their ability to protect their investment depend on legal institutions, firms' capital structures should differ systematically across countries. Consequently, the classification of legal systems such as the civil-law countries (bank-oriented) and the common-law countries (market-oriented) could influence the deviations in international capital structure. According to LLS (1999), they shed light on the possibility that ownership structure may affect financial decision through underlying legal system. Widely-held firms are common only in countries with good protection of shareholders, while firms

[28] This work is written by La Porta, Lopez-De-Silanes, and Shleifer.

[29] In fact, the effects of taxes on leverage are not clear. Mayer (1990) argues that taxes do not have explanatory power, whereas Rajan and Zingale (1995) suggest that it depends on assumptions about the marginal tax advantage of debt when personal tax as well as corporate tax is considered. Their conclusion shows mixed results as to whether taxes have significant effects on capital structure. Moreover, to the best of my knowledge, no study documents what are the differences in tax systems among the different legal regimes. Therefore, I do not focus on the possible effects of taxes on capital structure here. However, this issue may be a fruitful area for future research.

owned by a few large block shareholders, such as a few family members, state or government are more common in countries with poor protection of shareholders. Therefore, from the viewpoint of LLSV that the remedy to the agency problem is the law, the agency costs are not serious in the common-law countries where the legal protection of shareholders is strong. Thus, if tax shield effects of debt financing are held constant across countries, civil law countries, particularly French civil-law countries with the poorest legal protection of shareholders, should appear to be more levered than other legal groups. By contrast, the leverage should be lower in English common-law countries. However, the large shareholders of the firms with highly concentrated ownership structure may be undiversified, which may increase their aversion to debt. Accordingly, the effect of ownership concentration on capital structure might be far from obvious.

Another channel in which legal system may influence capital structure choice exists in the relation between bankruptcy and legal protection. LLSV (1998) argue that the English common-law countries have, on average, the strongest legal protection of creditor rights, while the French civil-law countries have the poorest legal protection of creditor rights. Therefore, they hypothesize that leverage, at least on average, would be the highest in the English common law countries and the least in the French civil-law countries (i.e., E»G»S»F[30]). However, LLSV (1997) surprisingly find that the German civil-law countries are the highest in leverage, while the English common-law, the French civil law, and the Scandinavian civil law countries follow in this order (i.e., G>E>F>S)[31]. LLSV state that the German civil law countries are an anomaly, and the results, contrary

[30] E, G, S, and F denote English common law countries, German, Scandinavian, and French civil law countries, respectively.

[31] They did not conduct pairwise *t*-test between the legal groups. Hence, it cannot be inferred whether the differences among the legal groups are significant.

to their expectation might be attributable to differences in accounting practices. From the viewpoint of the theoretical and empirical explanations mentioned above, it is indeed far from clear whether the legal origin as a proxy variable for institutional differences across countries explains significantly the variation of international capital structure. In order to investigate the effectiveness of LLSV's legal classification, the values of the dummies representing the four legal groups are set at 4 for English legal system, 3 for German legal system, 2 for Scandinavian legal system, and 1 for French legal group, respectively. Therefore, the dummy variable for the legal institutions should be significantly and positively related to the leverages so that legal institutions can have the significant explanatory power responsible for the differences in capital structure across countries.

(Table 2 here)

Table 2 presents the results of cross-sectional regression of the leverages defined in Table 1 against the legal dummies. The estimated coefficients of legal system variables are significantly positive for the liability-leverage, which implies that firms in the German civil law group are more levered than those in other legal groups. As reported in Table 2, firms in the English common law group are least levered. This finding confirms consistently the "conventionally received wisdom" when the leverage is defined as liability-leverage. The results pertaining to debt-leverage are of particular interest. In line with LLSV (1997), firms in the German civil law countries are significantly more levered than those in other legal groups. Putting aside the Scandinavian legal group, the ranking of the legal groups with higher debt-leverage is exactly consistent with LLSV (1997).

However, as LLSV (1997) concede, the results imply that legal factors associated with the legal protection of investors' rights do not adequately reflect the extent of the size or breadth of debt market and, therefore, do not capture the variation in international capital structure. Contrarily, the results seem to confirm the "conventionally received wisdom" discussed earlier.

Second, other recent studies document that the differences in legal system are in part responsible for the variation in international capital structure in a rather indirect manner. In particular, the features of legal system in a given country influence firm characteristics. DM (1998) report that an active stock market and high scores on an index of respect for legal norms are associated with form growth financed by long-term external debt and equity. Therefore, a well-developed legal system is important in facilitating firm growth. Similarly, BDM (2003) argue that firms in the countries with weak legal and institutional systems have an incentive to substitute internal capital markets for public markets. In other words, firms in the countries with poor legal systems have less access to external financing. Therefore, the advantages to having an internal capital market would be the highest in those countries. The suggestions raised by BDM (2003) means an inverse relation between firm size and the development of a country's legal system and financial institutions. Giannetti (2003) documents that the effect of collateral value of assets could vary depending on the quality of legal protection of creditor rights. Firms that invest more intensively in intangible assets are penalized less for a lack of collateral in countries with good creditor protection. Until recently, there has not much literature as to how observed differences in the legal environments affect the

financing choices of firms through their influencing firm, industry or macro-economic characteristics around firms.

(Table 3 here)

4.1.2 Country-specific determinants (Macro financial institutions)

A. The Size of the Banking Industry and Stock Market

On theoretical grounds where the "conventionally received wisdom" discussed earlier is deeply rooted, the difference in the development of banks versus financial markets has long been perceived as a possible determinant of capital structure.[32] This indicator of banking or market development may cause differences in the accessibility to external financing by firms in that the monitoring activities and controls of firms by financial institutions are more available in bank-oriented countries where the weight of the banking sector is heavier than that in the market-oriented countries. It is generally accepted that as equity markets become more developed, they become a viable option for corporate financing and firms make less use of debt financing. Similarly, countries with a relatively large banking sector are more likely to be associated with higher private sector debt ratios. The variable of 'size of equity market' used in this research is the stock market capitalization divided by GDP, as is evident in previous studies (*STKMKT*)[33]. The magnitude of banking sector in a given country is measured by the ratio of the assets of domestic banks to GDP (*BANK*).

[32] For a more extensive discussion of the influence of developmental phase of financial markets on capital structure, see Mayer (1990) and Rajan and Zingales (1995).
[33] Italics in parenthesis stands for the abbreviated names of the variables used in this paper.

The two indicators relative to GDP are plausible measures of the overall ability of the private sector to access capital. Previous studies appear to agree on the negative relation between the size of stock market and leverage level. As reported in Panel B of Table 3, however, these studies present mixed results for the relation between the size of the banking sector and leverage. For instance, Demirgüç-Kunt, and Maksimovic (henceforth DM, 1999) report a positive sign for the relation between the banking sector/GDP and debt to asset ratios (long term debt and short term debt) when leverages are regressed on the banking sector/GDP variable alone. However, negative signs are generated once other institutional variables are added in their models. Also, DM (1998) report a negative sign for the relationship between the banking sector/GDP and the proportion of investment financed by long-term debt.

(Table 4 here)

Table 4 reports the results of cross-sectional regressions in which dependent variables are the two measures defined in Table 1, and independent variables are the main macroeconomic variables listed in Panel C of Table 1. In accordance with previous studies, high stock market capitalization has a positive effect on firms' leverage, as it seems to make more credit available to firms that do not resort to the stock market to raise capital. Also, I find the coefficients of BANK positive and significant. This finding implies that firms' leverages are closely related to the size of the banking sector. Again, the overall results of Table 2 and 4 are straightforward and confirm the "conventionally received wisdom."

B. GDP and GDP Growth

GDP (Gross Domestic Product, *GDP*) and annual growth rates of GDP (*GDPGRW*) over the sample period are considered institutional variables that may influence capital structure: however, differences in the development of institutions needs to be controlled for when using GDP (in constant US dollars). According to DM (1998) GDP per capita is closely correlated with the efficiency of the legal system. Also, DM argue that GDP per capita proxies for institutional determinants of external financing not explicitly captured by other variables. They report that GDP per capital is associated with the portion of a firm's investment financed by long-term debt. In other words, a higher proportion of firms in the richer countries rely on debt financing. However, the coefficient of the indicator of the legal efficiency is not significant once macroeconomic variables are incorporated in the models.

The results regarding GDP in Table 4 seem partly consistent with previous studies.[34] The coefficient of GDP is negative and significant for liability-leverage. However, this result is due to the multi-collinearity between GDP and the growth rate of GDP. The coefficient of GDP becomes positive once the growth rate of GDP is dropped from the model (not reported here). It should be noted that the positive relation between leverage and the size of GDP does not necessarily mean the positive relation between the size of the banking sector and GDP. Using a two-stage estimation to control for the possible dependency between the size of the banking sector in developing countries and other variables, DM (1999) argue that countries with larger GDP per capita have larger banking

[34] Strictly speaking, GDP and GDP per capita measure different attributes of an economy. The former measures the overall size of an economy, while the latter represents the income level of an economy. However, it is well known that the two variables are closely correlated.

sectors. Country to DM (1999), my finding in developed countries indicates the significant negative relation between the size of the banking sector and GDP. This finding implies the possibility that the effects of macro economic variables on firms' capital structure may not be consistent because of their dependency on other variables.

The growth rate of GDP is another macroeconomic variable to be considered. If investment opportunities in an economy are correlated, there should be a relationship between the growth rate of individual firms and the growth rate of the economy. Thus, the aggregate growth rate may serve as a control variable in cross-country comparisons of firm financing choices. As in the case of the variable of the size of the banking sector, the relation between GDP growth rate and leverage ratios does not seem clear. Interestingly, contrary to DM (1998), LLSV (1997) argue that although GNP and GDP growth rate are positively related to indebtedness of a country, the statistical significances of these results do not carry over once the legal system is accounted for. Therefore, there should be a conflict between LLSV (1997) and DM (1998) in the context of legal-institutional factors and macroeconomic variables. As mentioned earlier, this conflict implies a possible dependency between institutional factors. The estimated coefficients pertaining to the growth rate of GDP in Table 4 are negative and significant. Higher economic growth tends to cause the two leverage ratios to fall. This implies that since economy-wide growth opportunities are closely correlated with firms' growth opportunities, firms with large growth opportunities tend to use less debt in optimality as Myers' hypothesis (1977) argues. An alternative explanation may result from the use of historical growth data to proxy future growth. Mature firms with large economy-wide opportunities may not require large amounts of external funds, and thus turn out to have lower leverage levels.

C. Taxes

Another important country-specific institution that may affect corporate financial decision is the debt-related tax shield effect (*DTS*). It is generally accepted that more debt is used in those countries that assign a higher tax advantage to debt financing. Mayer (1990) claims that taxes have no significant effect on aggregate leverage. As Rajan and Zingales (1995) argue, however, this conclusion may be unwarranted if personal taxes are also considered in addition to corporate taxes. There is an obvious caveat with regard to the application of personal tax rates: It is not easy to consider personal tax codes in terms of uniformly standardized or effective rates, not only because the tax rates vary depending on the tax bracket of the investors, but also because each country imposes special treatment, such as personal allowance and deduction on personal taxes according to the source of income. In addition, the complexity of personal tax systems with both federal and local taxes makes it difficult to compare the benefit of debt across a large sample of countries. For instance, according to Table 13, a tax-exempt investor finds debt more tax advantaged in Finland than in France (tax advantage with respect to dividend income 71% versus 67%). However, this conclusion is reversed if we consider an investor who is taxed at the top marginal tax rate in each of the two countries (33.4% versus 61.6%). For this reason, the highest personal tax rates are employed in this research. It may be reasonable to use the highest marginal tax rates when listed companies are considered because it is well known that only the wealthiest individuals invest in the equity market (see, Guiso, Haliassos, and Jappelli, 2001). The personal tax rates on dividends, capital gains, and interest are restricted to income from corporate equities and bonds. The tax advantage of interest over dividends or capital gains is

computed using $1-(1-\tau_C)\ (1-\tau_{pS})/\ (1-\tau_{pB})$[35] derived by Miller (1977), where τ_C is the corporate tax rate, τ_{pS} is the personal income tax rate on equity income from either dividends or capital gains, and τ_{pB} is the personal income tax on interest income from corporate bonds. Since debt investors take advantage of debt investment over equity investment when personal tax rate levied on interest income is relatively lower than that on dividend income, Miller's tax advantage is expected to be positively related to the leverage.

Existing literature is not clear on the relation between the leverage and Miller's tax advantage. Although BADM (2001) document positive relation between debt ratios and Miller's tax advantage, it is not clear which one of two definitions of Miller's tax terms is incorporated in their model. Miller's tax advantage of interest over dividends (*Miller-DTS*), rather than Miller's tax advantage of interest over capital gains, is considered in this dissertation because there is a multi-collinearity between Miller's tax advantage of interest to dividends and capital gains, and also it is more reasonable to assume that periodic income from equity investment is primarily dividends, rather than capital gains. The results regarding debt-related tax shield are partly in accordance with theoretical predictions. For debt-leverage, firms tend to use more debt, given the tax shield benefit of debt financing and the higher corporate tax rate. However, the coefficient of the debt-tax shield effect for liability-leverage reveals a negative sign, though not significant. This

[35] Some of previous studies present inaccurate values of tax advantages. For example, BADM (2001) give 0.635 and 0.794 for Korea as Miller tax advantages of dividend and gain, respectively. However, the implied tax rates on dividend and capital gain based on their values lead to unusual numbers of 71.3% and 83.8%.

seems to result from the definition of liability-leverage that includes trade-credit, non-financing activity related accounts as well as financing activities.

D. Dependency between Institutional Variables

It is striking that the Miller tax term (Miller's tax advantage) is significantly negatively related with debt-leverage ratio. In fact, this finding strongly suggests the dependency between institutional factors that should be adjusted. In other words, this implies that the effects of the Miller tax term could differ across legal environments. Similarly, it should be noted that macro financial variables could be correlated with legal institutions. For example, it makes sense to conjecture that countries with a common-law tradition have better investor rights as in LLSV (1998). Therefore, leverage would be more sensitive to changes in the size of the banking sector in those countries with the quality of creditor rights. By contrast, firms in those countries would be less indebted with higher capitalized stock market. Therefore, legal institutions have an indirect effect on firms' leverage. As DM (1998) argue, GDP or GDP growth rate could be correlated with legal institutions because they can be regard as proxies for the legal efficiency. Unfortunately, until recently, few studies document evidence on the relation between macro financial institutions and legal environments. Moreover, theories to support those potential relations have not been explored. More details on this issue will be discussed in Chapter 6.

4.2. Firm-Specific Determinants

A large number of studies on capital structure have concentrated on figuring out the determinants affecting the optimality of capital structure and providing theoretical explanations of the relationships between firm characteristics and capital structure. Theories developed to explain the optimality of capital structure have been mainly driven on the basis of bankruptcy costs, agency costs, asymmetric information as well as debt tax shield effects[36]. If the empirical implications of firm-specific determinants of capital structures differ across countries, they should result in different features of international capital structure. I consider three possibilities[37] as the reasons for the variations of international capital structure.

First, the theories underlying capital structure could be applicable only to some countries. For example, agency theory predicts that leverage increases with a decrease in profitability (negative relationship) (e.g., Kester, 1986; Friend and Hasbrouck, 1988; Gonendes et al.,1988; Titman and Wessels, 1988), whereas asymmetric information theory posits the reverse relationship (e.g., Heinkel, 1982; Long and Malitz,1985; Blazenko, 1987; Poitevin, 1989). Therefore, the effects of firm-specific determinants of capital structure could be different across countries, and therefore cause variations in international capital structures.

[36] In addition, Harris and Raviv (1991) address approaches based on product/input, market interactions and corporate control.

[37] These three possibilities are related to the sign of the relationship between firm-specific determinants and leverage; that is, the heterogeneities caused by sample bias and the sensitivity of the leverage to the changes in firm-specific determinants, respectively. These possibilities are considered in our model (cross-sectional regression model) later on.

Second, the variations in international capital structure could be caused by differences in the levels of the determinants of capital structure. Even though the effects of the determinants on capital structure work more or less in similar ways across countries, the observed capital structures would differ across countries if the magnitudes of the determinants differ from country to country. For instance, if the average size of firms in a country is small relative to another country, the mean leverage of firms may differ across countries.

Third, even if the heterogeneities at the level of firm-specific determinants are controlled for, the cross-country variations in international capital structure could survive only if the sensitivities of leverage to the changes in the determinants differ across countries. In fact, this possibility appears to be closely related to institutional determinants, especially legal systems. For example, if agency problem, as mentioned above, is not serious in civil-law countries, where ownership by large shareholders is more common, this legal environment may affect the sensitivities of leverage to changes in several firm-specific determinants, and thereby cause variation in international capital structure. In other words, it should be noted that firm characteristics could be influenced by legal environments; therefore, the extent to which firm characteristics affect capital structure choice could vary with legal systems.

