

The Equity Mix in Executive Compensation: An Investigation of Cross-Country Differences

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ABSTRACT

Why do firms from some countries use no equity in the compensation mix, while others use amounts equivalent to that observed in the U.S.? We examine this issue by investigating compensation data from 381 firms in 43 countries over the 1996 to 2000 period. The data indicate that firms use more equity-based compensation in countries with equity-oriented capital markets and where shareholder rights are strongly protected. After controlling for these country-level macro-factors, we test for how the firm-specific agency costs of debt and equity impact compensation structure. We find that firms with higher growth opportunities (and therefore higher agency costs of equity) and lower risk of default (and therefore lower agency costs of debt) use more equity in the compensation mix. This is consistent with the predictions of contracting theory.

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1. Introduction

Our compensation programs are designed to attract, develop, retain and motivate the high caliber of executives, managers and associates that are critical to the long-term success of the business. Globalization of labor markets and a “war for talent” have led to a rapid narrowing of the gap between U.S. and E.U. principles of compensation with a clear focus on long-term, equity-based forms of programs. (Novartis’ 20-F filing with the U.S. Securities and Exchange Commission in 2000).

Has the globalization of labor markets for senior management led non-U.S. firms to design management compensation contracts similar to those offered to executives of U.S. firms? Despite extensive analysis of the structure of executive compensation in the United States, we still know little about how non-U.S. firms design management compensation contracts. Anecdotal evidence, however, suggests that some non-U.S. firms continue to include no equity in the compensation mix (i.e., the relative use of equity-based and cash-based compensation), while others use amounts equivalent to that of U.S. firms. If the market for senior executives has truly gone global and there is a “war for talent”, why is there such wide variation in the use of equity in executive compensation by non-U.S. firms? We provide an answer to this question by comparing compensation schemes of firms from 43 non-U.S. countries and identifying potential determinants of cross-sectional differences in executive compensation contracts.

Demirguc-Kunt and Maksimovic (1999) note that contracting choices (such as the design of compensation contracts) are driven by the characteristics of both the individual firm and the underlying institutional environment. Using this framework, we attempt to identify how both firm-specific factors (micro-determinants) and institutional factors (macro-determinants) affect the structure of management compensation contracts. Our macro-determinants measure the impact of cross-sectional differences in capital markets and legal systems, while our micro-determinants focus on the firm-specific agency problems of equity

and debt.

Prior studies of U.S. management compensation emphasize the role of firm-level agency costs. This literature generally concludes that U.S. firms develop compensation contracts to motivate managers to maximize shareholder wealth and minimize conflicts of interest within the firm. To determine if the agency cost theories are applicable beyond the U.S. borders, we examine whether firm-specific agency problems of debt and equity similarly affect the structure of compensation contracts of non-U.S. firms.

A country's institutional setting (or macro-factors) may also impact the design of management compensation contracts. Primarily utilizing the models of LaPorta, López-de-Silanes, Shleifer, and Vishny (1997), several authors have recently linked the firm's contracting decisions to its institutional environment. For example, Booth et al. (2001) finds that country-specific institutional factors (such as the nation's legal environment and level of financial market development) impact the firm's capital structure choices. We extend the analysis of the impact of cross-country institutional differences by testing whether these macro-factors affect the design of compensation contracts of non-U.S. firms.

Through an analysis of compensation data from 381 firms in 43 countries, we find evidence of both firm-specific (micro) and country-specific (macro) determinants of equity mix. Specifically, firms in countries with equity-dominated capital markets use a larger relative amount of equity compensation. Also, the equity mix is higher in countries that provide stronger protection of shareholder rights. In addition to these macro-determinants, we find that the use of equity-based compensation is affected by the firm's agency costs of debt and equity.

We hypothesize that increases in the firm's risk of default will increase the agency costs of debt (i.e., underinvestment and asset substitution). Consistent with that expectation, we find that firms with higher levels of default risk use less equity in the compensation mix. Moreover, we also hypothesize that as growth opportunities in the firm's investment opportunity set increase, the agency costs of equity increase. As expected, we find that firms with higher growth opportunities (and the resultant larger agency costs of equity) use relatively more option-based compensation. Overall, these findings (that the use of equity in the compensation mix is related to both the agency costs of debt and equity) are consistent with the predictions of John and John (1993).

We organize this paper as follows. Section 2 briefly summarizes the empirical literature regarding the determinants of the structure of compensation contracts for U.S. firms. This literature primarily focuses on how the firm-specific agency costs of equity and debt affect the relative use of equity-based and cash-based executive compensation. In section 3, we develop our hypotheses regarding how these agency conflicts may impact the compensation structure of non-U.S. firms. We refer to the firm-specific agency problems as micro-determinants of the design of compensation contracts. Section 4 specifies our hypotheses regarding the potential macro-determinants of the compensation structure of non-U.S. firms. These macro-determinants are country-specific, institutional features such as characteristics of a nation's capital market and legal system. Section 5 describes our data sources and our sample. Section 6 defines the proxies we use in our empirical tests. In Section 7, we provide descriptive statistics for our data. Our empirical findings are presented in Section 8, while Section 9 documents the results for our robustness tests. We end with our summary and conclusions in Section 10.

2. Determinants of the Structure of U.S. Executive Compensation Contracts

Financial economists have long suggested that U.S. firms design management compensation contracts to mitigate agency conflicts. Specifically, providing greater amounts of equity-linked compensation should better align manager and stockholder interests. This should reduce the agency costs of equity but may increase the agency costs of debt. On the other hand, larger amounts of cash-based compensation will provide managers with a fixed series of payouts (akin to that received by bondholders). This should reduce the agency costs of debt but may contribute to higher agency costs of equity. Because the compensation structure (equity vs. cash-based) affects both types of agency costs, John and John (1993) contend that the optimal compensation mix should seek to minimize the firm's total agency costs.