I will not elaborate on the stylized relationships between firm-specific determinants and leverage here, because these have been documented in previous studies (see, Harris and Raviv, 1991 for more details on this issue). Instead, I focus on the possible relationships between the legal environment and the firm-specific determinants

summarized in Panel A, Table 3 that are frequently employed in prior related studies, as reviewed in the following subsections.

(Table 5 here)

A. Profitability

Researchers posit different views on the relationship between leverage and profitability. The pecking order hypothesis suggests a negative relationship between leverage and profitability, whereas the asymmetric information approach predicts a positive one. Looking at Table 5, the results of cross-sectional regression of leverages on firm characteristics present a negative and statistically significant relation between profitability and the two kinds of leverage. Also, firms' debt-leverage appears to be more sensitive to profitability than liability-leverage because debt-leverage is more closely related to corporate financing decision.

LLSV (2000) argue that when the quality of investor protection is viewed as a proxy for lower agency costs, dividend payout is higher in common-law countries than in civil-law countries, because investors in strong legal-protection countries use their legal power to extract dividends from firms. However, when considering that agency costs consist of the costs associated with both equity and debt financing, the effects of profitability on leverage could be different across legal regimes.

For the agency costs between insider and outsider shareholders in the English common law countries, as LLSV (2000) argue, profitability is not strongly negatively

related to the leverage as much as in civil-law countries;[38] however, dividend payouts are low in civil-law countries where the legal protection of equity holders is poor. Thus, the expected reverse relation between leverage and profitability could be more sensitive in the countries with civil-law tradition than those with common-law codes. More specifically, the French civil-law countries where the legal protection is the poorest may have a more sensitively negative relationship between profitability and leverage, while the German and the Scandinavian civil-law countries should show slightly weaker negative relationships.

By contrast, with regard to the agency costs between debt holders and equity holders, the German civil- law countries are more favorable for creditors than the French civil-law countries. Firms in the German civil-law countries may be more motivated to retire debts than those in the French civil-law countries.[39] Therefore, I argue that negative relationship between profitability and leverage will be more pronounced in the German civil-law countries than any other legal groups, followed by the French, the Scandinavian civil-law countries, and the English common-law countries. In order to test this claim, I use the ratios of net income after depreciation over total asset (*PROF*).[40]

[38] Since the equity repurchases are common as a kind of dividend in the U.S. and U.K. and not all of additionally earned earnings are paid out as dividend, the negative relationship may appear.

[39] When the ratios of debt over capital and non-equity liabilities over total assets are used as leverage, the ratios will much more sharply decrease when a firm uses their earnings to pay a cash dividend and retire outstanding debt.

[40] Earnings before interest and tax (EBIT) proxies for business risk or Earnings before tax (EBT) proxies for business and financial risk divided by total assets are more popular in measuring profitability. To be precise, depreciation expense and accumulated depreciation should be added back to EBIT, the numerator of the ratio, and total assets, the denominator of the ratio respectively to circumvent differences in depreciation accounting methods among countries. However, I use net income instead of depreciation-adjusted EBIT or EBT because 29 countries of my sample data have different names of income-relevant accounts, and thereby more serious measurement errors could potentially bias my results if I adjust and manipulate the relevant accounting items in order to create a unified item of EBIT across countries.

B. Non-debt tax shield

According to the DeAngelo and Masulis (1980) that non-debt tax shields are substitutes for interest or debt-related tax shields; hence non-debt tax shield should empirically show a negative sign in relation to the leverage ratios. However, empirical findings of several previous studies show positive signs. It is noteworthy that the results of the previous studies are obtained from the cross sectional data of U.S. firms. The regression results for the overall data set indicate a positive relation between debt-leverage and non-debt tax shield, though a negative insignificant sign for the relation between liability-leverage and non-debt tax shield. As will be discussed later, however, we find that non-debt tax shield effects are, in general, negatively related with leverage in the context of international capital structure.

In view of the legal determinants, I think that the relationship between leverage and non-debt tax shield may be affected by tax systems combined with accounting practices that differ across the legal origins, though corporate tax have not been documented as having significant explanatory power (e.g., Mayer, 1990). Non-debt tax shield effects are difficult to measure, but I use a ratio of annual depreciation charges plus R&D expenses over total assets (*NonDTS*), [41] as a proxy for the non-debt tax shield effect.

[41] Proxy variables for non-debt tax shield vary according to authors. Bradley et al. (1984) measure the shield effects by the sum of annual depreciation and investment tax credits divided by the sum of annual earnings before depreciation, interest, and taxes (EBIT). They also employ the sum of advertising and R&D expenses divided by the sum of net sales as a proxy for non-debt tax shield. Titman and Wessels (1988) use the ratio of investment tax credits over total assets, depreciation over total assets as direct estimate of non-debt tax shields over total assets.

C. Growth opportunities

LLSV (2000) suggest that high-growth firms distribute lower dividend payouts than low-growth firms in the common-law countries because legally protected equity holders are willing to wait for their dividends when investment opportunities are good. However, this conclusion does not necessarily mean that firms in the common-law countries pay less than those in the civil-law countries when they face good investment opportunities. Firms in the countries with poor legal protection of investors' rights may reduce dividend payout by even more than those in countries with better legal protection when growth opportunities are good, because poorly protected investors are more likely to take whatever dividends they can get. Therefore, the negative relationship between leverage and growth opportunities in common-law countries would be weaker than those in civil-law countries, *ceteris paribus*. I use an annual percentage change of total assets as the proxy for growth (*GRW*).

D. Income variability

An increase in the income variability of a firm typically makes banks increasingly restrictive in issuing credit to a firm. Variability of earnings is negatively related to leverage because the more volatile the earnings, the higher the probability of default. Contrary to this view, agency theory suggests a positive relationship between earning volatility and leverage because the underinvestment problem decreases when the volatility of a firm's returns increase. The results presented in Table 5 are in accordance with the explanation offered by agency theory, though not statistically significant.

Unfortunately, no other research about the possible relationship with legal arrangements has been documented. Standard deviation of the percentage change in net income will be used as the proxy variable for income variability in cross-sectional model, and the absolute value of the first difference in percentage change of net income (*VAR*) in the panel and dynamic model.

E. Size

Traditionally and intuitively, firm size is most likely positively related to leverage, and my results also confirm the stylized sign. The relationship, however, could be reversed in that size may also proxy for informational asymmetries between inside and outside investors, which are likely to be less severe for large firms. For this reason, the incentives to preserve financial slack may not be as great for large firms (Kester, 1982). As Rajan and Zingales (1995)[42] argue, if size is a proxy for the inverse probability of default, and relationship-lendings are more common in the civil-law countries, in particular, in the German civil-law countries, where firms are also closely tied to banks, a negative relationship (or at least insignificantly positive) may be found in the civil-law groups. In fact, like the relations between other variables and leverage, either sign of the relationship between firm size and leverage can be theoretically supported. In view of legal institutions, firms in the countries with better protection of investors' rights would be more capable of issuing informationally sensitive securities like equity, and should

[42] For another possible explanation of the negative relationship between size and leverage, Rajan and Zingales (1995) argue that since size may be a proxy for the inverse probability of default, it should not be strongly positively related to leverage where costs of financial distress are low. However, it is enough to explain insignificant positive relationship between size and leverage, but not enough to account for the significant negative relationship between size and leverage.

have relatively lower debt compared with firms of the same size in countries with worse legal protection. I use the natural logarithm of total assets as the proxy for size (*SIZE*).

F. Collateral value of assets

Stockholders of leveraged firms have an incentive to invest suboptimality to expropriate wealth from the firm's bondholders. This incentive may also induce a positive relation between debt ratios and the capacity of firms to collateralize their debt (Jensen and Meckling, 1976; Myers, 1977). It is interesting to note that the relative magnitudes of *t*-values of collateral value of asset and firm size differ from the kinds of leverages. The *t*-value of collateral value of asset is greater than that of firm size for liability-leverage, and vice versa for debt-leverage. Thus, it seems that the debt-leverage associated with pure financing activity is influenced more by collateral value of assets than by firm size.

Under asymmetric information, the asset structure of a firm has a direct impact on its capital structure because firms' tangible assets are the most widely accepted collateral for banking and raising secured debt. In this vein, Berger and Udell (2001) argue that relationship- lending can reduce collateral requirements as well as lower loan interest rates. Thus, according to their argument, it is expected that the size of collateralized assets would matter less in the civil-law countries than in common-law countries. In other words, for a given collateral value of assets, firms in the civil-law countries are likely to raise more debt than firms in the common-law countries. A proxy variable for collateral value of assets is measured by the ratio of the sum of inventory, net property, plant, and equipment to total assets (*COL*).

4.3. Industry-Specific Determinants

The view that industry-class has an impact on capital structure is intuitively appealing. Firms in the same industry-class ordinarily should experience similar amounts of business risk, because these firms produce similar products, face similar costs for material and skilled labor, and typically rely on similar technology. However, the findings from the previous empirical studies regarding the relationship between capital structure (leverage ratios) and industry classification are contradictory. The majority of the previous relevant studies seem to agree that industries have developed their target levels of capital structures conditioned on their "inherent business risks" (e.g., Schwartz and Aronson, 1967; Scott and Martin, 1975) and maintain such optimal capital structures over time (e.g., Bowen et al., 1982; Bradley et al., 1984).

In contrast, Remmers, Stonehill, Wright, and Beekhuisen (1974) question the assertion of a relationship between industry classification and capital structure through international comparisons of manufacturing industries in five countries. They argue that there is no support for the hypothesis that industry is a determinant of corporate debt ratios. Ferri and Jones (1979) suggest that industry classification is linked to a firm's leverage, but in a less pronounced manner than has been previously suggested. It is generally accepted, at least, in the U.S. that industries have characteristically different capital structures and, hence, account for their unique business risks. However, as the above references indicate, the relationship between industry-specific determinant and international capital structure still remains an open question. A detailed description of 10-industry classification is given in Panel B of Table 1.

Chapter 5: Preliminary Statistics on "Received Wisdom"

Table 6 reports key descriptive statistics of my sample firms in OECD countries. From Panel A of Table 6 focusing on liability-leverage, the firms in the German (0.61) and the French civil-law countries (0.59) are, on average, more highly levered than those in the other two legal groups. By way of contrast, the English common-law countries have correspondingly low average leverage ratio of 0.50. This finding is entirely consistent with the "received wisdom" of international capital structure. Interestingly, the relative magnitudes of debt-leverage across legal groups look different from those of liability-leverage as shown in Panel B, Table 6. Although the German civil-law group is still most highly levered than other legal groups, the English common-law group is more levered than the civil-law groups other than the German civil law group. This implies that the validity of "conventional received wisdom" partly depends on the definition of the leverage as a proxy for capital structure.

(Table 6 here)

The distribution of liability-leverages looks skewed to the left because medians of the leverage are greater than mean values for all legal groups while the distribution of debt-leverage seems skewed to the right for all legal groups except for the Scandinavian group. In particular, the distribution of debt-leverages is more prominently skewed for the English legal group than other legal groups. Moreover, the median value of the English group is the lowest among the legal groups. These findings support the evidence that the

magnitude of leverages could be affected by a potential sample bias inherent in the distribution of firms in the international database.

At the level of country-specific variables, it is noteworthy that Germany and Austria have much higher liability-leverage level of 0.63 and 0.85, respectively than the group average of 0.61, whereas they have debt-leverage of 0.20 and 0.43 each, which is lower than or almost similar to the group average of 0.42. This result is consistent with Rajan and Zingales' (1995) finding from non-accounting practice adjusted data set. As reported in Table 13, the portions of long-term debt of non-current liability are even smaller in Germany and Austria than in other countries. This, in turn, means larger portion of "other non-current liability" in these two countries. Unlike the practice in the U.S., both funded and unfunded portions of pension liabilities are reported on the balance sheet in Germany and Austria, Furthermore, the accounting practices in those countries allow firms to set aside greater provisions as a special reserve for the future potential liability in profitable years. Thus, large portions of other non-current liability are represented by both the special reserve and pension liabilities. Overall inspection of the results pertaining to country means of leverages implies a preliminary inference: the mean leverages of countries do not appear homogenous within each legal group. Accordingly, the legal classification based on legal tradition and legal protection of investors' rights may not be an effective factor in accounting for the deviation in international capital structure.

Mean leverages of industries for each legal group are provided in Table 6. To the best of my knowledge, this is the first study on international comparison of the leverages

across various kinds of industries.[43] The reason that I am concerned with the comparison of leverages at the industry level is two-fold: first, no existing studies answer the question as to whether inter-industry differences discovered in the U.S. are similarly prevalent in other countries. In fact, empirical results from the relevant studies in the U. S. are in broad agreement, and show that industries tend to retain their relative leverage-ratio rankings over time, and regulated industries are among the most highly levered firms. Second, international comparison of industry leverages is directly linked to the question as to whether industry characteristics have some explanatory power in accounting for the variations in international capital structure. If there are significant differences in the leverage levels across industries, and the ranking of the industries with higher leverage is not significantly different across the legal groups, the differences in distributions of industries could result in the variations in international capital structure. Therefore, the non-parametric methods of the Kruskal-Wallis rank-sum test and the Spearman rank-correlation test are employed to investigate inter-industry differences "within" and "among" the legal groups, respectively.

Test results show that industries tend to retain their relative leverage ranking within each legal group except for the German and French groups, whereas there is no significant difference in the ranking of the industries with higher debt-leverage for almost all legal groups. Nevertheless, overall inspection of Table 6 indicates some regularities; regulated industry, chemical and heavy construction industry, and wholesale and retail industry have a consistently high leverage, while health and business equipment related

[43] Although there have been several papers that conduct the comparison of industry leverage across several countries, their scope is restricted to a specific industry.

industries have a consistently low leverage. In particular, regulated industries (electric and gas utilities, railroad, airlines, and communication) are among the most highly levered firms. Moreover, the test results for the inter-industry difference in leverages for the overall data set present that industries appear to retain their relative leverage ranking. Spearman rank-correlation test reports that the ranking of the industries with higher leverage in the civil-law groups is significantly correlated at the conventional significance levels. To summarize, industry-specific leverages appear to be determined by unique business risks, which may be generalized across countries or legal origins.

(Table 7 here)

I also conduct a statistical test to examine whether or not the mean leverages among the four legal groups exhibit statistically significant differences. Before conducting the test, I investigate not only whether there is homogeneity among the leverage ratios of all firms in the overall data set, but also whether inter-country leverage levels within each legal group exhibit similarities. The test results are given in Panel A, Table 7. As shown in Table 7 above, it appears that the leverage measures (both liability-leverage and debt-leverage) of my sample firms are significantly heterogeneous, and no significant inter-country similarities of leverages are found in all individual legal groups (exempting the Scandinavian legal group for liability-leverage). This finding implies that the legal origin classification might not be a valid factor in distinguishing capital structure across countries.

Panel B in Table 7, also shows the test results of the differences in mean leverage ratios across legal groups along with the estimated coefficients that are reported already in Table 2. Regressing leverage ratios on dummy variables representing legal groups, I find that the leverage ratios of the firms are significantly different across the legal groups.[44] As noted before, the ranking of the legal groups with higher liability-leverages is in accordance with "conventionally received wisdom." Although the mean debt-leverage of the English common-law group is significantly greater than the French and Scandinavian civil-law groups, the German civil-law group is still more levered than the English common law group. The pairwise *t*-tests[45] for the mean leverage ratios of the four legal groups show that the group mean leverages are significantly different across all individual legal groups. An exception is can be noted the pairwise *t*-test between the French and Scandinavian legal groups for debt-leverage. However, it does not need to read too much into this exception.

[44] The estimated intercept indicates the mean leverage of the English group used as a reference group. In the cases of other legal groups, the mean leverage of each group is the sum of intercept plus the estimated coefficient of the corresponding group binary. Also, the mean leverages of legal groups are exactly the same as those shown in Table 6.

[45] The Cochran and Cox (1950) approximation is adopted in doing *t*-tests when the variances of leverages of firms in paired legal groups are not equal. For the sake of accuracy, non-parametric tests that are needed when the sample observations do not follow the normal distribution are also conducted, but the test results are almost similar to the results of the parametric *t*-test.

Chapter 6: Empirical Results

6.1 Findings from Cross-Sectional Data

6.1.1 Overall analysis

A. Liability-leverage

In Table 8 for liability-leverage I examine the extent to which a country's legal system, macro financial institutions, industry and firm-specific characteristics explain liability-leverage of firms. Specifications (1)-(3) enter groups of variables sequentially, and specification (4) includes all of them in a single regression.

Overall inspection of the differences in mean leverages of the legal groups using a legal group index shows that the relation between the legal group index and the mean leverages of the legal groups is negative and significant in specifications (1)-(3). Interestingly, however, the relation between the legal group index variable and the mean leverage turns out to be positive once the firm characteristics enter the model. According to the regression using legal dummies for pairwise *t*-test, the mean leverage of the English legal group is lowest among the legal groups in specification (1)-(3), but it dramatically becomes highest and significantly differs from the other legal groups, that is, the civil-law groups when firm-specific variables are incorporated into the model. When firm-specific variables are controlled for, the leverage of the English legal group appears to be higher by 4.3% than that of the French group, and by 4.7% point and 5.7% point

than that of the German and that of the Scandinavian group, respectively. Also, there is no significant difference in the mean leverages between the civil-law groups.

These findings are straightforward to infer the followings: the influence of the legal factors (more accurately legal protection of investor rights) on the deviation in international capital structure tends to be dominated by other variables, and is valid (but not statistically significant) at best only when the variables other than legal institutions are controlled for. This is consistent with the finding of Giannetti (2003). Therefore, the reason that LLSV (1997)'s empirical results cannot confirm their hypothesis (E»G»S»F) may result from the fact that they do not control for the heterogeneities inherent in other variables that are believed to affect capital structure choice. In addition, the "conventionally received wisdom" that is more pronounced in the liability-leverage collapses when the heterogeneity of firm characteristics is considered. Therefore, I argue that "conventional received wisdom" appears to be based on a sample bias inherent in international databases.

As specification (1) in Panel A for liability-leverage shows, there exist significant differences among the liability-leverages of the legal groups when no variables other than legal institutions are controlled. As discussed in Tables 2 and 7, civil-law countries appear to be more levered than common-law countries. More specifically, the German civil-law group tends to be most highly levered, followed by the French civil-law group, and followed by the Scandinavian civil-law group. The English common-law group shows the lowest leverage among the legal groups.

Most firm-specific variables seem to have the same relationships with leverages as predicted in Table 1. More strictly speaking, the relations between leverages and the

firm-specific variables seem to conform to the stylized results obtained from the cross-sectional data of the U.S. firms. Two exceptions are non-debt tax shield (NonDTS) and income variability (VAR). The estimated coefficient of NonDTS shows negative relation with leverage, though not significant. The positive relationship between leverage and VAR supports the agency theory as discussed before (see, section 4.2).

Again, the results of the industry variables indicate that the leverages of the regulated, chemical and construction industries, and the whole retail industry are consistently and significantly higher than those of the other industries. As shown in specifications (3) and (4) of Table 8 for liability-leverage, the signs of the estimated coefficients of some macroeconomic variables such as GDP (LnGDP), debt-related tax shield (DTS) vary with different specifications of the models. This implies that the influences of those variables on leverage may differ across legal groups. This possibility will be explored in section 6.1.2. The signs of GDP growth rate (GDPGRW), the size of the banking sector (BANK), the size of stock market capitalization (STKMKT), debt tax shield (DTS), and Miller tax shield effect (Miller-DTS) are the same as expected before, when all variables are taken into account. Therefore, for the legal and macro financial institutions, I can say that leverage is higher in countries with good legal protection of investor rights, low growth rate of GDP, large banking sector (relative to the GDP size), low stock market capitalization (relative to the GDP size), and high corporate tax rate and Miller tax term. However, as discussed already, the above argument should be understood with caution because some macro variables do not seem to work universally across legal groups.

As the estimates of Tables 2, 4, and 5 indicates, the last row of Panel A of Table 8 for liability-leverage highlights that the value of the adjusted R-square jumps up from

14% to 24% when firm-specific variables enter the model (i.e., specification (4)). This alludes to the conjecture that firm-specific variables appear to be responsible for most of the deviation in international capital structure.

(Table 8 here)

B. Debt-leverage

The empirical results for debt-leverage ratio are more surprising than those for the liability-leverage. Overall inspection of the differences in mean leverages of the legal groups using legal group index demonstrate that the relation between the legal group index and the mean leverages of the legal groups is positive in specifications (1) and (4), whereas it is negative in specifications (2) and (3). At first glance, the result of specification (1) that incorporates only legal classification in the model seems to confirm that the leverages are seemingly consistent with the order of legal protection of investor rights as LLSV (1997) hypothesize. Although the sign of legal group index is positive in both specification (1) and (2), the quality of the sign is different between the two specifications.

To further investigate this issue, I conduct pairwise *t*-tests of the differences in mean leverages for all pairs of the legal groups. The result of specification (1) indicates that the German legal group is most highly levered among the legal groups, followed by the English common-law group, and finally the French and Scandinavian civil-law groups in such order. Moreover, the leverages are significantly different among the legal groups.

This ranking of group leverages is completely consistent with what LLSV (1997) find in their empirical work.

Therefore, the results of specification (1) go against the validity of legal classification suggested by LLSV. Unlike the results of specification (1), the results of specification (4) show that the Scandinavian legal group is most levered, and followed by the English common-law, the German, and the French civil-law group in such order.

With the exception of the Scandinavian legal group, this finding appears to confirm LLSV's hypothesis that leverage, at least on average, would be the highest in the English common law countries with the best legal protection of investors' rights, and the least in the French civil-law countries with the poor legal protection. However, it should be noted that the significant differences in leverages across the legal groups become alleviated as the heterogeneities caused by macroeconomic variables, industry-, and firm-specific variables are subsequently accounted for. In particular, significant differences in leverages across the legal groups dissipate completely when firm-specific variables are introduced in the model (i.e., specification (4)). One needs to recall the result of specification (4) for liability-leverage that the English legal group is still significantly more levered than the other legal groups even after all variables are considered in a single model. It is inferred that liability-leverage seems to be more affected by legal environments than debt-leverage does because liability-leverage includes not only financing-related liability, but also non-financing activities, such as operating-related accounts including note payables, accounts payable or accrued expenses.

To sum up, a new, more refined generalization emerges; only the residual deviation in international capital structure that remains after accounting for other variables such as firm, industry, and macro economic variables, may be explained by the legal factor. And, even then, the explanatory power of the legal institutions is still insignificant. As in Table 8 for liability-leverage the results of pairwise *t*-tests applied to specification (4) are also contrary to the received wisdom because major civil-law groups, such as the German and French civil-law groups are less levered by 1.3 % point and 1.5 % point, respectively than the English common-law group.

The estimated coefficients of firm-specific variables follow the stylized relationships that have already been established using the cross-sectional data of U.S. firms. With one exception, income variability (VAR) is positively related to leverage. Unlike the case of liability-leverage, debt-leverage is negatively and significantly related to profitability of firms. This is because debt-leverage is more directly related to a firm's financing activities, and therefore is more closely linked to profitability than liability-leverage that includes non-financing activities. In this vein, another interesting finding is that debt-leverage seems to be influenced more strongly by collateral value of assets (COL) than by firm size (SIZE), while liability-leverage tends to be affected more by firm size, rather than by collateral value of assets. This is because a firm's capability to finance debt usually depends on the collateral value of assets that the firm possesses, rather than mere firm size.

For the macro financial institutions, their estimated coefficients reveal the same signs as expected before. The meanings of the relations between leverage and the macro financial variables have already been discussed in the previous section. Broadly speaking,

it can be stated here that leverage is higher in countries with good legal protection of investor rights, high GDP level, low growth rate of GDP, large banking sector (relative to the GDP size), low stock market capitalization (relative to the GDP size), and high corporate tax rate. The sign of the Miller tax term, however, is contrary to my expectation. Considering the results associated with macro variables for liability-leverage, this unexpected sign implies that some macro financial variables do not seem to operate universally across the legal groups. To further investigate this issue, I examine the interaction effects between the legal environments and the other groups of variables in the following section.

6.1.2 Indirect influences of the legal institutions

Most of the variations in international capital structure can be attributed to the heterogeneities of firm- and industry-specific variables, and macro financial variables. Nevertheless, to some extent, some of the differences in the level of the financial leverage ratios could be ascribed to the legal-institutional differences, though their explanatory power is not significant. Moreover, the influences of some macro financial variables on capital structure choice seem to be affected by the difference in the legal institutions. Therefore, to understand whether the legal institutions are indeed effective enough to explain the differences in capital structure choice, not only must the heterogeneities of firm-, industry- and country-specific variables be taken into account, but also how the same variables affect the leverages in different legal environments.[46]

[46] Since no significance is found in the interaction term between industry-specific variables and the legal variable, my empirical analysis is concentrated on the firm and macroeconomic variables.

A. Influences on the macro financial institutions

The estimates of the coefficients of the interaction terms between the legal system and the macro financial variables are presented in Table 9 for macro financial institutions. For liability-leverage, the interaction variables associated with GDP size (LnGDP), the size of the banking sector (BANK), and tax-related variables (DTS and Miller-DTS) show statistical significance (Panel A). In the case of debt-leverage, the interaction variables for the growth rate of GDP (GDPGRW), stock market capitalization (STKMKT), and tax-related variables (DTS and Miller-DTS) are significant. For the most part of the overall- interaction terms in Panel A, the results seem to support the view that the legal protection of investor rights has an indirect effect on capital structure choice. There seems to be a tendency to fund with less debt in countries with better legal protection of investor rights when the stock market capitalization becomes larger. Also, the corporate leverage decision seems to be more sensitive to corporate debt tax shield (DTS) than personal tax shield in countries with better legal protection, while it seems more sensitive to personal debt tax shield than corporate tax shield in countries with poor legal protection of investor rights.

However, the critical caveat to the above interpretations is that the overall-interaction terms do not provide details on how indirect influences work across legal groups. In addition, those coefficients do not identify the directions of the influences of the macroeconomic variables on leverages for each legal group.[47]

[47] Moreover, since the legal group index represents the four legal groups, the meaning based on the overall interaction variables may be contradictory to the meaning obtained from pairwise interaction variables.

To further pursue this issue, the pairwise-interaction variables, rather than the overall-interaction variables are incorporated in the model. Since the English legal group is adopted as a reference group, the estimates of the coefficients of other groups are ones that reflect the estimated coefficients of the pairwise-interaction variables. For example, the estimated coefficient of LnGDP for liability-leverage is 0.022 which is the coefficient representing the relation between LnGDP and liability leverage in the English group. Therefore, the corresponding coefficient in the German group is –0.050, which is the sum of the coefficient in the English group and the coefficient of the interaction term between LnGDP and the German group (0.022+(-0.071)).

Overall inspection of the signs of the coefficients of the macroeconomic variables reveals how the influences of most macro economic variables on capital structure look different across legal groups when the indirect effect of the legal environments is taken into account. The relation between liability-leverage and GDP size is positive in the Scandinavian and English legal groups, while it is negative in the French and German legal groups. If one considers the coefficient of the overall-interaction term associated LnGDP is negative (-0.005), the results from the pairwise-interaction terms appear contrary to those from the overall-interaction term. Therefore, when GDP increases, firms in the countries with stronger legal protection tend to be more levered, while firms in the countries with poor legal protection may be less levered. Also, the liability-leverage of firms in the German and the Scandinavian legal groups tend to be positively related to the size of the banking sector, whereas the leverage of firms in the French and the English legal group is negatively correlated with the size of the banking sector.

The relation between debt-leverage and GDP growth rate show negative for all legal groups. From the comparison of the magnitudes of the coefficients, firms in the countries with better legal protection tend to use relatively less debt than those in countries with worse legal protection as the growth rate of GDP becomes high. Also, the stronger the legal protection, the less the debt-leverage as the stock market is developed. This implies that the quality of legal protection of investor rights seems to expedite the resort to the stock market to raise capital. Surprisingly, the relation between debt tax shield (DTS) and leverages (both liability-leverage and debt-leverage) is negative for most legal groups, whereas the relation between Miller tax term (Miller-DTS) and leverages shows a positive sign for most legal groups. This finding seems very controversial and difficult to interpret. I conjecture that since the Miller tax term is calculated on the basis of the corporate tax rate, it seems that the unexpected negative signs of the debt tax shield variable for the legal groups may be due to the possible correlation between DTS and Miller-DTS.

One needs to recall that in the results of the cross-sectional regression reported in Table 8 the estimated coefficients of some variables vary with specifications or show different signs on the contrary to the generally accepted expectations. Those variables are the GDP size (LnGDP) and debt tax shield (DTS) for the liability-leverage and Miller tax term (Miller-DTS) for the debt-leverage. As presented in Table 9 for macro financial institutions, the different signs of those variables across legal groups may explain the unexpected results from the cross-sectional regression using the overall data set.

In sum, although the legal protection of investor rights seems to have an indirect effect on capital structure choice, more accurate investigation for individual legal groups casts doubt upon the indirect influence of the legal system on capital structure. In other words, although legal environments appear to affect the variation in international capital structure through a conduit of macroeconomic institutions, the patterns of the indirect influences of the legal environments are not identifiable, and fail to fit the meaning of the quality of the legal protection. The reason for the skepticism is two fold; first, the signs of the relations between leverages and macro financial variables after controlling for the interaction terms with the legal factors are not the same across legal groups. Second, the magnitudes of the coefficients of the macro economic variables do not seem to correlate to the ranking of the legal groups with higher legal protection.

(Table 9 here)

B. Influences on the firm characteristics

The interaction terms between firm specific variables and legal group index reported in Table 9 for firm characteristics seems to be consistent with the predictions presented in section 4.2. Unlike the results relating to the interactions between macro variables and legal factors, it is most interesting that all firm-specific variables except for non-debt tax shield show the same signs across legal groups. Therefore, legal environments seem to be closely related to the extent of the relationship between leverage and firm characteristics. More interestingly, the same signs of the coefficients of firm-specific variables support

the view that the influence of firm-specific variables on capital structure choice is similar across international capital structures.

The positive sign of the overall-interaction variable of profitability means that as LLSV (2000) argue, dividend payouts are usually low in civil-law countries where the legal protection of equity holders is poor. Thus, the negative relation between profitability and leverage in the common-law countries is more likely to be weaker than that in the civil-law countries. Also, the agency costs between debt holders and equity holders, the German civil- law countries are more favorable for creditors than the French civil-law countries. Firms in the German civil-law countries may be more motivated to retire debts when they are profitable than those in the French civil-law countries. Thus, the negative relationship between profitability and leverage will be more pronounced in German civil-law countries than any other legal groups, followed by French and Scandinavian civil-law countries, and finally English common-law countries. For both leverages, I find that the leverages of the civil-law groups tend to react strongly to the changes in profitability more so than the English common-law group. For example, the estimated coefficient of the interaction term with respect to debt-leverage is –0.611 for the German group and –0.061 for the French group. Therefore, a unit increase in profitability decreases the leverage by 0.614 (-0.003+(-0.611)) and 0.063(-0.003+(-0.061)) in the German and the French group, respectively. Although the Scandinavian group appears to be an exception, this finding generally accords with my prediction regarding the relation between legal protection and profitability.

A similar scenario may be applicable to the growth opportunity of firms. The coefficient of the overall-interaction term of growth opportunity (GRW) is negative, and

growth opportunity is negatively related to the leverages across all legal groups. This means that the leverage of firms in the civil-law countries tend to be more strongly negatively related to growth opportunities than that of firms in the common-law countries. As explained before, firms in the countries with weak legal protection of investors' rights are more likely to reduce dividend payout by even more than firms in the countries with better legal protection when growth opportunities are improved. This is because poorly protected investors are more likely to take whatever dividends they can get. Therefore, the negative relationship between leverage and growth opportunities in common-law countries would be weaker than those in civil-law countries, *ceteris paribus.*

Unlike the stylized negative relationship between income variability and leverage obtained from the U.S. firms, my results indicates a positive relation, which is in support of Myer (1977)'s argument that the positive relation between leverage and income variability implies that, in the presence of growth-induced agency problems, high operating variance may reduce the agency cost of debt, rather than increase it. Also, in view of LLSV (2000), law is one of the principal remedies to agency problems, and the quality of investor protection can be viewed as a proxy for lower agency costs. By combining the arguments raised by Myer and LLSV, the leverage is more sensitive to income variability in the civil-law groups with poor legal protection than in the common law group with the quality of legal protection. Although the ranking of the legal groups with higher coefficient does not completely accord with the above hypothesis in the case of liability-leverage, the results of debt-leverage look consistent with my prediction that

firms in the civil-law countries seem to react with greater positive to the increase in the variatility of net income than firms in the common-law countries do.

The size and collateral value of assets are positively related to the leverages for all legal groups even after controlling for the interactions with the legal institutions. However, the overall-interaction terms associated with these variables for liability-leverage are opposite to those for debt-leverage. For debt-leverage, the results are in accordance with the prediction made before. Since a possible remedy to information asymmetry between equity investors and debt investors is the law, firms in the countries with better protection of investor rights would be more capable of issuing informationally sensitive securities like equity, and should have relatively lower debt compared with firms of the same size in countries with worse legal protection. My results confirm that the positive relation between firm size (SIZE) and debt-leverage in the civil-law countries appears to be stronger than that in the common-law countries. Likewise, the positive relation between collateral value of assets and debt-leverage is stronger in the civil-law countries than in the common-law countries because the size of collateralized assets would matter less in the civil-law countries than in common-law countries as discussed in section 4.2. According to the results given in Table 9 for firm characteristics, a unit increase in collateral value of assets increases debt-leverage by 0.240 (0.140+0.100)[48] for the German legal- group, 0.168 (0.140+0.027) for the French legal-group and 0.282 (0.140+0.142) for the Scandinavian legal-group. Therefore, the sensitivity of leverage to the change in collateral value of assets in the civil-law countries is maximum over 2 times as high as 0.140 in the common-law countries.