Extant studies have identified that stockholder/manager conflicts are primary determinants of the compensation structure for U.S. firms. According to contracting theory, managers of firms with greater growth opportunities are less effectively monitored. Therefore, higher growth opportunities should lead to larger agency costs of equity and a greater relative use of option-based management compensation. Smith and Watts (1992), Gaver and Gaver (1993), Kole (1997), and Bryan et al. (2000) confirm this positive relation. Empirical evidence also suggests that a firm's earnings variability may impact its design of management compensation contracts. That is, greater earnings variability should decrease the observability of management performance and increase the likelihood of managerial opportunism. This suggests larger agency costs of equity and higher use of option-based compensation. Eaton and Rosen (1983), Lewellen et al. (1987), and Bryan et al. (2000) provide empirical support for this relation. Finally, firm size, another commonly used proxy

for the potential agency problems of equity, has similarly been found to affect the structure of managerial compensation contracts. In empirical studies, Smith and Watts (1992), Gaver and Gaver (1993), and Bryan et al. (2006) identify a positive relation between size and equity-based compensation. However, it should be noted that Murphy (1985) reports a negative association between size and equity-based compensation, and Kole (1997), Eaton and Rosen (1983), and Mehran (1995) find no significant relation.

Other papers have recognized the potential impact of the agency problems of debt on the firm's choice of managerial compensation. In most early studies, leverage was the pervasive proxy for all stockholder/bondholder conflicts. These empirical tests yielded mixed results. Lewellen et al. (1987) determine a positive relation between leverage and equity-based compensation; Bryan et al. (2000) report a negative relation; Mehran (1995) and Yermack (1995) find no significant relation.

These inconclusive results are puzzling because the agency costs of debt have such a strong impact on many of the firm's other contracting decisions. To analyze more deeply the relation between the agency costs of debt and the design of management compensation contracts, Bryan et al. (2006) develop proxies for each of the specific agency problems of debt (i.e., asset substitution, underinvestment, and event risk).¹ They find that asset substitution and event risk have the greatest influence on the relative use of option-based compensation by U.S. firms in the 1990s.

While it appears that U.S. firms design compensation contracts to control agency conflicts, little is known about whether these same factors drive the structure of compensation

¹ The contracting literature identifies multiple agency problems of debt (each of which involves a separate type of management action). Asset substitution occurs when a manager accepts a negative NPV, high-variance project. Underinvestment happens when a manager forgoes a positive NPV, low-variance project. Event risk occurs when a manager engages in levered-takeovers or other debt-increasing transactions.

contracts in other countries. In the following section, we outline the firm-specific agency problems (i.e., the micro-determinants) that we expect to influence compensation policy. We then use our multinational data to consider whether management compensation contracts for non-U.S. firms are similarly affected by these agency problems.

3. Potential Micro-Determinants of Non-U.S. Compensation Structure: The Agency Costs of Debt and Equity

The equity mixes in executive compensation affect both the agency problems of debt and equity.

3.1. Agency Costs of Debt and the Structure of Managerial Compensation

The following section briefly describes specific stockholder/bondholder conflicts and identifies testable hypotheses regarding the relations between these agency problems and the design of managerial compensation contracts of non-U.S. firms.

3.1.1. Underinvestment

Myers (1977) notes that managers of levered firms may forgo favorable opportunities or engage in underinvestment. Studies by Begley and Feltham (1999) and Bizjak et al. (1993) conclude that a larger use of equity-based compensation will potentially increase the underinvestment problem. Our first hypothesis focuses on efforts to mitigate underinvestment.

H1: Firms with a higher likelihood of underinvestment should use lower option-based compensation.

3.1.2. Asset Substitution

Managers may transfer value from bondholders to stockholders by shifting from safer to riskier investments. Begley and Feltham (1999), Yermack (1995), and John and John (1993) present evidence that a greater use of equity-based pay will increase the likelihood of asset substitution. Therefore, our next hypothesis considers whether firms attempt to minimize the likelihood of asset substitution by providing less option-based compensation.

H2: Firms with a higher likelihood of asset substitution should use lower option-based compensation.

3.1.3. Event Risk

Event Risk refers to the bondholder's exposure to wealth expropriation brought about by mergers, takeovers, buyouts, or other leveraged transactions. These events damage the bondholder's position by introducing, or exacerbating, many of the agency problems of debt. Cook and Easterwood (1994), Crabbe (1991), and Asquith and Wizman (1990) describe the wealth losses that bondholders suffer following leveraged buyouts, major capital restructurings, or other such "events". Equity-based compensation should increase the likelihood of such managerial decisions. Accordingly, we base our next hypothesis on the issuing firm's desire to mitigate the event risk problems.

H3: Firms with a higher likelihood of event risk should use lower option-based compensation.

3.2. Agency Costs of Equity and the Structure of Managerial Compensation

Agency costs of equity exist because of a separation of ownership and control (i.e., the shareholders own and the managers control). To lessen the severity of these agency problems, the interests of managers and shareholders must be more closely aligned. The following section describes major agency costs of equity. We further identify testable

hypotheses as to how the potential severity of a firm's agency costs of equity may affect its design of managerial compensation contracts.

3.2.1. Excessive Perquisite Consumption & Managerial Shirking

A benefit of the control exercised by managers is the opportunity for the consumption of perquisites (or non-pecuniary benefits). While managers who are sole owners feel the full costs of any perks consumed, managers who are partial owners capture the entire value of any perks but only bear costs proportional to their ownership percentage. Accordingly, limited ownership encourages managers to seek more perquisites.