[48] There is a rounding error.

For the relations between firm size (SIZE) and collateral values (COL) and liability-leverage, the ranking of the legal groups with higher estimated coefficient differs from that obtained in the case of debt-leverage. Since liability-leverage is not a pure proxy representing financing activities, and include business-operating activities, the results do not seem to correspond to the prediction based on legal protection of investor rights.

Lastly, I focus on the results associated with non-debt tax shield. The stylized relation between non-debt tax shield and leverage obtained from the U.S. firms is positive. As shown in Table 9 for firm characteristics, I find that non-debt tax shield effects are, in general, negatively related with leverage in the context of international capital structure. In particular, the relationship is negative in all legal groups except for the English common-law groups for debt leverage.

To sum up, most firm-specific characteristics identified in previous studies correlated in the cross-sectional analysis with firm leverage in the U.S., are similarly correlated in other countries as well. In addition, the legal environment such as the quality of the legal protection of investor rights, in general, seems to have significant indirect effect on firm leverage.

6.1.3. Firm characteristics vs. macroeconomic institutions

As presented in the results of the cross-sectional regressions given in Table 8, a large part of the variations in international capital structure may be ascribed to the heterogeneities inherent in firm-, industry-specific characteristics and country-specific macroeconomic institutions. However, there still remains an open question as to which

variables have more influential power in explaining the variations in international capital structure. For the sake of brevity, I focus on the comparison of the influences of firm-specific variables and macroeconomic variables. Also, indirect effects of the legal environments on those variables are excluded in order to compare direct influences of firm characteristics and macroeconomic variables. It should be noted that since the variables are measured at different units, these different units hamper direct comparison of the influences of the variables on firm leverage. Thus, the units of the variables are standardized using "standard partial coefficients." The standardized estimates of the coefficients enable us to assess the relative importance of the independent variables. The standard partial coefficient β_j^* indicates that when there is 1 standard deviation change in a variable, X^j, there will be β_j^* standard deviation changes in leverage L.

(Table 10 here)

Table 10 reports the standard partial coefficients of firm-specific and macroeconomic variables. For the relative influences of firm-specific variables on leverage, collateral value (COL) and firm size (SIZE) appear to have the most powerful influence on both leverages. More specifically, for debt-leverage, collateral value (COL), debt tax shield (DTS), and firm size (SIZE) seem important factors in that order, whereas for liability-leverage, firm size (SIZE), collateral value (COL), and the growth rate of GDP (GDPGRW) look influential factors in determining leverage level. The reason that tax-related variables is one of important factors for debt-leverage is that unlike liability-

leverage, debt-leverage is closely related to pure financing activities. In the case of debt-leverage, a standard deviation increase in collateral value and firm size increases leverage by 18.24 % and 12.49% of its standard deviation, respectively. For liability-leverage, a standard deviation increase in collateral value and firm size increases leverage by 22.90% and 27.42% of its standard deviation each. Also, as noted before, the collateral value is the most influential factor for debt-leverage whereas the firm size is the most important factor for liability-leverage in determining leverage level. This is reasonable in terms of the difference in definitions of liability-leverage and debt-leverage.

Interestingly, debt-related tax shield benefit (DTS) is an important factor in determining corporate debt-leverage decision while Miller tax term (Miller-DTS) and non-debt tax shield benefits (NonDTS) are relatively less important factors to affect financial leverage decision. This finding implies that firms tend to rely more on considerations of direct tax shield benefit, rather than the tax benefit to investors when they make a decision on leverage. A standard deviation increase in debt tax shield (DTS) tends to increase debt-leverage by 14.41% of its standard deviation, while a standard deviation increase in non-debt tax shield (NonDTS) increases the leverage only by 3.16% of its standard deviation. Also, GDP growth rate, GDP level, and the extent of stock market capitalization or the size of the banking industry seem to matter for corporate finance choices.

6.2 Findings from Panel Data

The main discussions presented so far have been based on cross-sectional data. As noted before, the cross-sectional analyses do not seem to capture the time-series information aggregated in the cross-sectional data. Consequently, the cross-sectional model cannot control for potential heterogeneity in the variables over time. In addition, the cross-sectional regression analysis using aggregate time series is subject to the omitted variable problem. Thus, the results from the panel model as compared to those obtained from the cross-sectional regression model are used to identify systematic differences.

I briefly investigate whether the firm-specific determinants affect similarly capital structure across the four legal groups over time. Hausman's *m*-test rejects the null hypothesis of random effects for all legal groups at the 1% level of significance. Also, F-test shows rejections of no fixed effects for all groups at the 1% level. These results support the fixed effects model, rather than the random effects model in two-way panel data analysis. The fixed effects method is based on a two-way error component model in panel regression, which is employed to estimate parameters. Time-invariant variables such as debt tax shield, Miller tax term, and other industry and legal origin-related variables have single values for all years of the sample period. Thus, as in BADM (2001), those variables cannot be used in the "fixed-effects" model that is employed in this study.[49] Table 11 reports the estimates from the two-way fixed-effects model. Here, I

[49] Giannetti (2003) employs two separate models; a regression of leverage on time-varying determinants and on time-invariant determinants.

offer several interesting findings that are not found from the analyses of the cross-sectional data.

(Table 11 here)

From the overall test of debt-leverage[50], several irregularities in the relationship between the firm-specific determinants and leverage are found. Unlike the results of the cross-sectional analyses reported in Table 8 for debt-leverage, the relations between firm-specific variables and leverage do not seem to be similar across legal groups. Income variability (VAR) and firm size (SIZE) appear to be negatively related to leverage, which is opposite to the result obtained from the cross-sectional data.

More specifically, the French civil-law group shows a positive relation between leverage and non-debt tax shield (NonDTS), which is opposite to the results from the cross-sectional regression. The relation between leverage and growth opportunity of firms (GRW) is positive in German, French, and Scandinavian legal groups, though the relation was negative in the cross-sectional regression. It is very striking that firm size (SIZE) is significantly negatively related to leverage in the German and English legal groups. This finding is contrary to the stylized prediction obtained from the cross-sectional data. However, the findings from the panel analyses should be interpreted cautiously. For instance, the negative sign does not mean that smaller firms are more levered than larger firms. Instead, it presumably indicates that individual firms, on

[50] My discussion associated with my panel model and dynamic model mainly focuses on the leverage defined at the ratio of debt to capital, that is, debt-leverage only which is more directly related to firm's pure financing activities. Still, the results of the analyses on the liability-leverage are available from author upon request.

average, tend to reduce leverage as their firm sizes become larger over time. Suppose that larger firms in a particular country experience a rapid reduction of leverage during a specific period. In the context of this situation, even though the larger firms still might be more levered than the smaller firms, the relationship between firm size and leverage could be negative when average values of the firm size over the period are used in the cross-sectional regression. Rajan and Zingales (1995) report that firm size is negatively related to leverage in Germany when using the cross-sectional data set, and conclude that the smaller firms are more levered than larger firms. I argue, however, that the negative sign associated with size and leverage may occur because time-series information may be aggregated into the cross-sectional analyses as I have explained above.

I investigate the relation between firm size (SIZE) and leverages across countries to identify countries that produce the opposite sign (i.e., negative sign) to one obtained from the cross-sectional regression.[51] Surprisingly, U.S firms that show significantly positive relation between firm size and leverage in the cross-sectional analyses indicate a significantly negative sign for the relation in the panel analysis. This finding confirms that the stylized relations between firm-specific variables and leverage obtained from the cross-sectional data could not be valid when time-series information is taken into account. For example, Portugal shows a negative sign that is opposite to the positive sign generated in the cross-sectional data. Firms in Austria, which belongs to the German legal group, also show a negative sign for the relation between firm size and debt-leverage when analyzing the panel data, though the negative sign is not significant.

[51] The results are not reported, but available from author upon request.

It is also noteworthy that profitability (PROF) and collateral value of assets (COL) seem to work universally both across firms and over time. The coefficients of profitability and the collateral value of assets show negative and positive sign for all legal groups, respectively.

The influences of the macroeconomic variables on leverage seem to be similar across the four legal groups. In particular, GDP (LnGDP) and the size of the banking sector (BANK) appear to be positively related to leverages across legal groups. Stock market capitalization (STKMKT) seems to be negatively related to debt-leverage across legal groups. The relation between stock market capitalization and debt-leverage is positive in the English group, but it is not significant. GDP growth rate (GDPGRW) does not seem to give a consistent relationship with leverages across the four legal groups. Taken together, the results obtained from the panel model look different from those from the cross-sectional regression: the overall results indicate that almost all of the macro financial institutions lose their significance when the pooled time-series and cross-sectional information contained in data are exploited. Thus, I argue that most variations in international capital structure can be attributed to the heterogeneities of firm-specific characteristics, rather than those of macroeconomic institutions.

In summary, I find that the stylized relationships between firm-specific variables and leverage obtained from the cross-sectional data may not hold for international capital structure once unobserved heterogeneous time-variant effects are accounted for. The heterogeneities of collateral value (COL), firm size (SIZE), non-debt tax shield benefit (NonDTS), and profitability (PROF) over time appear responsible for the variations in

international capital structure. Corporate financial leverage in the civil-law countries tends to grow as GDP and banking sector (BANK) expand, however, it does not show any significant relation or tendency with increase in stock market capitalization. By contrast, corporate financial leverage in the common-law countries appears to be influenced more by the development of the banking sector and the stock market than by the level of GDP. Finally, compared with the value of R-square obtained in the cross-sectional regression models (see, specification (4) in Table 8 for debt-leverage), it is dramatically improved in the panel model from 9.2% to 71% (for liability-leverage it is improved from 24% to 79%). Thus, similarities in the signs and significance levels of coefficients (especially, firm-specific variables) in the two models suggest that the underlying structure of the panel model is sound, and has a better fit in explaining the leverage behavior in international capital structure.

6.3 The Heterogeneity in Adjustment Speed of Capital Structure

The static model implicitly assumes instantaneous adjustment of the actual capital structure toward the target level. Therefore, the model neglects the difference between the observed and the target leverage ratios. This assumption needs to be relaxed because the theory associated with capital structure is discussed in terms of the optimal capital structure, rather than the actual capital structure. Thus, a key feature of the dynamic model is that it simultaneously endogenizes the adjustment factor and the target leverage.

In this section, I attempt to focus on whether the potential heterogeneity of the adjustment speed of actual capital structures of firms explains the leverage behavior in

the context of the OECD countries. The estimates of the parameters for the adjustment speed function of the dynamic model are given in Table 12. I estimate a restricted version of the adjustment speed function in the dynamic model in order to measure the speed of capital structure adjustment across the legal groups while excluding potential influences of the heterogeneities inherent in the firm, industry, macroeconomic factors on the adjustment speed. In other words, the restricted version of the model consists of the legal dummies as independent variables of the adjustment speed function, whereas the unrestricted version includes all variables that are believed to affect the adjustment speed.

(Table 12 here)

As the unrestricted model in Panel A of Table 12 confirms, almost all of the variables are statistically significant, and similar across legal groups. The empirical significance supports the theoretical reasoning for modeling a measure of flexible speed of adjustment. I had earlier suggested the inclusion of a distance variable (GAP) representing the absolute difference between target and observed leverages. This variable proved to be one of the most important variables for explaining the speed of adjustment in capital structure. The coefficient of GAP is positive, indicating a positive association for the gap between target and observed leverage and the speed at which a firm might fill the gap in optimality.

The estimated coefficients of profitability (PROF) are positive for all legal groups except for the French legal group. Also, growth opportunity (GRW) of firms has a positive impact on the speed of adjustment as predicted before. The positive associations

are interpreted as follows: a high-growth firm may find it easier to change its capital structure by choosing the source and composition of the new financing. Even under asymmetric information, the action is less likely to be accompanied by value drops. A non-growth firm, on the other hand, can only change its capital structure by issuing equity. Under asymmetric information actions may be viewed as negative signals by the market. Capital structure changes will result in a drop in firm value. If the positive association between growth opportunity and a firm's external financing is combined with the low fixed costs of raising external capital, then the unit cost of raising extra funds will be lower for high-growth firms. Thus, firms with high growth opportunities are expected to adjust faster towards the target or optimal capital structure compared to non-growth firms.

The parameter estimate of firm size (SIZE) is negative across legal groups, which is consistent with my prediction. The negative association can be interpreted as meaning that since the change in capital structure involves substantial cost, and larger firms are more likely to adjust larger amounts of the gap between the actual and the target capital structure, larger firms tend to have less flexibility in changing their capital structure. It is reasonable that small adjustments can be accomplished as part of a firm's normal operations, while larger adjustments in leverage are more likely to be committed to alter the composition of firms' financing sources.

Considering the *t*-values given in Table 12, the explanatory powers of macro variables tend to be dominated by those of firm-characteristics in explaining the adjustment speed. Moreover, the signs of macro variables do not have similarity across legal groups, and/or lose their statistical significance. This finding implies that the

adjustment speed for debt-leverage does not seem to be affected by country-specific macro variables and the influences of these variables also cannot be generalized across countries.

The parameter estimates of the three time-dummy variables are negative and significantly different from zero. The results intimate that the speed of adjustment towards target leverage decreased over time during 1995-2002. However, as revealed in Table 12, I find no similarity in the signs of the time dummy variables across legal groups. Therefore, like macro variables, the speed of adjustment in leverage seems to differ across countries and subperiods.

For the mean speed of adjustment, I find that firms in the civil-law countries, on average, tend to slowly adjust their actual capital structure to certain prescribed target levels when their structure deviates from the target level, as compared to the common-law countries. According to the restricted dynamic model, firms in the German and the French civil-law countries adjust by only 0.47 % and 11.71% of the gap between actual and target debt-leverage for two years, respectively, whereas the firms in the English common-law countries tend to adjust by 29.54% of the leverage gap for two years.[52]

When the heterogeneities of firm-specific characteristics, macroeconomic variables, and time dummy variables discussed above are controlled for (i.e., unrestricted dynamic model), the differences in the speed of adjustment of leverage across legal groups seem to lose statistical significance. However, although the variations in international capital structure across legal groups explained by the heterogeneities of various sets of variables

[52] Similar results are obtained from the analyses for liability-leverage. The firms in the German and French civil-law countries adjust by 6.55% and 9.97% of the gap between actual and target liability-leverage for two years, respectively. In contrast, the firms in the English common-law countries tend to adjust by 27.4 % of the leverage gap for two years.

are accounted for, the pariwise *t*-test results of the differences in mean speeds of adjustment between the legal groups confirm that there still exist differences in the speed of adjustment in leverage gap across legal groups, which are not explained by the control variables, such as firm-specific variables, macro economic variables, and time dummies representing the possible heterogeneity over time. The pairwise *t*-test results indicate that the adjustment of the leverage gap in German and French civil-law countries is relatively tardy compared with that in English common-law countries. German civil-law countries appear to adjust significantly slowly their actual capital structure to its target level when it deviates from a target level, while the English civil-law countries converge their observed leverage to the target level relatively swiftly once their actual leverage deviates from the target level.

An interesting finding emerges from the discussion so far. Although no significant deviations in leverage across legal groups are found in terms of actual leverage (see, Table 8 for debt-leverage), a significance in the speed of adjustment of leverage gap between actual and target leverage is found in German legal-group. At first glance, these two findings appear contradictory. It is, however, very plausible that some firms might have lower level of leverage than their target leverage and others might have higher level of leverage than their target leverage in each legal group at a specific time. Therefore, finding no significant cross-sectional deviations in international capital structure does not necessarily imply any significant difference in adjustment speed of the actual capital structure to the target capital structure.

Chapter 7: Conclusions

This dissertation investigates how firm characteristics, industry-specific factors, and institutions, including macro financial situation and legal systems, contribute to the variations in capital structure of OECD countries. Although literature that highlights the role of institutional factors, especially legal environments or systems, has been rapidly growing since a series of publications by LLSV, my findings cast substantial skepticism about the role of legal factors in explaining the variations in international capital structure. Even though the legal institution representing creditor protection could explain some differences in international capital structure, evidence is at best only suggestive.

This dissertation reports many new results on the origins of the variation in international capital structure under diverse analytical frameworks. Several primary findings are summarized as follows:

First, according to the results of cross-sectional and panel analyses, almost all of the cross-sectional deviations in international capital structure appear to be caused by heterogeneities at the levels of firm-specific, industry-specific, and macroeconomic determinants rather than by legal-institutional factors. In particular, most of the variations in international capital structure tend to be attributed to the heterogeneity of firm characteristics, rather than macro economic factors. I find that LLSV's classification of legal origins is not an effective factor in explaining the deviations in international capital structure. In addition, the alleged uniqueness in accounting practices within the German legal-group (in particular, Germany) raised by Rajan and Zingales (1995) does not seem

to play a significant role in explaining the deviations in capital structure across legal groups.

Empirical results also confirm this finding. After the firm-, industry-, country-specific heterogeneities are accounted for, most significant differences in international capital structure dissipate. Interestingly, I find no significant difference in debt-leverage across legal groups only when the heterogeneity originating firm-characteristics is taken into account. This finding implies that most cross-sectional variations in international capital structure could be ascribed to a possible sample bias inherent in international databases that usually contain more firms from the U.S. than other countries. Consequently, more small firms in the U.S. may be included in the databases, whereas relatively large firms in other countries where observations are not easily available may be contained in the database.

Second, countries in civil-law groups appear to be surprisingly less levered than the English common-law group only when the heterogeneity of firm-specific characteristics is controlled for. In particular, the countries in German and Scandinavian civil-law groups are the least levered for liability leverage, while the countries in German and French civil-law groups appear to be the least levered for debt-leverage. This finding is contrary to the "conventionally received wisdom" that the firms in the "bank-oriented countries" are more levered than those in the "market-oriented countries. I document that the "conventionally received wisdom" seems to be caused by several biases: too much emphasis was put on the leverage defined as liabilities-to-total assets. Also, it overlooks the possibility that sample firms could be much more heterogeneous than expected.

Third, although legal factors are not important in explaining the variations in international capital structure, a legal environment such as the quality of the legal protection of investor rights, in general, seems to have a significant indirect effect on firm leverage through a conduit of firm characteristics. However, I do not find clear evidence to support the conjecture that the indirect influence of legal environments on leverage behavior through a conduit of macro variables is identifiable enough to prove a meaningful interaction between macroeconomic situations and the quality of legal protection underlying legal classification.

Fourth, I argue that while most firm-specific characteristics identified in previous studies as correlated in the cross-section with firm leverage in the U.S., are similarly correlated in other countries as well, the stylized relationships between firm-specific variables and leverage obtained from the cross-sectional data may not hold across countries over time. Industries tend to retain their relative leverage ranking within each legal group. The rankings of the industries with higher leverage in the civil-law groups are correlated at the conventional significance levels. Industry-specific leverages appear to be determined by unique business risks, which may be generalized across countries or legal origins. However, unlike the results obtained from the cross-sectional data, results from the panel analysis that the stylized relationships between firm-specific variables and leverage obtained from the cross-sectional data may not hold for international capital structure once unobserved heterogeneous time-variant effects are considered.

Fifth, collateral value (COL) and firm size (SIZE) appear to have the most powerful influence on both leverages. When time-variant effects are considered, the heterogeneities of non-debt tax shield benefit (NonDTS) and profitability (PROF), as

well as collateral value (COL) and firm size (SIZE) appear to be responsible for the variations in international capital structure over time. For country-specific macro variables, leverage seems to be higher in countries with good legal protection of investor rights, high GDP level, low growth rate of GDP, large banking sector (relative to the GDP size), low stock market capitalization (relative to the GDP size), and high corporate tax rate.

Finally, when assuming that the observed leverages are not in optimality and that target leverages instead of actual or observed leverages are viewed as a function of the determinants (when the pooled time-series and cross-sectional data are used) I find that there is a difference in the speed of adjustment of leverages among several legal groups under the dynamic setting. Civil-law countries seem to converge their actual leverages relatively slowly toward certain target levels when their current leverages deviate from the levels, as compared with the common-law countries. In particular, firms in the German group tend to react most slowly to the gap between target and observed leverage, whereas firms in the English group appear to adjust their actual leverages to their target leverages more swiftly than firms in the other legal groups.

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Appendix

Table 1 Description of Variables and Data Sources

Attributes	Proxy Variables / SIC / Countries	Stylized Relations with Leverage
Leverage	-The Ratio of Nonequity Liabilities to Total Assets (liability-leverage) -The Ratio of Debt to Capital[1)] (debt-leverage)	
Panel A: Firm-Specific Determinants (X^f)		
Profitability	-The ratio of Net Income to Total Assets (PROF)	- (or +)[2)]
Non-Debt Tax Shield	-The ratio of the sum of Depreciation and R&D Expenses to Total Assets (NonDTS)	+ (or -)
Growth Opportunity	-The percentage change in Total Assets over years (GRW)	- (or +)
Income Variability	-The standard deviation of the percentage change in Net Income (VAR) Used for Cross-sectional Analyses - Absolute value of the first difference in the percentage change of Net Income (VAR) : Used for Panel & Dynamic analyses	- (or +)
Size	-Natural logarithm of Total Assets (SIZE)	+ (or -)
Collateral Value of Assets	-The ratio of the sum of Inventory + Net Property, Plant & Equipment to Total Assets (COL)	+
Panel B: Industry-Specific Determinants (D^s)		
Non Durables	0100-0999, 2000-2399, 2700-2749, 2770-2799, 3100-3199, 3940-3989	
Durables	2400*, 2500-2519, 2590-2599, 3630-3659, 3710-3711, 3714-3714, 3716-3716, 3750-3751, 3792-3792, 3900-3939, 3990-3999	
Manufacturing	2520-2589, 2600-2699, 2750-2769, 3000-3099, 3200-3569, 3580-3629, 3700-3709, 3712-3713, 3715-3715, 3717-3749, 3752-3791, 3793-3799, 3830-3839, 3860-3899	
Oil_Gas	1000*, 1400*, 1200-1399, 2900-2999	
Chemicals & Construct	1500*, 1600*, 1700*, 2800-2829, 2840-2899	
Business Equipment	3570-3579, 3660-3692, 3694-3699, 3810-3829, 7370-7379	
Regulated	4000*, 4400*, 4500*, 4600*, 4800-4899, 4900-4949	
Wholesale & Retail	5000-5999, 7200-7299, 7600-7699	
Health	2830-2839, 3693-3693, 3840-3859, 8000-8099	
Service & etc.	Others	
Panel C: Country-Specific Determinants (X^c)		
Log GDP (USD)	- Natural log of GDP in US dollars (LnGDP)	+
GDP Growth	- Annual growth rate of GDP (GDPGRW)	+ (or -)
Bank Assets / GDP	- The ratio of Assets of banking sector to GDP (BANK)	+ (or -)
Stock market Capitalization / GDP	- The ratio of stock-market value to GDP (STKMKT)	-
Debt Tax-Shield	- Corporate tax rate applicable to ordinary income (DTS)	+

Table 1 -*continued*

Miller Tax Advantage of Interest to Income from Equity	- 1-(1-τ_c) (1-τ_{pE})/ (1-τ_{pB}) (Miller-DTS)

Panel D: Legal Determinants (D^g)

German Civil-Law: (8 Countries): Legal group index=3

Germany	Austria	Japan (1,440)	Korea
Switzerland	Czech Republic	Hungary (28)	Slovak Republic

French Civil-Law: (11 Countries): Legal group index =1

France	Netherlands	Italy	Spain
Belgium	Greece	Mexico	Turkey
Portugal	Poland	Luxembourg	

Scandinavian Civil-Law: (4 Countries) : Legal group index =2

Norway	Sweden	Denmark	Finland
Iceland			

English Common-Law : (6 Countries) : Legal group index =4

United States	United Kingdom	Canada	Australia
New Zealand	Ireland		

Panel E: Data Sources

Financial Data of Sample Firms	6/30, 1994 - 5/31, 2002	? MERGENT™ (CD-Rom of Moody's Manuals)
GDP in constant U.S. dollars	1979-2001	? SourceOECD (online access to OECD) ? The IMF's International Financial Statistics (IFS)
Bank Assets / GDP	1979-2002	? SourceOECD (online access to OECD) ? OECD, 2000, *Bank Profitability*
Stock Market Capitalization / GDP	1990-2002	? The World Bank
Corporate and Personal Income Tax Data	as of January, 1994	? John Graham, 1994, *The International Handbook of Corporate and Personal Taxes* ? PricewaterhouseCoopers, 2001, *Corporate taxes: worldwide summaries* ? PricewaterhouseCoopers, 2001, *Individual taxes: worldwide summaries* ? OECD, 1994, *Taxation and household saving:* Country Surveys ? OECD, 2001, *Tax Ratios: A Critical Survey*

Panel A presents typical firm-specific variables that have been primarily employed in other related studies. Although there have been a wide variety of definitions of firm-level variables, the most popular definitions of each variable are adopted here. For instance, some papers use the percentage change in the ratio of net income to total asset as a proxy for income variability, while others employ absolute value of the first difference in percentage change of net income or standard deviation of the percentage change in net operating income. Since the standard deviation of the percentage change in net income is calculated over the entire sample period for cross-sectional models, another proxy variable for the variability of income that varies over time, which is the absolute value of first difference in the percentage change in net income, is employed for panel analyses. Some variables and alternative definitions of a variable are dropped

from the models because of multi-collinearities with other variables or other definitions of the variable. For Panel B, the industry classification is a modified version of Kenneth R. French's 12-industry portfolios; the financial industry (6000~) is dropped; the mining industry (1000, 1400) is added to the industries of energy oil, gas, and coal extraction and products (Oil_Gas); the communication industry, the utility industry, and the transportation industry including water and gas supplies (4000,4400, 4500, 4600) are merged into the regulated industry; the chemical and construction industries are combined together; and additional Standard Industrial Classification (SIC) codes (1500,1600, 1700) belonging to the construction industry, which are included in the construction industry in Bradley et al.(1984), are added. Although the chemical and construction industry are merged, it is unlikely to pose a serious bias because the two industries have similar leverage ratios in the U.S (Bradley et al., 1984). Panel C shows macro-institutional variables specified at the level of country. GDP in US dollars is converted from national currency denominated GDP based on the average of the end-of year exchange rates over the period of 1994-2002. Bank assets are the summation of all assets of the banking sector in a given country. In order to take possible influences of personal tax rates on capital structure across countries into account, the tax advantage of interest over dividends or capital gains is computed using $1-(1-\tau_C)(1-\tau_{pE})/(1-\tau_{pB})$ derived by Miller (1977), where τ_C is the corporate tax rate, τ_{pE} is the personal income tax rate on equity income from either dividends ($-\tau_{pd}$) or capital gains ($-\tau_{pg}$), and τ_{pB} is the personal income tax on interest income from corporate bonds. Miller tax advantage of interest to dividend only is considered here. Panel D presents the list of all OECD member countries, which are categorized into four legal origins following La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998). Iceland is omitted due to lack of sample firms. Panel E shows various data sources used in this paper. Notes: [1] Capital is the sum of debt and equity. [2] The signs in parentheses are reported from a minority of studies. * indicates Standard Industrial Classification(SIC) codes added to original industries presented by Kenneth R. French.

Table 2 Legal System Variables and Their Influences on Capital Structure

Legal System Variables	LIAB/TA	DEBT/CAP
Intercept	0.499 ***	0.388 ***
	(247.71)	(152.09)
German civil law	0.108 ***	0.028 ***
	(26.16)	(5.00)
French civil law	0.089 ***	-0.016 **
	(15.24)	(-2.13)
Scandinavian civil law	0.072 ***	-0.016
	(8.36)	(-1.48)
No. of Observations	14582	13779
Root MSE	0.198	0.248
Adjusted R^2	0.054	0.003

Table 2 shows the results of cross-sectional regression of the two leverages defined in Table 1 against a set of legal dummies described in Panel D of Table 1. The specification estimated is as follows: $LIAB/TA_i = \alpha_0 + \sum_g D_i^g + \varepsilon_i$, and $DEBT/CAP_i = \alpha_0 + \sum_g D_i^g + \varepsilon_i$ where LIAB/TA and DEBT/CAP are the ratio of liabilities to total assets and the ratio of debt to capital for a firm *i*, respectively. $D_{i,g}$ is legal dummy variable. English common law origin is incorporated as a reference group. Notes: *t*-statistics are in parentheses. *** indicates statistical significance at 1% level. ** indicates statistical significance at 5% level. * indicates statistical significance at 10% level.

Table 3 The Stylized Determinants of Leverage

Determinants	Previous Studies									
Panel A: Firm-Level	BJK	CN	FH/L	GLC	LM	Kest	KS	Mar	TW	RZ
Profitability			-*	-	+	-*			-*	-*
Non-Debt Tax Shield	+*	+*					-*		-	
Growth Opportunities		-				+*	-*		-	
Income Variability	-*		-*			-	+*		-	
Size		-	+			-	-	+*	-	+*
Collateral Value of Assets[1)]			+*	+*	+*			+		+*
Bankruptcy Possibility								-*		
Advertising	-*				-*					
R&D expenditure	-*				-*					
Uniqueness									-*	
Free Cash Flow		-*								
Market-to-Book										-*
Panel B: Country-Level	LLSV[2)]		DM[a), 3)]		DM[b), 4)]		BADM		GIAN[6)]	
GDP (USD)	+*		+*		+* (-)					
GDP Growth	+*				- (+)		+			
Banking Sector / GDP			-*		+ (+)		+*			
Stock Market / GDP			-		- (-)		-		-*	
Debt Tax-Shield									+*	
Miller Tax Advantage of Interest to Dividends							+?*[5)]			
Miller Tax Advantage of Interest to Capital Gains							+?*[5)]			

The signs of change in leverage as a result of an increase in the given determinants are shown for each of the main 10 studies. The studies summarized here are as follows: BJK=Bradley et al. (1984). CN=Chaplinsky and Niehaus (1990). FH/L=Friend and Hasbrouck (1988) , and Friend and Lang (1988). GLC=Gonendes et al. (1988). LM=Long and Malitz (1985). Kest=Kester (1986). KS=Kim and Sorensen (1986). Mar=Marsh (1982). TW=Titman and Wessels (1988). RJ=Rajan and Zingales (1995). LLSV=La Porta, Lopez-de-Silane, Shleifer, and Vishny (1997). DM[a)]=Demirgüç-Kunt and Maksimovic (1998). DM[b)] = Demirgüç-Kunt and Maksimovic (1999). BADM=Booth, Aivazian, Demirgüç-Kunt, and Maksimovic (2001). GIAN=Giannetti (2003). The definitions of leverages used as dependent variables and methodologies differ according to each study. Therefore, such different definition of leverage is a caveat to direct comparisons of the effects of the determinants on capital structure choice. Notes: [1)] Collateral value of assets is usually defined as the ratio of several items of fixed assets such as inventory, net property, plant, and equipment to total assets. Since tangibility is measured by fixed assets divided by total assets, the results from the papers using tangibility as an independent variable are included in those using the collateral value of assets. [2)] Debt/GNP is used as a dependent variable. [3)] The dependent variable is the proportion of a firm's investment financed by long-term debt. Banking sector /GDP is the domestic assets of the deposit banks divided by GDP. [4)] Long-term debt-to-total asset ratio is used as a dependent variable. The result for short-term debt-to-total asset ratio is in parentheses. [5)] It is reported that the Miller Tax gain is positively related to the ratio of total liabilities to total liabilities plus net worth. Although BADM present two kinds of Miller tax terms in terms of dividend and capital gain, it is not clear which one is incorporated into their regression model. [6)] Leverage is defined as the ratio of financial debt to the

book value of shareholders' funds plus financial debt. (-): inversely related to leverage, (+): positively related to leverage. * means statistically significance at the conventional significance levels.

Table 4 Macro Institutional Variables and Their Influences on Capital Structure

Macro-Institutional Variables:	LIAB/TA	DEBT/CAP
Intercept	0.879 ***	-0.357 ***
	(19.27)	(-6.18)
LnGDP (USD)	-0.009 ***	0.024 ***
	(-4.78)	(9.82)
GDPGRW	-0.508 ***	-0.106 **
	(-13.01)	(-2.14)
BANK	0.006 ***	0.010 ***
	(3.77)	(5.33)
STKMKT	-0.095 ***	-0.139 ***
	(-13.52)	(-15.28)
DTS (Corporate tax rates)	-0.099	0.794 ***
	(-1.52)	(8.98)
Miller-DTS (Miller tax advantage of interest to dividends)	0.167 ***	-0.210 ***
	(8.28)	(-8.31)
No. of Observations	14575	13772
Root MSE	0.199	0.244
Adjusted R^2	0.050	0.033

The table shows the results of ordinary least squares regressions of the cross-section of firms in OECD countries. The regression equation estimated is: $LIAB/TA_i = \alpha_0 + \mathbf{X}_i^c \mathbf{ß}_c + \varepsilon_i$ and $DEBT/CAP_i = \alpha_0 + \mathbf{X}_i^c \mathbf{ß}_c + \varepsilon_i$, where LIAB/TA is the ratio of liabilities to total assets, and DEBT/CAP is debt to capital ratio. $\mathbf{X}_i^c$ is a row vector of country-specific variables, [LnGDP GDPGRW BANK STKMKT DTS Miller-DTS], and $\mathbf{ß}_c$ is a column vector containing the coefficients of country-specific variables. The debt to capital ratio as the summation of long- and short-term debt divided by capital, which consists of debt and shareholders equity. The natural logarithm of GDP is 1994-2001 average. The growth rates of GDP in the sample of OECD countries are measured using all 1979-2001 data that are available at IMF, IFS database in order to obtain better estimate. Bank assets /GDP is the summation of all assets of all banks in a given country divided by GDP. The values of bank assets / GDP are averages of the period of 1994-2001. Stock Market capitalization / GDP is the stock market capitalization divided by GDP; the stock market values are 1994-2002 averages. The tax advantage of interest over dividends is computed using $1-(1-\tau_C)\ (1-\tau_{pE})/\ (1-\tau_{pB})$ derived by Miller (1977), where τ_C is the corporate tax rate, τ_{pE} is the personal income tax rate on equity income from either dividends or capital gains, and τ_{pB} is the personal income tax on interest income from corporate bonds. Notes: *t*-statistics are in parentheses. *** indicates statistical significance at 1% level. ** indicates statistical significance at 5% level. * indicates statistical significance at 10% level.