The division of ownership from control also results in situations in which managers may exert less than maximum effort. Known as shirking, this stockholder/manager conflict happens because the manager may capture the entire benefits from the reduced effort while the shareholders bear a majority of the costs.

The contracting literature identifies several strategies to mitigate these stockholder/manager conflicts. Using more equity-based compensation may reduce these agency problems by establishing an explicit connection between manager and stockholder wealth. Additionally, Malitz (1994), John and John (1993), Easterbrook (1984), and Rozeff (1982) note that direct monitoring by capital market participants (such as investors, underwriters, and auditors) may exert pressure on managers to minimize diversion of shareholder wealth and thus reduce the agency costs of equity. For example, the process of more frequently raising cash from external sources should expose firms to more intense capital market monitoring. This is the basis for the following hypothesis.

H4: Because firms that more frequently enter the external capital markets should have lower agency costs of equity, we expect they should use less option-based managerial compensation.

3.2.2. Growth Options and the Agency Costs of Equity

External monitoring may reduce the agency costs of outside equity. However, some firms are more difficult to monitor than others. Bryan et al. (2000), Kole (1997), and Bizjak et al. (1993) identify that growth options contribute to more severe informational asymmetries (that allow for potential rent extraction by managers). As a result, firms characterized by large quantities of growth options should have greater agency problems of equity. Therefore, our next hypothesis is as follows.

H5: Because firms with larger amounts of growth options are more difficult to monitor, we expect a positive relation between the prevalence of growth options and the use of option-based compensation.

3.2.3. Firm Size and the Agency Costs of Equity

Jensen and Meckling (1976) contend that agency costs increase with firm size because a larger span of operations allows for greater managerial opportunism and less effective external monitoring. Bryan et al. (2000), Yermack (1995), and Gaver and Gaver (1993) argue that the greater difficulty in monitoring managers of larger companies contributes to a greater use of stock-based compensation in bigger companies.

H6: Because larger firms are more difficult to monitor, we expect a positive relation between firm size and the use of option-based compensation.

4. Potential Macro-Determinants of Non-U.S. Compensation Structure

The following section describes cross-country institutional differences (or macro-determinants) that may impact the relative use of cash and stock-based compensation. We follow Stulz (2000), Demirguc-Kunt and Maksimovic (1999), and Rajan and Zingales (1998) and organize these macro-factors into two broad groups: the development of capital markets and the enforceability of contracts (legal environment).

4.1. *Development of Capital Markets*

In most nations, financial systems evolve as either debt-based (such as in Japan and Germany) or market/equity-based (such as in England and America).² Differences in the orientation of a nation's capital market could impact the firm's contracting decisions. For example, Booth et al. (2001) finds that firms from countries with well-developed stock markets have different capital structures than those from nations with large banking sectors. Similarly, Demirguc-Kunt and Maksimovic (1999) determine that the focus of a country's financial system (debt vs. equity-based) affects the firm's choice of debt maturity.

The orientation of a nation's capital market may also impact the design of management compensation contracts. When it comes to the firm's contracting decisions, a fundamental difference between debt-based and equity-based financial systems is the objective of the dominant suppliers of capital in the market. In an equity-based financial system, shareholders provide the majority of the capital. As residual claimants, shareholders are obviously concerned about the maximization of shareholder value. Moreover, in countries with an equity-dominated market, a larger proportion of the population generally holds stock and an "equity culture" (i.e., a preference for stock ownership and a focus on value-maximization) is more prevalent. This proclivity for equity ownership and focus on maximization of shareholder wealth should lead to a greater relative use of equity-based compensation if managerial interests are to be aligned with those of shareholders. Accordingly, we expect that equity-based compensation should be more prominent for firms

² See Booth et al. (2001), Stulz (2000), Thurow (1992), and Mayer (1990) for a more detailed discussion of the differences between the "Continental-German-Japanese" banking model and the "Anglo-Saxon" capital markets model.

in an equity-dominated financial system.

Furthermore, as Subrahmanyam and Titman (1999) and others report, a large and liquid equity market is more likely to be informationally efficient. Dow and Gorton (1997) and Holmstrom and Tirole (1993) note that an informationally efficient stock price is important to assess manager performance accurately. Otherwise, stock-based compensation would be less effective in terms of aligning manager and shareholder interests. Therefore, because the presence of a larger stock market increases the efficacy of equity-based compensation, we expect the equity mix to be higher in countries with more developed stock markets.

Alternatively, creditors care predominantly about receiving their fixed payments and attach little emphasis to ensuring the maximization of equity value. In a debt-dominated financial system, the institutional environment is designed to ensure that management does not reduce firm value too much (as opposed to equity-based systems structured to encourage shareholder value maximization). Accordingly, in a debt-oriented economy, the value of equity is of less importance when monitoring and motivating managers. It follows that firms operating in a debt-based economy should compensate managers with less equity and with more cash.

Our next hypothesis tests these predicted relations between the orientation of the nation's capital market and the relative use of equity-based compensation.

H7: Firms in an equity-oriented (debt-oriented) capital market should use more (less) option-based management compensation.

4.2. Enforceability of Contracts (Legal Environment)

The legal protection of private property rights and the long-term viability of contractual commitments should also have an important impact on the firm's design of compensation contracts. For managers to feel the full disciplining pressure of the capital market, the rights of the individual stockholder (particularly the voting rights) must be enforced by the country's legal system. LaPorta, López-de-Silanes, Shleifer, and Vishny (1997, 1998) note that the amount of protection of shareholders' legal rights varies significantly across countries. Specifically, shareholders in countries with an English common law tradition generally benefit from much stronger legal protection than those living in nations with civil law systems. Accordingly, the greater pressure (brought about because of stronger shareholder legal rights) should more effectively motivate managers to maximize shareholder wealth. For example, Pagano and Roell (1998) argue that stronger legal protection of investor rights hinders collusion between the firm and potential monitors and promotes more effective managerial oversight. Accordingly, firms in nations providing for stronger shareholder protection should use more equity-based compensation.