Table 5 Firm-Specific Determinants and Their Influences on Capital Structure

Firm Chracteristics	LIAB/TA	DEBT/CAP
Intercept	0.176 ***	0.273 ***
	(22.59)	(25.40)
PROF	-0.001 *	-0.004 ***
	(-1.73)	(-3.69)
NonDTS	-0.003	0.015 ***
	(-0.87)	(2.78)
GRW	-1.3E-06	-2.3E-07
	(-1.64)	(-0.21)
VAR	1.8E-07 *	4.1E-08
	(1.92)	(0.30)
SIZE	0.022 ***	0.004 ***
	(36.72)	(4.55)
COL	0.191 ***	0.192 ***
	(21.99)	(16.03)
No. of Observations	8840	8275
Root MSE	0.183	0.246
Adjusted R^2	0.213	0.038

This table provides the results of cross-sectional regression of leverages against firm-specific variables. The equation estimated is as follows: $\text{LIAB}/\text{TA}_i = \alpha_0 + \mathbf{X}_i^f \mathbf{ß}_f + \varepsilon_i$, $\text{DEBT}/\text{CAP}_i = \alpha_0 + \mathbf{X}_i^f \mathbf{ß}_f + \varepsilon_i$ where, LIAB/TA is the ratio of liabilities to total assets, and DEBT/CAP is debt to capital ratio. $\mathbf{X}_i^f$ is a row vector of firm characteristics, [PROF NonDTS GRW VAR SIZE COL] as defined in Table 1. $\mathbf{ß}_f$ is a column vector containing the coefficients of firm-specific variables. The debt to capital ratio as the summation of long- and short-term debt divided by capital, which consists of debt (long-term and short-term) and shareholders equity. Notes: *t*-statistics are in parentheses. *** indicates statistical significance at 1% level. ** indicates statistical significance at 5% level. * indicates statistical significance at 10% level.

Table 6 Distributions of Capital Structure of Industries across Countries and Legal Origins

Panel A: LIAB/TA	German Civil Law		French Civil Law		Scandinavian Civil Law		English Common Law		Overall	
Legal Group	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
	0.61	0.62	0.59	0.61	0.57	0.59	0.50	0.51	0.53	0.54

Legal Group x Country	country	Mean	Std.D.	N	country	Mean	Std.D.	N	country	Mean	Std.D.	N	country	Mean	Std.D.	N	N
	Germany	0.63	0.17	655	France	0.63	0.17	495	Norway	0.57	0.16	138	U.S.	0.50	0.21	7061	14582
	Austria	0.85	0.14	100	Nether.	0.61	0.17	174	Sweden	0.56	0.17	195	U.K.	0.51	0.19	1222	
	Japan	0.60	0.20	1917	Italy	0.61	0.17	104	Denmark	0.58	0.16	130	Canada	0.52	0.18	827	
	Korea	0.56	0.18	110	Spain	0.56	0.17	146	Finland	0.59	0.13	98	Australia	0.48	0.16	456	
	Switzer.	0.57	0.17	180	Belgium	0.61	0.20	83					Zealand	0.46	0.18	53	
	Czech.	0.50	0.18	46	Greece	0.54	0.15	71					Ireland	0.51	0.19	58	
	Hungary	0.39	0.14	24	Portugal	0.59	0.20	49									
	Slovak.	0.54	0.09	7	Luxem.	0.55	0.22	17									
					Mexico	0.46	0.16	87									
					Poland	0.41	0.20	47									
					Turkey	0.52	0.18	32									

Legal Group x Industry	Mean	Rank	N	Mean	Rank	N	Mean	Rank	N	Mean	Rank	N	Mean	Rank	N
Non Durables	0.60	8	331	0.57	8	207	0.62	2	62	0.53	5	665	0.56	6	1265
Durables	0.61	5	165	0.64	1	61	0.62	1	21	0.52	6	329	0.57	5	576
Manufacturimg	0.61	7	677	0.57	9	242	0.57	8	114	0.54	4	1057	0.57	4	2090
Oil_Gas	0.67	2	51	0.59	6	49	0.59	6	31	0.46	8	648	0.49	8	779
Chemicals & Construct	0.65	3	375	0.60	5	109	0.61	3	25	0.57	2	367	0.61	2	876
Business Equipment	0.52	9	347	0.58	7	150	0.50	9	75	0.41	9	1967	0.44	9	2539
Regulated	0.70	1	195	0.62	3	128	0.60	4	83	0.61	1	992	0.62	1	1398
Wholesale & Retail	0.63	4	523	0.60	4	176	0.57	7	74	0.54	3	1310	0.57	3	2083
Health	0.46	10	127	0.48	10	47	0.41	10	28	0.40	10	846	0.41	10	1048
Service & etc.	0.61	6	248	0.62	2	136	0.59	5	48	0.51	7	1496	0.54	7	1928
Total			3039			1305			561			9677			14582
Kruskal-Wallis test, χ^2	13.09			10.69			18.51 **			27.12 ***			18.86 **		

Table 6 -*continued*

Panel B: DEBT/CAP	German Civil Law			French Civil Law			Scandinavian Civil Law			English Common Law			Overall	
Legal Group	Mean	Median		Mean	Median		Mean	Median		Mean	Median		Mean	Median
	0.42	0.41		0.37	0.37		0.37	0.38		0.39	0.36		0.39	0.37
Legal Group x Country	country	Mean	Std.D.	N	country	Mean	Std.D.	N	country	Mean	Std.D.	N	country	Mean	Std.D.	N	N
	Germany	0.20	0.14	205	France	0.39	0.39	495	Norway	0.41	0.41	135	U.S.	0.41	0.40	6932	13779
	Austria	0.43	0.45	85	Nether.	0.39	0.36	163	Sweden	0.31	0.30	183	U.K.	0.25	0.21	1162	
	Japan	0.45	0.45	1878	Italy	0.37	0.39	103	Denmark	0.39	0.40	129	Canada	0.41	0.40	810	
	Korea	0.45	0.43	109	Spain	0.36	0.37	145	Finland	0.42	0.42	90	Australia	0.33	0.33	441	
	Switzer.	0.35	0.34	167	Belgium	0.44	0.48	81					Zealand	0.42	0.41	53	
	Czech.	0.29	0.31	42	Greece	0.33	0.33	65					Ireland	0.23	0.20	56	
	Hungary	0.21	0.17	24	Portugal	0.44	0.45	48									
	Slovak.	0.34	0.39	7	Luxem.	0.40	0.30	16									
					Mexico	0.35	0.35	83									
					Poland	0.15	0.10	42									
					Turkey	0.31	0.27	30									
Legal Group x Industry	Mean	Rank	N	Mean	Rank	N	Mean	Rank	N	Mean	Rank	N	Mean	Rank	N
Non Durables	0.43	4	255	0.39	4	201	0.43	4	61	0.40	5	658	0.40	3	1175
Durables	0.41	8	135	0.43	1	60	0.45	2	21	0.38	7	326	0.40	6	542
Manufacturimg	0.42	7	568	0.36	6	236	0.38	5	111	0.40	3	1050	0.40	5	1965
Oil_Gas	0.45	3	42	0.34	7	47	0.45	3	30	0.37	8	618	0.37	8	737
Chemicals & Construct	0.47	2	346	0.34	9	109	0.37	6	24	0.42	2	365	0.43	2	844
Business Equipment	0.32	9	283	0.34	8	144	0.24	10	70	0.33	10	1877	0.32	10	2374
Regulated	0.52	1	152	0.43	2	124	0.47	1	79	0.51	1	990	0.50	1	1345
Wholesale & Retail	0.43	5	447	0.37	5	168	0.34	8	68	0.39	6	1297	0.39	7	1980
Health	0.27	10	104	0.28	10	46	0.29	9	26	0.35	9	821	0.34	9	997
Service & etc.	0.42	6	185	0.40	3	136	0.34	7	47	0.40	4	1452	0.40	4	1820
Total			2517			1271			537			9454			13779
Kruskal-Wallis test, χ^2	7.68			16.06 *			14.26			12.37			24.64 ***		

Panel A and B show mean leverage ratios specified by liabilities-to-assets ratio and debt-to-capital ratio for each legal group, each country, and its industries. A non-parametric Kruskal-Wallis rank-sum test is conducted to examine whether significant difference exists in the ranking of the mean leverages of industries across both countries in each legal group and legal groups. In addition, Spearman-rank test (results are not reported here) is employed to test whether the ranking of the mean leverages of industries are correlated across legal groups. The test results show that the rankings of the leverages of industries of the three civil law groups legal are significantly correlated at the 5% level, while English common law group appear to be significantly correlated with German civil law group only at the 5% level. Industry classification is modified from Kenneth R. French's 12-industry

portfolio. Note: Swtizer.=Switzerland, Czech.=Czech Republic, Slovak.=Solvak Republic, Nether=Netherlands, Luxem.=Luxembourg, Zealand.=New Zealand. Std.D.=Standard deviation. N=the numb er of observations. *** indicates statistical significance at 1% level. ** indicates statistical significance at 5% level. * indicates statistical significance at 10% level.

Table 7 Legal Institutions and Their Influences on Capital Structure

Legal Institutions	LIAB/TA		DEBT/CAP	
	No. of observations	Estimates (F- or *t* -statistics)	No. of observations	Estimates (F- or *t* -statistics)
Overall	14582	(275.87) ***	13779	(12.37) ***
Panel A: Within Legal Origin				
German origin	3039	(33.02) ***	2517	(32.35) ***
French origin	1305	(14.26) ***	1271	(7.21) ***
Scandinavian origin	561	(1.13)	537	(9.64) ***
English origin	9677	(5.08) ***	9454	(97.76) ***
Panel B: Among Legal Origins				
Intercept		0.499 ***		0.388 ***
		(247.71)		(152.09)
German Origin		0.108 ***		0.028 ***
		(26.16)		(5.00)
French Origin		0.089 ***		-0.016 **
		(15.24)		(-2.13)
Scandinavian Origin		0.072 ***		-0.016
		(8.36)		(-1.48)
Root MSE		0.198		0.244
R^2		0.054		0.033
Panel C: Pairwise *t* -test of mean difference				
German vs. French		(3.04) ***		(5.51) ***
German vs. Scandinavain		(4.64) ***		(4.17) ***
German vs. English		(25.76) ***		(4.78) ***
French vs. Scandinavian		(2.02) *		(0.05)
French vs. English		(16.43) ***		(-2.43) **
Scandinavian vs. English		(10.09) ***		(-1.71) ***
Ranking of the estiamted coefficients of legal origin dummies		G»F»S»E		G»E»F>S

The specification of the model estimated is $L_i = \alpha_0 + \sum_g \beta_g D_i^g + \varepsilon_i$. F-tests (panel A) are conducted to examine the homogeneity of mean leverages of the countries in each legal group. Before applying pairwise *t*-tests for differences of mean leverages among the legal groups, I examine the normality of distribution of leverages of the firms in each legal group because the distribution should follow normality so that *t*-tests may be valid. The test results from the cross-sectional data not shown here indicate that the distributions of liabilities-to-asset ratios and debt-to-capital ratios of each legal group do not seem to seriously violate the normality condition. The English common-law origin is used as a reference variable in the cross-sectional regression model. Parametric test (*t*-test) is applied to investigate the differences of leverages among the four legal groups. When the null hypothesis of homogeneous variances of the leverage distributions of paired groups are rejected, *t*-test should be conducted on the basis of Cochran and Cox (1950) approximation. Positive *t*-value of the pairwise *t*-tests for the null hypothesis of no difference of mean leverages between two legal groups means that the former of the two legal groups has a higher mean leverage ratio than the latter, and vice versa. The test results are reported in Panel C. Notes: » means significant inequality. *t*-statistics in parentheses. *** indicates statistical significance at 1% level. ** indicates

statistical significance at 5% level. * indicates statistical significance at 10% level. G=German civil-law, F=French civil-law, S=Scandinavian civil-law, E=English common-law.

Table 8 Parameter Estimates: Cross-Sectional Regressions

LIAB/TA	(1)		(2)		(3)		(4)	
	Estimate	*t*- Value	Estimate	*t*- Value	Estimate	*t*- Value	Estimate	*t*- Value
Panel A: Parameter Estimates	N=8840							
Intercept	0.667	(104.36) ***	0.729	(15.05) ***	0.625	(13.36) ***	0.649	(9.90) ***
Firm-Specific, X^f								
PROF							-0.0004	(-0.45)
NonDTS							-0.002	(-0.75)
GRW							-1.6E-06	(-2.02) **
VAR							1.9E-07	(2.10) **
SIZE							0.014	(19.61) ***
COL							0.159	(17.50) ***
Industry-Specific, D^s								
Non Durables					-0.007	(-1.02)	0.005	(0.52)
Durable					0.000	(-0.03)	0.008	(0.74)
Oil_Gas					-0.060	(-7.41) ***	-0.059	(-6.24) ***
Chemicals_Construct					0.039	(5.13) ***	0.029	(2.86) ***
Business Equipment					-0.108	(-19.00) ***	-0.059	(-8.30) ***
Regulated					0.068	(10.25) ***	0.053	(6.96) ***
Whole_Retail					0.010	(1.66) *	0.019	(2.60) ***
Health					-0.135	(-18.56) ***	-0.096	(-11.41) ***
SVC & etc					-0.013	(-2.09) **	0.017	(2.27) **
Macro-Institutions, D^c								
LnGDP			0.003	(1.40)	0.006	(2.76) ***	-0.017	(-5.40) ***
GDPGRW			-0.451	(-11.44) ***	-0.403	(-10.68) ***	-0.720	(-10.15) ***
BANK			0.003	(1.62)	0.002	(1.40)	0.003	(1.85) *
STOCKMKT			-0.054	(-6.55) ***	-0.045	(-5.66) ***	-0.064	(-5.81) ***
DTS			-0.368	(-5.16) ***	-0.303	(-4.40) ***	0.348	(3.93) ***
Miller-DTS			0.043	(1.78) *	0.041	(1.73) *	0.208	(7.38) ***
Legal Institutions, index D^g								
Legal Origins	-0.039	(-21.76) ***	-0.031	(-9.12) ***	-0.027	(-8.35) ***	0.013	(3.12) ***
Legal Institutions, dummy D^g								
German Origin	0.108	(26.16) ***	0.085	(12.91) ***	0.067	(10.46) ***	-0.047	(-4.45) ***
French Origin	0.089	(15.24) ***	0.087	(8.15) ***	0.078	(7.61) ***	-0.043	(-3.21) ***
Scandinavian Origin	0.072	(8.36) ***	0.047	(4.40) ***	0.046	(4.51) ***	-0.057	(-4.42) ***
Panel B: Pairwise *t*-test for differences, Ho: bi=bj								
German vs. French		(2.92) ***		(-0.18)		(-1.11)		(-0.4)
German vs. Scandinavian		(4.03) ***		(3.62) ***		(2.08) **		(0.77)
German vs. English		(26.16) ***		(12.91) ***		(10.46) ***		(-4.45) ***
French vs. Scandinavian		(1.93) *		(3.39) ***		(2.80) ***		(1.14)
French vs. English		(15.24) ***		(8.15) ***		(7.61) ***		(-3.21) ***
Scandinavian vs. English		(8.36) ***		(4.40) ***		(4.51) ***		(-4.42) ***
Ranking of the estiamted coefficients of legal origins		G»F»S»E		F>G»S»E		F>G»S»E		E»F>G>S
Panel C: OLS Residuals								
Root MSE	0.198		0.198		0.189		0.180	
R^2	0.054		0.061		0.140		0.240	

Table 8 –*continued*

DEBT/CAP	(1)		(2)		(3)		(4)	
	Estimate	*t*-Value	Estimate	*t*-Value	Estimate	*t*-Value	Estimate	*t*-Value
Panel A: Parameter Estimates	N=8275							
Intercept	0.383	(47.27) ***	-0.418	(-6.83) ***	-0.524	(-8.63) ***	-0.501	(-5.67) ***
Firm-Specific, X^f								
PROF							-0.004	(-3.42) ***
NonDTS							0.018	(3.43) ***
GRW							-7.8E-07	(-0.73)
VAR							1.4E-07	(1.03)
SIZE							0.006	(5.92) ***
COL							0.152	(12.24) ***
Industry-Specific, D^s								
Non Durables					0.009	(1.03)	0.026	(2.14) **
Durable					-0.009	(-0.76)	0.004	(0.24)
Oil_Gas					-0.023	(-2.21) **	-0.034	(-2.72) ***
Chemicals_Construct					0.024	(2.47) **	0.020	(1.45)
Business Equipment					-0.085	(-11.55) ***	-0.057	(-5.92) ***
Regulated					0.093	(10.88) ***	0.081	(7.86) ***
Whole_Retail					-0.006	(-0.79)	0.014	(1.37)
Health					-0.072	(-7.66) ***	-0.055	(-4.82) ***
SVC & etc					0.003	(0.41)	0.028	(2.76) ***
Macro-Institutions, D^c								
LnGDP			0.029	(9.83) ***	0.033	(11.33) ***	0.019	(4.36) ***
GDPGRW			-0.082	(-1.62)	-0.039	(-0.79)	-0.081	(-0.85)
BANK			0.009	(4.47) ***	0.008	(4.09) ***	0.007	(2.88) ***
STOCKMKT			-0.121	(-11.11) ***	-0.110	(-10.32) ***	-0.047	(-3.04) ***
DTS			0.688	(7.22) ***	0.648	(6.87) ***	0.936	(7.16) ***
Miller-DTS			-0.263	(-8.55) ***	-0.256	(-8.47) ***	-0.164	(-4.33) ***
Legal Institutions, index D^g								
Legal Origins	0.002	(1.09)	-0.013	(-3.00) ***	-0.013	(-2.94) ***	0.002	(0.27)
Legal Institutions, dummy D^g								
German Origin	0.028	(5.00) ***	0.060	(7.20) ***	0.053	(6.31) ***	-0.013	(-0.92)
French Origin	-0.016	(-2.13) **	0.015	(1.14)	0.016	(1.20)	-0.015	(-0.85)
Scandinavian Origin	-0.016	(-1.48)	0.061	(4.53) ***	0.065	(4.84) ***	0.025	(1.44)
Panel B: Pairwise *t*-test for Differences, Ho: bi=bj								
German vs French		(5.14) ***		(3.48) ***		(2.92) ***		(0.14)
German vs Scandinavian		(3.65) ***		(-0.09)		(-0.89)		(-2.28) **
German vs English		(5.00) ***		(7.20) ***		(6.31) ***		(-0.92)
French vs Scandinavian		(0.05)		(-3.07) ***		(-3.30) ***		(-2.43) **
French vs English		(-2.13) **		(1.14)		(1.20)		(-0.85)
Scandinavian vs English		(-1.48) ***		(4.53) ***		(4.84) ***		(1.44)
Ranking of the estiamted coefficients of legal origins		G»E»F>S		S>G»F>E		S>G»F>E		S>E>G>F
Panel C: OLS Residuals								
Root MSE	0.244		0.244		0.239		0.237	
R^2	0.041		0.038		0.075		0.092	

The estimated cross-sectional regression equations are as follows: (1) $L_i = \alpha_0 + \sum_g \alpha_g D_i^g + \varepsilon_i$ (2) $L_i = \alpha_0 + \mathbf{X}_i^c \mathbf{ß}_c + \sum_g \beta_g D_i^g + \varepsilon_i$ (3) $L_i = \alpha_0 + \sum_s \beta_s D_i^s + \mathbf{X}_i^c \mathbf{ß}_c + \sum_g \beta_g D_i^g + \varepsilon_i$ (4) $L_i = \alpha_0 + \mathbf{X}_i^f \mathbf{ß}_f + \sum_s \beta_s D_i^s + \mathbf{X}_i^c \mathbf{ß}_c + \sum_g \beta_g D_i^g + \varepsilon_i$. Where L_i is LIAB/TA or DEBT/CAP. The index D^g has the values ranging from1 to 4 according to the ascending order of the quality of legal protection (E>S>G>F) following LLSV (1997). The estimates from the cross-sectional regression using the English group as a reference

dummy are presented. Therefore, $\sum_g \beta_g D_i^g$ in each specification is replaced with D^g for the overall F-test of legal group mean leverages. The pairwise *t*-tests come from all regressions using each legal group as a reference. For Panel B, a positive sign of *t*-value means that the former of the two legal groups has higher leverage ratio than the latter. Likewise, negative sign indicates that the former group has smaller leverage ratio than the latter. Notes: » means significant inequality. *** indicates statistical significance at 1% level. ** indicates statistical significance at 5% level. * indicates statistical significance at 10% level. G=German civil-law, F=French civil-law, S=Scandinavian civil-law, E=English common-law

Table 9 Indirect Influences of the Legal System on the Macro Financial Institutions and Firm Characteristics

Leverages	LIAB/TA				DEBT/CAP			
Macro-Variables	Estimates Reference= English Group			Estimates for Other Groups	Estimates Reference= English Group			Estimates for Other Groups
Panel A: Overall Interactions								
LnGDP*Legal Index	-0.005	(-2.49)	**		-0.003	(-1.09)		
GDPGRW*Legal Index	-0.079	(-0.62)			0.328	(1.93)	*	
BANK*Legal Index	0.019	(4.32)	***		0.006	(1.02)		
STKMKT*Legal Index	0.009	(0.73)			-0.113	(-6.59)	***	
DTS*Legal Index	0.315	(2.61)	***		0.941	(5.80)	***	
Miller-DTS*Legal Index	-0.087	(-4.51)	***		-0.208	(-7.94)	***	
Panel B: Pairwise Interactions								
LnGDP	0.022	(3.08)	***		0.007	(0.98)		
GDPGRW	-0.560	(-5.76)	***		-4.449	(-3.74)	***	
BANK	-0.149	(-3.16)	***		-0.005	(-1.55)		
STKMKT	-0.063	(3.40)	***		-0.217	(-6.91)	***	
DTS	-2.134	(-3.30)	***		0.593	(2.06)	**	
Miller-DTS	0.287	(3.26)	***		0.161	(1.78)	*	
LnGDP* GDPGRW* German	-0.071	(-7.88)	***[a), b)]	-0.050	2.967	(3.18)	***[a)]	-1.481
LnGDP* GDPGRW* French	-0.022	(-2.17)	**[c)]	-2.7E-04	4.181	(3.73)	***	-0.267
LnGDP* GDPGRW* Scandinavian	0.016	(0.70)		0.038	2.648	(1.55)		-1.800
BANK* STKMKT* German	0.267	(5.77)	***[a)]	0.118	0.137	(3.40)	***[a), b)]	-0.080
BANK* STKMKT* French	0.149	(3.17)	***	-3.4E-05	0.361	(5.69)	***[c)]	0.145
BANK* STKMKT* Scandinanvian	0.237	(2.23)	**	0.088	0.003	(0.05)		-0.213
DTS*German	3.185	(4.95)	***[a), b)]	1.050	-0.661	(-2.24)	**[a), b)]	-0.068
DTS*French	1.911	(2.58)	***[c)]	-0.223	-2.374	(-8.47)	***[c)]	-1.780
DTS*Scandinavian	-1.047	(-0.71)		-3.181	-3.031	(-5.52)	***	-2.438
Miller-DTS*German	1.664	(4.53)	***[a), b)]	1.950	-1.696	(-6.19)	***[a), b)]	-1.535
Miller-DTS*French	-0.039	(-0.39)	[c)]	0.248	0.039	(0.31)	[c)]	0.200
Miller-DTS*Scandinavian	-0.973	(-1.20)		-0.686	1.051	(1.78)	*	1.212

Table 9 -*continued*

Leverages	LIAB/TA			DEBT/CAP		
Firm-Variables	Estimates Reference= English Group		Estimates for Other Groups	Estimates Reference= English Group		Estimates for Other Groups
Panel A: Overall Interactions						
PROF*Legal Index	0.008	(2.02) **		0.026	(4.81) ***	
NonDTS*Legal Index	0.001	(0.18)		0.135	(3.20) ***	
GRW*Legal Index	4.3E-06	(2.62) ***		4.4E-06	(1.60)	
VAR*Legal Index	-2.8E-07	(-1.64)		-2.4E-07	(-0.91)	
SIZE*Legal Index	0.003	(3.08) ***		-0.006	(-5.28) ***	
COL*Legal Index	0.027	(3.00) ***		-0.037	(-2.98) ***	
Panel B: Pairwise Interactions						
PROF	-0.001	(-0.90)		-0.003	(-2.38) **	
NonDTS	0.002	(0.47)		0.016	(3.13) ***	
GRW	-1.2E-07	(-0.14)		-4.0E-08	(-0.03)	
VAR	3.8E-07	(2.03) **		3.6E-07	(1.45)	
SIZE	0.022	(21.30) ***		0.001	(0.97)	
COL	0.163	(15.75) ***		0.140	(10.14) ***	
PROF*German	-0.026	(-1.45) [b)]	-0.026	-0.611	(-7.82) ***[a), b)]	-0.614
PROF*French	-0.027	(-2.17) **[c)]	-0.028	-0.061	(-3.65) ***[c)]	-0.063
PROF*Scandinanvian	-0.131	(-2.37) **	-0.132	-0.263	(-3.53) ***	-0.266
NonDTS*German	0.004	(0.34) [a), b)]	0.006	-0.906	(-5.13) ***[a)]	-0.890
NonDTS*French	-0.226	(-1.90) *[c)]	-0.224	-0.228	(-1.44)	-0.212
NonDTS*Scandinanvian	-0.247	(-1.78) *	-0.245	-0.574	(-2.94) ***	-0.558
GRW*German	-2.2E-06	(-0.63) [b)]	-6.3E-01	-4.4E-06	(-0.82)	-4.5E-06
GRW*French	-1.1E-05	(-1.55) [c)]	-1.6E+00	-9.0E-06	(-0.95)	-9.1E-06
GRW*Scandinanvian	-0.0002	(-3.08) ***	-3.0800	-0.0001	(-0.77)	-0.0001
VAR*German	-5.2E-08	(-0.20)	3.3E-07	1.5E-06	(1.59)	1.8E-06
VAR*French	5.7E-07	(0.85)	9.5E-07	4.2E-07	(0.47)	7.8E-07
VAR*Scandinanvian	2.1E-06	(0.93)	2.5E-06	3.7E-06	(1.23)	4.1E-06
SIZE*German	0.009	(3.11) ***[a), b)]	0.031	0.032	(6.96) ***[a)]	0.033
SIZE*French	-3.8E-05	(-0.01) [c)]	0.022	0.015	(3.92) ***	0.016
SIZE*Scandinanvian	-0.004	(-0.64)	0.019	0.020	(2.52) **	0.021
COL*German	-0.050	(-1.94) *[a)]	0.113	0.100	(2.42) **	0.240
COL*French	-0.119	(-3.94) ***	0.044	0.027	(0.68)	0.168
COL*Scandinanvian	-0.049	(-1.11)	0.114	0.142	(2.36) **	0.282

Table 9 shows the results of the influences of the legal factors on macroeconomic variables. The regression model estimated in Table 9 is: $L_i = \alpha_0 + \mathbf{X}_i^f \boldsymbol{ß}_f + \sum_s \beta_s D_i^s + \mathbf{X}_i^c \boldsymbol{ß}_c + \sum_g \beta_g D_i^g + \beta_{f*g} \sum_f X_i^f D_i^g + \beta_{s*g} \sum_s D_i^s D_i^g + \beta_{c*g} \sum_c X_i^c D_i^g + \varepsilon_i$ where L means leverages defined as LIAB/TA or DEBT/CAP. Panel A, Table 9 for macro financial institutions provides overall interaction terms between the legal factors and macroeconomic variables. Legal dummy variables are replaced with legal index variable in the above specification. From the overall-interaction terms given in Panel A, the coefficients of the interaction terms between LnGDP, BANK, DTS, and Miller-DTS and the legal factors for liability-leverage retain significance, while those of the interactions between GDPGRW, STKMKT, DTS, and Miller-DTS show statistical significance for debt-leverage. For the sake of brevity, only the pairwise-interaction terms associated with the

macro variables that show significance in the overall test are reported in Panel B. By contrast, all pairwise-interaction terms between firm-specific variables and the legal factors are reported in Table 9 for firm characteristics without the results of overall interaction terms. Notes: [a)] significant difference between German and French legal origins at the conventional level, [b)] significant difference between German and Scandinavian legal origins at the conventional level, [c)] significant difference between French and Scandinavian legal origins at the conventional level. *t*-statistics in parentheses. *** indicates statistical significance at 1% level. ** indicates statistical significance at 5% level. * indicates statistical significance at 10% level.

Table 10 The Relative Influences of Variables

	LIAB/TA			DEBT/CAP		
Variable	Estimates	Standard Estimates		Estimates	Standard Estimates	
Intercept	0.544	0.544	(9.00) ***	-0.529	-0.529	(-6.54) ***
PROF	-0.001	-0.005	(-0.66)	-0.004	-0.035	(-3.82) ***
NonDTS	-0.006	-0.017	(-1.76) *	0.014	0.032	(2.61) ***
GRW	-1.1E-06	-0.089	(-1.40)	-2.6E-07	-0.017	(-0.24)
VAR	1.5E-07	0.034	(1.60)	7.7E-08	0.015	(0.57)
SIZE	0.017	0.274	(24.35) ***	0.009	0.125	(9.80) ***
COL	0.202	0.229	(24.06) ***	0.196	0.182	(17.31) ***
LnGDP	-0.012	-0.090	(-5.15) ***	0.017	0.102	(5.07) ***
GDPGRW	-0.712	-0.188	(-10.00) ***	-0.091	-0.020	(-0.97)
BANK	0.003	0.020	(1.75) *	0.008	0.040	(3.17) ***
STOCKMKT	-0.048	-0.072	(-4.76) ***	-0.039	-0.048	(-2.76) ***
DTS	0.199	0.034	(2.55) **	1.016	0.144	(8.74) ***
Miller-DTS	0.171	0.079	(7.60) ***	-0.171	-0.065	(-5.74) ***
Root MSE		0.185			0.241	
R^2		0.197			0.065	

This table provides standard partial coefficients of firm- specific characteristics and macro economic institutions, which enable us to assess the relative influences of individual variables on capital structure regardless of differences in unit of each variable. The equation estimated is: $L_i = \alpha_0 + \mathbf{X}_i^f \mathbf{ß}_f^* + \mathbf{X}_i^c \mathbf{ß}_c^* + \varepsilon_i$, where $\mathbf{ß}_f^*$ and $\mathbf{ß}_c^*$ are called "standard partial coefficient." In order to acquire standard partial coefficients, dependent variable should be divided by its standard deviation, and each independent variable is multiplied by the ratio of its own standard deviation to the deviation of the dependent variable. From a regression function, $Y = X\hat{\beta}$, the estimated standard partial coefficient of each variable, β_j^* of a particular variable *j* is equal to $\hat{\beta}_j \, \sigma_j / \sigma_L$ Therefore, the standard partial coefficient β_j^* indicates that when there is 1 standard deviation change in X_j, there will be β_j^* standard deviation changes in Y. Also, standard errors and *p*-values of the estimated coefficients do not change. Notes: *t*-statistics in parentheses. *** indicates statistical significance at 1% level. ** indicates statistical significance at 5% level. * indicates statistical significance at 10% level.

Table 11 Parameter Estimates: Panel Regressions

DEBT/CAP	Overall Estimates	German Estimates	French Estimates	Scandinavian Estimates	English Estimates
Intercept	-3.577 ***	-9.902 ***	-0.462	-8.728 **	7.017
	(-5.52)	(-8.26)	(-0.59)	(-2.48)	(0.90)
PROF	-0.002 ***	-0.234 ***	-0.066 ***	-0.093 ***	-0.002 ***
	(-4.53)	(-9.21)	(-3.50)	(-3.68)	(-3.93)
NonDTS	0.061 ***	-0.097	0.608 ***	-0.091	0.045 ***
	(14.27)	(-1.31)	(7.30)	(-0.91)	(9.72)
GRW	8.8E-08	6.5E-07	2.2E-06	0.0002 ***	-3.0E-07
	(0.27)	(1.54)	(0.55)	(4.50)	(-0.75)
VAR	-5.7E-08	6.9E-07 ***	-7.8E-08	4.9E-07	-1.6E-07
	(-0.54)	(4.25)	(-0.13)	(0.39)	(-1.30)
SIZE	-0.035 ***	-0.015 ***	0.001	0.016 *	-0.071 ***
	(-22.92)	(-3.16)	(0.56)	(1.94)	(-31.18)
COL	0.316 ***	0.153 ***	0.100 **	0.099 **	0.309 ***
	(28.11)	(4.40)	(2.49)	(2.25)	(24.31)
LnGDP	0.165 ***	0.414 ***	0.037	0.335 **	-0.248
	(6.64)	(8.59)	(1.28)	(2.48)	(-0.80)
GDPGRW	0.022	0.554 **	-0.073	-0.078	0.190
	(0.28)	(2.46)	(-0.74)	(-0.50)	(0.82)
BANK	-0.001	0.037 ***	0.009	0.295 ***	0.067 **
	(-0.17)	(2.76)	(0.95)	(4.53)	(2.12)
STOCKMKT	0.012	-0.012	-0.013	-0.024	-0.132 ***
	(1.40)	(-0.91)	(-0.57)	(-1.60)	(-2.71)
F-test for no fixed effects	(9.12) ***	(28.77) ***	(13.41) ***	(11.98) ***	(8.65) ***
No. of Observations	36804	3660	3159	1477	28508
Root MSE	0.1775	0.087	0.119	0.122	0.190
R^2	0.7109	0.922	0.798	0.797	0.691

Panel model based on pooled time-series and cross-sectional data has the following specification: $L_{i,t} = \alpha_0 + \mathbf{X}^{f}_{i,t}\,\mathbf{ß}_f + \mathbf{X}^{c}_{i,t}\,\mathbf{ß}_c + u_i + \nu_t + \varepsilon_{i,t}$ where u_i denotes an unobservable effect of individual cross-unit, ν_t denotes the unobservable effect of time, and $\varepsilon_{i,t}$ is the remainder stochastic disturbance term. Time-invariant variables among the macroeconomic variables are excluded from the above specification. Hausman's *m*-test rejects the null hypothesis of random effects for all legal groups at the 1% level of significance. Also, F-test shows rejections of no fixed effects for all groups at the 1% level. These results support the fixed effects model, rather than the random effects model in two-way panel data analysis. Fixed effects method based on two-way error component model in panel regression is employed to estimate parameters. Notes: *t*-statistics are in parentheses. *** indicates statistical significance at 1% level. ** indicates statistical significance at 5% level. * indicates statistical significance at 10% level.