Additionally, as we noted earlier, informational efficiency is necessary to ensure the efficacy of stock-based compensation plans. Morck, Yeung, and Yu (2000) contend that poor enforcement of shareholder rights weakens the informational efficiency of stock prices. This also suggests that the use of equity in the compensation mix should be positively related to the strength of shareholder rights in a country. In contrast, if creditors' legal rights were strong, we would expect less equity to be used in the compensation mix. This leads to our final hypothesis.

H8: Firms in nations that provide stronger protection of shareholder (creditor) rights should use a larger (smaller) relative amount of option-based compensation.

5. Data

Non-U.S. firms use American Depository Receipts (ADRs) to participate in the U.S. equity markets. If the ADR is listed on an exchange or quoted on Nasdaq or if the ADR is used for new equity offerings, the ADR must be registered with the SEC and the foreign issuer must file Form 20-F. The Form 20-F includes detailed financial statements and a reconciliation of foreign GAAP to U.S. GAAP.³

U.S. firms must present managerial compensation information in a Summary Compensation Table in the proxy statements. The proxy statements disclose the amounts of executives' salaries, bonuses, long-term incentive plan payouts (LTIP), restricted stock awards, and stock options. The disclosures pertain to the CEO and the five highest paid executives and are disaggregated by individual executive.

Foreign firms must disclose similar information on compensation in the Form 20-F filings. However, the level of detail is not as great as that required of U.S. firms. Firms issuing ADRs must provide:

"The amount of compensation paid, and benefits in kind granted, to such persons by the company and its subsidiaries for services in all capacities to the company and its subsidiaries by any person. Disclosure of compensation is required on an individual basis unless individual disclosure is not required in the company's home country and is not otherwise publicly disclosed by the company. The standard also covers contingent or deferred compensation accrued for the year, even if the compensation is payable at a later date. If any portion of the compensation was paid (a) pursuant to a bonus or profit-sharing plan, provide a brief description of the plan and the basis upon which such persons participate in the plan; or (b) in the form of stock options, provide the title and amount of securities covered by the options, the exercise price, the purchase price (if any), and the expiration date of the options." (Form 20-F Instructions for Item 6B, Compensation; SEC 1852, 06-2001).

We identified companies with ADR programs from Compustat and located Form 20-F filings from the SEC's EDGAR database. We recorded disaggregated compensation data

³ See Bryan et al. (2006) for a more thorough discussion of the nuances of the ADR filing process.

(at the individual level) when provided; however, most firms presented aggregated compensation data. For example, Novartis' 20-F (year 2000) states:

The aggregate amount of compensation expensed in 2000 by us in respect of our directors and senior management . . . was CHF 29.4 million, of which CHF 13.8 million was salaries and CHF 9.0 million was for cash bonuses. Under the 2000 Novartis Stock Option Plan, 16,471 Novas10 options were granted to directors and senior management. The exercise price of Novas10 Options is CHF 2,800 and the options may be converted at any time between March 10, 2003, and March 7, 2010.

Consistent with prior compensation studies (e.g., Yermack, 1995; Bryan et al., 2006), we used the Black-Scholes model (1973) to estimate the value of the options granted. In measuring the relative use of stock option awards to cash compensation (MIX), we use the ratio of the Black-Scholes option value (option compensation) and the salary plus bonus (cash compensation). Therefore, our primary measure of the structure of managerial compensation is: $MIX = \text{Value of Option Compensation} / \text{Cash Compensation}$

We also examine the robustness of our results using a second measure of compensation structure. This measure of managerial compensation is:

$$PCT = \text{Value of Option Compensation} / \text{Total Compensation}$$

We compute total compensation by adding the values of option-based compensation, restricted stock, long-term incentive plans, and cash compensation.

We also use Compustat data to form the firm-specific explanatory variables in our empirical models. Our final sample covers 1996-2000 and consists of 381 firms from 43 countries.

As Table 2 indicates, the largest number of firm-year observations are from the England. Identifying that English firms are the most frequent issuers of ADRs is not surprising since England has an equity-oriented capital market and accounting rules similar to those of the U.S. From Table 2, we further note that observations are more likely to be

from nations with financial market characteristics that are comparable to the U.S. (e.g., England) or are located geographically near the U.S. (e.g., Mexico).

From Table 3, we see that the data are clustered around two industries, constituting nearly 75 percent of the firm-year observations. The heaviest representation, nearly 54 percent, is from the Manufacturing and Mining sector (based on 1-digit SIC codes). The communications industry represents 20 percent of our sample. The heavier weighting towards the manufacturing and mining sector, relative to the communications sector, holds for most countries.

Table 4 presents information on the average equity mix in executive compensation by country. The data provide early indication that the macro-factors that we outline may help explain the variation in the use of equity-based compensation across countries. Specifically, we find that firms in countries with an English legal origin use larger amounts of equity-based compensation (than do firms from countries with civil law-based legal systems).

We further see that the equity mix is also high for firms from Israel. This is also expected since Israel has an equity-oriented capital market and a well-developed high-tech sector. High-tech firms have larger market-to-book ratios reflecting the sector's growth opportunities. Contracting theory suggests that these firms should use relatively greater quantities of equity in the compensation mix to better align stockholder/manager interests.

In summary, our sample indicates that not only are firms from some countries more likely to issue ADRs, but that firms from certain countries also use more equity in the compensation mix. Early evidence indicates that clustering of the data (both in the number of firm-year observations and in the use of option-based compensation) may be driven by the orientation of the country's capital market and the strength of shareholder rights. Finally,

there is some preliminary evidence that, like in the U.S., firms with high growth opportunities use more equity in their compensation mix.

6. Empirical Proxies

The following sections define and describe the empirical proxies we use to test our hypotheses regarding the determinants of the structure of compensation contracts. Table 1 contains a summary of our hypotheses and the expected relation between the specific proxy and the equity mix in executive compensation.

6.1. Agency Costs of Debt

Because there are multiple agency problems of debt, we develop multiple proxies which target the various forms of stockholder/bondholder conflicts.

6.1.1. Agency Cost of Debt Proxy 1: Likelihood of Financial Distress

The underinvestment and asset substitution problems intensify as financial distress becomes more imminent. Therefore, due to this relation between financial distress and both stockholder/bondholder conflicts, we use Altman's Z-score (a weighted average of five financial metrics) as an indicator of the likelihood of underinvestment and asset substitution. Because larger Z-scores reflect a smaller probability of financial distress and a lower likelihood of underinvestment or asset substitution, we predict a positive relation between Altman's Z-score and the use of option-based compensation.

6.1.2. Agency Cost of Debt Proxy 2: Likelihood of Event Risk

Lehn and Poulsen (1989) identify that the possibility of event risk increases as free cash flow increases. They contend that firms with high free cashflows are the most likely candidates

for leverage-increasing “events” because the additional debt incurred from the transaction reduces the free cash flow problem. Following Lehn and Poulsen (1989), we calculate free cashflow as:

Operating income before depreciation – income tax – interest – dividends paid

We divide this measure of cashflow by the market value of equity to form our free cashflow metric. Because higher free cash flow suggests a greater likelihood of a leverage-increasing event (and therefore higher agency costs of debt), we expect a negative relation between a firm’s free cash flow and its use of option-based compensation.

6.2. Agency Costs of Equity

The potential severity of the agency costs of equity is substantially driven by the effectiveness and frequency of managerial monitoring.

6.2.1. Managerial Monitoring: External Capital Markets

Because monitoring by the external capital markets encourages managers to act in shareholders’ interests, firms that more frequently raise external funding should have lower agency problems of equity. Comment and Jarrell (1995) measure dependence on external financing with the firm’s short-term debt to total debt ratio. Higher ratios of short-term debt to total debt should indicate more frequent monitoring in the external capital markets, which should contribute to lower agency costs of equity. Therefore, we expect a negative relation between the short-term to total debt ratio and the relative amount of a firm’s option-based compensation.

6.2.2. *Managerial Monitoring: Growth Options*

Firms with greater quantities of growth options may be more difficult to monitor (leading to increased agency costs of equity). We measure growth options with the ratio of the market value to the book value of the firm's assets. We predict a positive relation between the amount of growth options and the relative amount of option-based compensation.

6.2.3. *Managerial Monitoring: Firm Size*

External observers (such as outside stockholders, analysts, and the board) find larger firms more difficult to monitor. Therefore, larger firms should have higher agency costs of equity and should use more options in the compensation mix. We measure firm size with the natural logarithm of total assets.

6.3 *Proxies for Macro-Determinants*

The following are the empirical proxies we use to examine the impact of cross-country, institutional factors (macro-determinants) on the firm's design of management compensation contracts.

6.3.1. *Orientation of Capital Markets*

We expect that firms from economies with a greater equity-orientation will use a larger proportion of stock-based compensation (while firms from debt-dominated financial systems will use more cash compensation). To identify the relative importance of the debt vs. the equity market within a country, we form the ratio of total debt to total capital. As Rajan and Zingales (1998) describe, total capital (total debt and total equity market capitalization) reflects the amount of finance raised in a country. Our measure of total debt is "domestic credit" (line 32 from the IMF's *International Financial Statistics Yearbook*). Our measure of

equity market capitalization is “market capitalization” from S&P’s *Emerging Stock Markets Factbook*. Higher values of our total debt-to-total capital ratio indicate a nation’s greater orientation toward a debt-based financial system. Therefore, we predict a negative relation between this ratio and the use of equity-based compensation.

6.3.2. *Enforceability of Contracts (Legal Environment)*

LaPorta, López-de-Silanes, Shleifer, and Vishny ((1997), (1998)) and Morck, Yeung, and Yu (2000) document significant cross-country variation in the level of legal protection of shareholder rights. We use La Porta, López-de-Silanes, Shleifer, and Vishny’s shareholder rights index (SRI) to measure how strongly a nation’s laws favor the interests of minority stockholders. Specifically, the index reflects the amount of voting powers possessed by stockholders and the strength of the legal support of shareholder rights. This shareholder rights index (SRI) takes on a higher value as the legal support of shareholder rights increases. We expect that firms in countries that provide stronger legal protection of shareholder rights should use more equity-based executive compensation.

7. Descriptive Statistics

Table 5 presents descriptive statistics for the full sample. The average mix of equity-based compensation to cash compensation is 19.3% for the firms in our sample. As expected, the data are highly skewed, with less than a quarter of the sample firms using equity in the compensation mix. The average size of the debt capital market to total capital is about 52.5% with some skewness on the upper tail. The shareholder’s rights index indicates that very few sample firms are from economies with very weak legal protections. This is not surprising. Firms are more likely to issue ADRs if their legal protections are similar to those in the U.S.

equity markets.

In Panel A of Table 6, we provide descriptive statistics for equity mix arrayed by the shareholder's rights index (SRI). The data are consistent with our expectations. In nations with weaker protection of shareholder rights (i.e., SRI of 0 or 1), firms use lower amounts of equity-based compensation. In nations with stronger protection of shareholder rights (i.e., SRI of 4), firms use larger amounts of equity-based compensation.