Table 12 Parameter Estimates: Dynamic Model

DEBT/CAP	Overall Restricted Model			Overall Unrestrcited Model			German			French			Scandinavian			English		
Parameter	Estimates	*t*- values	P>|t|	Estimates	*t*- values	P>|t|	Estimates	*t*- values	P>|t|	Estimates	*t*- values	P>|t|	Estimates	*t*- values	P>|t|	Estimates	*t*- values	P>|t|
Panel A: Adjustment Speed ($\delta_{i,t}$)																		
Intercept	0.295	(73.99)	***	-0.158	(-1.27)		-0.568	(-2.04)	**	-0.036	(-1.19)		3.642	(2.73)	***	-0.245	(-0.75)	
GAP				0.364	(22.59)	***	0.286	(10.90)	***	0.034	(2.71)	***	0.180	(3.37)	***	0.338	(20.89)	***
PROF				0.001	(35.42)	***	0.017	(1.28)		-0.043	(-2.58)	**	0.014	(0.86)		0.001	(31.08)	***
GRW				0.0001	(24.44)	***	0.001	(11.05)	***	0.0001	(2.68)	***	0.003	(10.05)	***	0.0002	(24.33)	***
SIZE				-0.012	(-13.09)	***	-0.011	(-3.72)	***	0.0001	(0.29)		-0.037	(-5.01)	***	-0.008	(-6.17)	***
LnGDP				0.012	(2.69)	***	0.024	(2.61)	***	0.0003	(0.35)		-0.115	(-2.16)	**	0.010	(0.92)	
GDPGRW				-0.078	(-1.70)	*	0.034	(0.11)		0.036	(2.33)	**	-0.348	(-0.96)		0.481	(1.08)	
BANK				-0.002	(-0.85)		-0.007	(-0.56)		-0.0002	(-1.37)		-0.073	(-0.91)		-0.056	(-1.73)	*
STKMKT				-0.003	(-0.24)		0.059	(3.53)	***	0.002	(0.91)		-0.099	(-4.81)	***	-0.096	(-3.53)	***
1997-1998				-0.035	(-3.76)	***	-0.007	(-0.40)		0.002	(1.13)		0.039	(1.27)		-0.028	(-2.00)	**
1999-2000				-0.006	(-0.53)		-0.040	(-2.29)	**	0.004	(1.53)		0.130	(3.32)	***	0.027	(1.37)	
2001-2002				-0.082	(-7.65)	***	-0.048	(-2.45)	**	0.005	(1.90)	*	0.140	(3.51)	***	-0.046	(-2.95)	***
German Origin	-0.291	(-54.34)	***	-0.024	(-1.69)	*												
French Origin	-0.178	(-14.26)	***	-0.012	(-1.05)													
Scandinavian Origin	-0.158	(-7.56)	***	0.031	(1.46)													
Mean of $\delta_{i,t}$				18.99%			0.47%			11.71%			13.72%			29.54%		
Panel B: Pairwise *t* -test, Ho: bi=bj																		
German vs French		-8.98			(-1.51)													
German vs Scandinavian		-6.34	***		(-2.43)	**												
German vs English		(-54.34)	***		(-1.69)	*												
French vs Scandinavian		-0.85			(-0.30)													
French vs English		(-14.26)	***		(-1.05)													
Scandinavian vs English		(-7.56)	***		(1.46)													
Order of the estiamted coefficients of Group Dummies		E»S>F>G			S>E>F>G													

Table 12 -*continued*

DEBT/CAP	Overall Restricted Model			Overall Unrestrcited Model			German			French			Scandinavian			English		
Parameter	Estimates	*t*- values	P>|t|	Estimates	*t*- values	P>|t|	Estimates	*t*- values	P>|t|	Estimates	*t*- values	P>|t|	Estimates	*t*- values	P>|t|	Estimates	*t*- values	P>|t|
Panel C: OLS																		
NT	33232			33232			3543			3290			1385			25014		
Root MSE	0.186			0.179			0.094			0.123			0.118			0.195		
Adjusted R-Square	0.599			0.631			0.881			0.727			0.747			0.593		

The dynamic model estimated has the following system equations: 1) Adjustment function $L_{i,t} = (1-\delta_{i,t})L_{i,t-1} + \delta_{i,t} L^{*}_{i,t} + \varepsilon_{i,t}$ 2) target leverage function $L^{*}_{i,t} = \alpha_0 + \mathbf{X}^{f}_{i,t}\boldsymbol{ß}_f + \sum_s \beta_s D^s + \mathbf{X}^{c}_{i,t}\boldsymbol{ß}_c + \sum_g \beta_g D^g$ 3) adjustment speed function $\delta_{i,t} = \alpha_0 + \mathbf{Z}^{f}_{i,t}\mathbf{a}_f + \sum_s \alpha_s D^s + \mathbf{Z}^{c}_{i,t}\mathbf{a}_c + \sum_t \alpha_t D^t + \sum_g \alpha_g D^g$ (unrestricted model), $\delta_{i,t} = \alpha_0$ (restricted model). Mean of δ_{i,t_0} in unrestricted model is an average of the adjustment speed of all countries. Only the estimates of the adjustment speed function are reported. Also, the estimated values of the coefficients of industry-specific variables are not given here. Income variability is measured by the absolute value of the first difference in the percentage change in net income. The entire sample period of 1995-2002 except for 1994 is divided into four subperiods of two years each. The subperiod of 1995-1996 is used as a reference in the model. The mean of the adjustment speeds for each legal group is computed using restricted version of the dynamic model. Notes: *t*-statistics are in parentheses. *** indicates statistical significance at 1% level. ** indicates statistical significance at 5% level. * indicates statistical significance at 10% level.

Table 13 Abbreviated Common-Size Balance Sheets for Firms in OECD Countries and Macro Financial Data

		Balance Sheets for Non-Financial Firms in OECD countries							Macro Financial Characteristics of OECD Countries						
OECD Countries	No. of Obs.	Current Assets	Current Debt	Current Liabilities	Long-Term Debt	Non-Current Liabilities	Total Liabilities	Shareholders equity	Log GDP	GDP Growth	Stock market capitalization / GDP	Bank assets / GDP	Corporate tax rate	Miller tax adv. of interest to dividends	Miller tax adv. of interest to capital gains
Germany	655	56.33%	8.96%	12.18%	7.16%	51.18%	63.36%	36.64%	28.07	0.051	0.37	1.72	0.450	0.450	0.450
Austria	100	43.64%	5.41%	13.64%	12.64%	70.90%	84.53%	15.47%	25.77	0.053	0.13	2.38	0.340	0.365	0.577
Japan	1917	54.63%	16.55%	41.64%	18.05%	18.10%	59.73%	40.27%	28.86	0.039	0.71	1.33	0.375	0.412	0.456
Korea	110	44.04%	18.24%	33.89%	18.97%	21.87%	55.77%	44.23%	25.73	0.148	0.42	0.77	0.320	0.320	0.541
Switzerland	180	50.49%	9.57%	28.28%	19.52%	28.81%	57.09%	42.91%	26.02	0.045	1.72	3.63	0.300	0.300	-0.077
Czech Republic	46	30.46%	10.22%	29.47%	14.73%	20.79%	50.25%	49.75%	24.60	0.113	0.22	1.31	0.420	0.420	0.420
Hungary	24	48.49%	9.63%	26.16%	7.76%	12.54%	38.69%	61.31%	23.22	0.152	0.23	0.66	0.360	0.488	0.488
Slovak Republic	7	42.80%	17.03%	37.79%	12.01%	16.32%	54.11%	45.89%	23.62	0.120	0.04	n.a.	0.290	0.290	0.290
German	**3039**	**46.36%**	**11.95%**	**27.88%**	**13.86%**	**30.06%**	**57.94%**	**42.06%**	**25.74**	**0.090**	**0.48**	**0.48**	**0.36**	**0.38**	**0.39**
Civil Law :															
France	495	60.77%	5.15%	31.71%	20.70%	31.38%	63.09%	36.91%	27.71	0.063	0.54	2.35	0.333	0.616	0.284
Netherlands	174	57.09%	12.61%	39.79%	20.40%	20.78%	60.57%	39.43%	26.44	0.049	0.99	2.05	0.350	0.350	-0.625
Italy	104	56.38%	11.66%	40.10%	14.21%	21.10%	61.20%	38.80%	27.29	0.098	0.31	1.37	0.360	0.342	0.451
Spain	146	43.96%	10.41%	31.94%	15.71%	24.38%	56.32%	43.68%	26.50	0.101	0.48	1.48	0.350	0.350	-0.313
Belgium	83	53.01%	15.62%	32.05%	15.85%	29.21%	61.26%	38.74%	25.95	0.053	0.53	2.86	0.410	0.508	n.a.
Greece	71	54.74%	13.46%	25.48%	13.50%	28.51%	54.00%	46.00%	24.34	0.172	0.46	0.76	0.350	0.235	0.235
Portu	49	38.86%	13.32%	32.85%	18.46%	26.59%	59.44%	40.56%	24.50	0.161	0.30	1.65	0.360	0.360	0.232
Luxembourg	17	40.32%	6.58%	31.35%	22.75%	23.33%	54.68%	45.32%	23.06	0.095	1.47	33.62	0.330	0.330	0.330
Mexico	87	36.78%	8.98%	23.06%	20.40%	23.41%	46.46%	53.54%	24.30	0.443	0.27	0.35	0.340	0.571	0.571
Poland	47	50.61%	12.47%	30.07%	7.99%	11.27%	41.33%	58.67%	21.80	0.612	0.13	0.55	0.280	0.424	0.280
Turkey	32	61.44%	12.87%	40.33%	10.67%	11.89%	52.23%	47.77%	20.98	0.664	0.12	0.53	0.250	0.162	0.581
French	**1305**	**50.36%**	**11.19%**	**32.61%**	**16.42%**	**22.90%**	**55.51%**	**44.49%**	**24.81**	**0.228**	**0.51**	**4.32**	**0.34**	**0.39**	**0.20**
Civil Law :															
Norway	138	45.36%	7.42%	27.36%	29.24%	29.74%	57.11%	42.89%	25.25	0.084	0.31	0.77	0.280	0.280	0.280
Sweden	195	54.24%	7.00%	31.14%	15.85%	24.48%	55.62%	44.38%	25.70	0.076	0.83	0.96	0.280	0.280	0.280
Denmark	130	53.98%	11.35%	36.30%	17.33%	21.64%	57.94%	42.06%	25.45	0.062	0.44	1.11	0.380	0.277	0.380
Fin	98	48.14%	10.13%	30.30%	22.17%	28.74%	59.05%	40.95%	25.20	0.075	0.88	1.09	0.290	0.334	0.334
Scandinavian	**561**	**50.43%**	**8.98%**	**31.27%**	**21.15%**	**26.15%**	**57.43%**	**42.57%**	**25.40**	**0.074**	**0.61**	**0.98**	**0.31**	**0.29**	**0.32**
Civil Law :															

Table 13 -*continued*

		Balance Sheets for Non-Financial Firms in OECD countries							Macro Financial Characteristics of OECD Countries						
OECD Countries	No. of Obs.	Current Assets	Current Debt	Current Liabilities	Long-Term Debt	Non-Current Liabilities	Total Liabilities	Shareholders equity	Log GDP	GDP Growth	Stock market capitalization / GDP	Bank assets / GDP	Corporate tax rate	Miller tax adv. of interest to dividends	Miller tax adv. of interest to capital gains
US	7164	51.39%	7.20%	27.84%	21.63%	21.67%	49.52%	50.48%	29.33	0.065	1.09	0.76	0.350	0.350	0.350
UK	1222	53.35%	8.15%	36.23%	15.09%	15.26%	51.49%	48.51%	27.40	0.077	1.34	1.14	0.330	0.330	0.330
Canada	827	39.31%	9.16%	26.42%	23.14%	25.74%	52.16%	47.84%	26.77	0.065	0.76	0.96	0.280	0.059	0.206
Australia	456	40.61%	7.88%	27.80%	18.11%	20.47%	48.27%	51.73%	26.14	0.083	0.74	1.06	0.330	0.330	0.330
New Zealand	53	26.88%	7.57%	19.99%	25.34%	26.11%	46.10%	53.90%	24.27	0.088	0.43	1.25	0.330	0.330	0.000
Ireland	58	44.95%	7.75%	29.76%	19.86%	20.84%	50.60%	49.40%	24.46	0.118	0.63	3.42	0.400	0.400	0.308
English	**9780**	**42.75%**	**7.95%**	**28.01%**	**20.53%**	**21.68%**	**49.69%**	**50.31%**	**26.40**	**0.08**	**0.83**	**1.43**	**0.34**	**0.30**	**0.25**
Common Law :															
Overall	**14685**	**51.11%**	**9.19%**	**30.08%**	**19.18%**	**25.28%**	**53.24%**	**46.68%**	**25.47**	**0.139**	**0.92**	**2.57**	**0.34**	**0.35**	**0.28**

Financial Data of Firms are averages of the recent 9-year period (1994-2002) financial data of firms in OECD countries. Iceland is omitted due to lack of sufficient number of observations. All financial firms are excluded. Data are obtained from MERGENT^{TM}, 2004. GDP (Gross Domestic Product) data over 1979-2001 are from SourceOECD and the IMF's International Financial Statistics (IFS), and are converted to U.S. dollar. Stock market capitalization / GDP is the stock market capitalization divided by GDP. These ratios are from World Bank, but some GDP data are backfilled using SourceOECD statistical database; values are 1990-2002 averages except for the Czech Republic and the Slovak Republic, and Ireland (1994-2002), Poland (1993-2002), and Hungary (1991-2002). Bank assets /GDP is the summation of all assets of all domestic banks in a given country divided by GDP. Bank assets are obtained from SourceOECD and OECD, "Bank Profitability." Tax data are obtained from various sources. Corporate tax rates are from John Graham, "The International Handbook of Corporate and Personal Taxes" and PricewaterhouseCoopers, "Corporate taxes: worldwide summaries." Personal income tax rates on dividends, capital gains, and interests are collected from OECD, "Taxation and household saving: Country Surveys," OECD, "Tax Ratios: A Critical Survey," and PricewaterhouseCoopers, "Individual taxes: worldwide summaries." Since our sample data begin in 1994, all tax rates with a few exceptions are obtained as of the beginning of 1994. The highest personal income taxes are employed when various rates are applicable depending on income levels. The tax rates on dividends, capital gains, and interests are restricted to income from corporate equities and bonds. The tax advantage of interest over dividends or capital gains is computed using $1-(1-\tau_C)(1-\tau_{pS})/(1-\tau_{pB})$ derived by Miller (1977), where τ_C is the corporate tax rate, τ_{pS} is the personal income tax rate on equity income from either dividends or capital gains, and τ_{pB} is the personal income tax on interest income from corporate bonds. Legal Groupings of OECD countries follow La Porta et al. (1998). Notes: n.a.=Not Available.

Vita

Joon-Young Song was born in Seoul, Korea on July 21, 1964. He graduated from Seoul National University, Seoul, Korea with a Bachelor of Science degree in Business Administration in 1988. He then earned his Master of Business Administration (concentration on Finance) from Seoul National University, Korea in 1990. From 1990 to 1991 he served in the Korean Army. He worked for the LG Economic Research Institute in Korea as a researcher during the period of 1993-1994, and then joined the Maeil Business News Paper in Korea as a staff reporter from 1994 through1998. He began his graduate studies in the U.S. at Adelphi University, Garden City, New York in 1998. One year later he entered the master program in Finance at Syracuse University, Syracuse, New York. He began his doctoral studies at the University of Tennessee, Knoxville, Tennessee in 2000. While attending the Ph.D. program in Finance he earned a Master of Art degree in Economics in 2003. He received a Doctor of Philosophy degree in Business Administration with concentration on Finance in 2004.

Joon is now employed with the University of Findlay in Ohio as an assistant professor in the College of Business.