In Panel B of Table 6, we next consider the equity mix sorted by the origin of the nation's legal system (i.e., English, German, French, Scandinavian, and Socialist).⁴ Building on the findings of LaPorta, López-de-Silanes, Shleifer, and Vishny (1997, 1998), our data indicate that the use of equity-based compensation relative to cash compensation varies with the legal origin of the country. Countries with English and Scandinavian legal origins have smaller debt capital markets relative to the size of their total capital market. If nations provide stronger protection for shareholders, we should expect their equity capital markets to be more developed, and we should thus expect firms within the economy to use more equity-based compensation. Our findings in Panel B, Table 6 are consistent with those expectations.

8. Empirical Findings

The following sections describe our empirical findings regarding the determinants of the relative use of option-based management compensation. We use regression models that include industry and year dummy variables. The regression coefficients are estimated using Tobit as the data are left censored. We present robust t-statistics.

⁴ For our sample, only China and Russia fall under the "Socialist" legal origin.

8.1 *Macro-factors and the Equity Mix in Executive Compensation*

The use of equity in the compensation mix should reflect the country's preference for equity and the relative strength of shareholder and creditor rights. The findings in Table 7 (Regression 1) support our hypotheses. First, the coefficient of the relative size of the debt capital market is significantly negative at the one percent level. This indicates that firms in countries with debt-oriented capital markets use less equity in the compensation mix.

Second, the coefficient of the shareholder rights index (SRI) is significantly positive in Regression 1 (at the one percent level) indicating that firms in countries with strong shareholder rights use more equity-based compensation.

8.2 *Agency Costs of Debt and the Equity Mix in Executive Compensation*

Regression 2 in Table 7 tests for whether the agency costs of debt impact the use of equity-based compensation. From Regression 2, we identify that Altman's Z-score, a measure of the riskiness of debt, is significantly positive. This is consistent with expectations because a higher value of the Z-score indicates lower risk of default. If the risk of debt decreases, the agency costs of underinvestment and asset substitution decrease (which allows the firm to use more equity in the compensation mix). Finally, the regression results indicate that event risk is unimportant in explaining the cross-sectional variation in compensation structure.

8.3 *Agency Costs of Equity and the Equity Mix in Executive Compensation*

Regression 3 in Table 7 presents our findings regarding whether the stockholder/manager conflicts affect the use of equity in the compensation mix. Our proxy for growth opportunities (market-to-book ratio) is significantly positively related to the equity mix in executive compensation. This finding is consistent with our expectations and with the

empirical evidence for U.S. compensation (e.g., Bryan et al. (2000), Kole (1997), and Bizjak et al. (1993), among others). However, inconsistent with the evidence for U.S. firms in Bryan et al. (2000), Yermack (1995), and Gaver and Gaver (1993), we find that firm size is unrelated to the use of equity in the compensation mix for non-U.S. firms. Moreover, external monitoring, as captured by the ratio of short-term debt to total debt, is also unrelated to the relative use of equity-based compensation by non-U.S. firms.

8.4 *What Drives the Equity Mix in Executive Compensation of Non-U.S. Firms?*

Regression 4 of Table 7 simultaneously examines how the equity mix is affected by macro-determinants (the relative orientation of the nation's capital market and the strength of shareholder rights) and by micro-determinants (firm-specific characteristics that affect the agency costs of debt and equity). The size of the debt capital market is negatively related, while the strength of shareholder rights is positively related, to equity mix in executive compensation. This finding is robust to model specification, as the two macro-variables are highly significant in all four regressions.

After controlling for these macro-factors, our proxy for underinvestment and asset substitution (Altman's Z-score) is significant and positive indicating that as the agency costs of debt decrease, the use of equity-based compensation increases. Our proxy for event risk, however, continues to remain insignificant.

Regression 4 in Table 7 also presents evidence regarding the impact of the agency costs of equity on the design of compensation contracts. As noted in previous studies of U.S. firms, growth opportunities are an important determinant of compensation structure. Specifically, our data indicate that non-U.S. firms with higher growth opportunities use more equity in their compensation mix. The coefficient of the market-to-book ratio is positive and

significant. The other variables that measure agency costs of equity (firm size and the ratio of short-term debt to total debt) are unrelated to the equity mix for non-U.S. firms.

9. Robustness Tests

The following sections describe additional tests to confirm the robustness of our primary findings.

9.1. *Alternative Measure of Compensation Structure*

As a robustness test, we measure compensation structure with the ratio of the value of option compensation to total compensation, as we define in Section 5. The findings in Table 8 indicate that our results are robust. The size of the debt capital market is significantly negatively related, while the strength of the shareholder's rights index is significantly positively related, to the use of option-based compensation. Both variables continue to remain significant at the one percent level (after controlling for the agency costs of debt and equity). Similar to the results from Table 7, both the agency costs of debt and equity explain the cross-sectional variation in the use of equity in managerial compensation. Altman's Z-score, a measure of default risk, continues to be significant and positive. This indicates that as the agency costs of underinvestment and asset substitution decrease (risk of default decreases as the Z-score increases), more equity-based compensation is used. Moreover, as the agency costs of equity increase due to higher growth options, the use of equity in the compensation mix increases. Consistent with the findings in Table 7, event risk, firm size, and the extent of external monitoring are unimportant in explaining the relative use of equity-based compensation for non-U.S. firms.

9.2. *Effect of Other Control Variables on Compensation Structure*

In addition to the agency-based determinants of compensation structure, the contracting literature frequently includes other firm-level variables. Therefore, as a further robustness test, we include additional control variables. Specifically, we add controls for CEO age, CEO equity ownership, firm liquidity, and firm tax status. See Yermack (1995) and Bryan et al. (2000) for detailed discussion of these control variables.

We attempt to collect the control data from Compustat and from each firm's 20-F document (for CEO age and equity ownership). Unfortunately, extreme data availability problems greatly reduce our sample size. Data for the additional control variables are available for less than 10% of our sample. Nevertheless, the regression results (from the very small sample) provide some confirmation of our earlier findings. The signs of all coefficients are consistent with our previous results (although the significance levels are lower, perhaps because of the smaller sample size).

10. **Summary and Conclusions**

We investigate determinants of the structure of managerial compensation contracts for non-U.S. firms. Essentially, we focus on two fundamental questions. First, do institutional differences (such as variations in the strength of shareholder rights and orientation of the nation's capital market) explain the use of equity in the compensation mix? We think of these differences as macro-factors that may drive cross-country variation in the equity mix of executive compensation. Second, after controlling for these cross-country differences, do firm-specific, micro-factors (such as the firm-level characteristics that affect agency costs of debt and equity) also help explain the cross-sectional variation in the use of equity-based compensation?

Using data from 381 firms from 43 countries over 1996-2000, we find that both macro-factors and micro-factors are significant determinants of the cross-sectional variation in the structure of management compensation. First, the data indicate that macro-factors (i.e., institutional characteristics) related to the orientation of the capital market and the strength of shareholder rights in each country affect the relative use of equity-based compensation for non-U.S. firms. There is a greater use of equity-based compensation by firms in nations with institutional environments favoring equity ownership and providing strong protection of shareholder legal rights. Moreover, after controlling for these macro-factors, we identify that firm-level proxies for both the agency costs of debt and equity are significant in the regression models. Theory suggests that as the risk of default increases, the agency costs of underinvestment and asset substitution should increase. Our findings indicate that as these agency costs increase, the use of equity in the compensation mix decreases. Furthermore, firms with greater growth options should face more severe agency costs of equity (which should lead to greater use of equity in the compensation mix). The data support this expectation. Therefore, regarding the impact of the firm-level factors, our findings are consistent with the theoretical predictions of John and John (1993) and with the general empirical findings for U.S. firms. Our conclusions are unchanged when we use an alternative measure of compensation mix and when we include additional control variables.

Our paper contributes to the contracting literature in several respects. Specifically, our models reveal that the strength of shareholder rights and the orientation of a country's capital market (debt vs. equity) are significant factors that explain whether, and to what extent, firms in a particular country use equity-based compensation. We also provide broad, cross-sectional evidence that several of the same firm-level agency problems of debt and

equity that drive the design of U.S. management compensation contracts similarly affect the compensation schemes for executives of non-U.S. firms. That is, our empirical analysis suggests that the agency-cost explanations for the structure of management compensation are portable across countries.

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Table 1

Hypothesized Relations between Equity-Based Compensation and Potential Determinants

Hypothesis Tested	Variable	Expected Sign	Variable Description
<i>Macro-Determinants: Institutional Factors</i>			
Development of Capital Market	Total Debt/Total Capital (Debt-Cap)	-	Total Debt/(Total Debt + Equity Market Capitalization)
Legal Environment	Shareholder Rights Index (SRI)	+	Index of Minority Shareholder Rights (LaPorta et al., 1997) <i>Higher value = stronger protection of shareholder rights</i>
<i>Micro-Determinants: Agency Costs of Debt</i>			
Underinvestment & Asset Substitution	Altman's Z-score (Z)	+	Altman's Z-score is a weighted sum of five ratios [See Altman (1993)]
Event Risk	Free Cash Flow (FCF)	-	[Operating Income before Depreciation - Interest Expense - Income Tax - Dividends] / Market Value of Equity

Table 1 (continued)

Hypothesized Relations between Equity-Based Compensation and Potential Determinants

Hypothesis Tested	Variable	Expected Sign	Variable Description
<i>Micro-Determinants: Agency Costs of Equity</i>			
Frequency of External Monitoring			
Short-Term Debt/Total Debt	Short-Term Debt as % of Total Debt (STD)	-	Short-Term Debt/Total Debt
Observability of Management Effort			
Size of Firm	Total Assets (SIZE)	+	Natural Logarithm of Total Assets
Growth Opportunities	Market Value/Book Value (MVBV)	+	[Total Assets – Book Value of Equity + Market Value of Equity] / Total Assets

Table 2**Observations by Country and Year**

Table 2 presents the number of observations (ADR issuers) by country and by year. We identified the ADR issuers during 1996-2000 from Compustat and obtained the specific executive compensation data from the Securities and Exchange Commission's EDGAR database. We express the observations in firm-years.

Panel A: Observations by country

Country	Totals
Argentina	36
Australia	35
Austria	1
Belgium	1
Bermuda	13
Brazil	46
British Virgin Islands	1
Chile	52
China	37
Denmark	4
Dominican Republic	4
England	163
Finland	12
France	77
Germany	32
Greece	5
Hong Kong	14
Iceland	4
India	8
Indonesia	6
Ireland	35
Israel	36
Italy	35

Country	Totals
Japan	50
Luxembourg	10
Mexico	78
Netherlands	69
New Zealand	7
Norway	8
Pakistan	5
Peru	4
Philippines	5
Portugal	4
Russia	9
Singapore	3
South Africa	14
South Korea	17
Spain	15
Sweden	39
Switzerland	12
Taiwan	7
Turkey	1
Venezuela	8
	1,022

Panel B: Observations by year

Year	Totals
1996	103
1997	162
1998	212
1999	251
2000	294
	1,022

Table 3 (continued)**Observations for Each Country by Industry**

Country	Industry								Total
	Communi- cations	Financial	Mfg & Mining	Petro- leum	Retail	Trans- portation	Utility	Other	
Singapore			3						3
South Africa			14						14
South Korea	6		6				5		17
Spain	5		2	5			3		15
Sweden	4		25			10			39
Switzerland	3		9						12
Taiwan			7						7
Turkey	1								1
Venezuela	4		4						8
Totals	202	58	548	39	39	73	35	28	1,022

Table 4
Average Equity Mix as a Percent of Cash Compensation by Country

Table 4 presents the average equity mix for firms in each country of our sample. Equity Mix is the ratio of equity-based compensation to cash-based compensation. Number of observations is expressed in firm-years.

Country	Number of obs.	Equity Mix
Argentina	36	0.000
Australia	35	0.592
Austria	1	0.000
Belgium	1	0.000
Bermuda	13	0.122
Brazil	46	0.010
British Virgin Islands	1	0.194
Chile	52	0.000
China	37	0.000
Denmark	4	0.193
Dominican Republic	4	0.000
England	163	0.342
Finland	12	0.031
France	77	0.278
Germany	32	0.095
Greece	5	0.000
Hong Kong	14	0.016
Iceland	4	0.000
India	8	0.153
Indonesia	6	0.000
Ireland	35	0.430
Israel	36	0.367
Italy	35	0.114
Japan	50	0.044
Luxembourg	10	0.000
Mexico	78	0.002
Netherlands	69	0.370
New Zealand	7	0.480
Norway	8	0.000
Pakistan	5	0.000
Peru	4	0.000
Philippines	5	0.000
Portugal	4	0.000
Russia	9	0.000
Singapore	3	0.715
South Africa	14	1.044
South Korea	17	0.000
Spain	15	0.037
Sweden	39	0.269
Switzerland	12	0.056
Taiwan	7	0.000
Turkey	1	0.000
Venezuela	8	0.000
Total	1,022	

Table 5**Descriptive Statistics for the Full Sample**

Table 5 presents the mean values of Equity Mix and the explanatory variables used in the regressions (Tables 7 and 8). MIX is the ratio of equity-based compensation to cash-based compensation. Debt-Cap is the ratio of total debt outstanding in an economy to total capital (total debt and total equity market capitalization). The shareholder rights index (SRI) is from LaPorta et al. (1997). SRI is an index that measures the legal protection of shareholder rights. Higher values indicate greater protection. FCF (Free Cashflow) is the ratio of operating income before depreciation less the sum of income tax, interest, and dividends paid to the firm's market value. Altman's Z is a combination of five ratios based on Altman (1993). STD is the ratio of short-term debt to total debt. Short-term debt is debt due in one year, while total debt is the sum of short-term debt and long-term debt. MVBV is the book value of total assets less the book value of equity plus the market value of equity divided by the book value of total assets. SIZE is the natural logarithm of the firm's total assets.

Variable	Mean	Standard Deviation	First Quartile	Median	Third Quartile
MIX	0.193	0.667	0.000	0.000	0.000
Debt-Cap	0.525	0.141	0.428	0.497	0.614
SRI	2.550	1.275	2.000	3.000	4.000
FCF	0.036	0.084	0.014	0.043	0.070
Altman's Z	3.148	2.961	0.894	2.160	3.810
STD	0.246	0.213	0.087	0.201	0.357
MVBV	2.083	1.445	1.107	1.522	2.446
SIZE	7.546	2.284	6.144	7.581	9.172

Table 6
Average Values of Equity Mix as a Percent of Cash Compensation and Explanatory Variables
by Shareholder Rights Index (SRI) and Origin of Legal System

Table 6 presents the mean values of Equity Mix and the explanatory variables (arrayed according to the nation's SRI and its legal origin). The shareholder rights index (SRI) and the legal origin are from LaPorta et al. (1997). LaPorta et al. (1997) do not report SRI or legal origin for Iceland. Our four observations from Iceland are excluded from the table. SRI is an index that measures the legal protection of shareholder rights. Higher values indicate greater protection. MIX is the ratio of equity-based compensation to cash-based compensation. Debt-Cap is the ratio of total debt outstanding in an economy to total market capitalization (total debt plus total equity market capitalization). FCF (Free Cashflow) is the ratio of operating income before depreciation less the sum of income tax, interest, and dividends paid to the firm's market value. Altman's Z is a combination of five ratios based on Altman (1993). STD is the ratio of short-term debt to total debt. Short-term debt is debt due in one year, while total debt is the sum of short-term debt and long-term debt. MVBV is the book value of total assets less the book value of equity plus the market value of equity divided by the book value of total assets. SIZE is the natural logarithm of the firm's total assets. We express number of observations in firm-years.

Panel A: Descriptive Statistics by Shareholder Rights Index (SRI)								
SRI	Nobs	MIX	Debt-Cap	FCF	Z	STD	MVBV	SIZE
0	114	0.036	0.515	0.052	3.033	0.272	1.812	7.390
1	57	0.065	0.610	0.043	3.762	0.281	2.183	7.160
2	304	0.196	0.548	0.045	3.646	0.260	2.068	8.317
3	241	0.140	0.569	0.048	0.934	0.251	1.918	7.531
4	302	0.319	0.455	0.011	4.766	0.218	2.304	6.912

Panel B: Descriptive Statistics by Origin of Legal System								
Legal Origin	Nobs	MIX	Debt-Cap	FCF	Z	STD	MVBV	SIZE
English	334	0.384	0.473	0.009	4.101	0.210	2.407	6.754
German	119	0.050	0.650	0.052	3.842	0.285	2.020	8.679
French	456	0.114	0.528	0.052	3.535	0.262	1.909	7.840
Scand.	63	0.185	0.379	0.021	4.703	0.244	2.303	7.386
Socialist	46	0.000	0.760	0.076	1.739	0.294	1.160	7.663

Table 7**Regression Results Explaining Non-U.S. Firms' Equity Mix as a Percent of Cash Compensation**

Table 7 presents the regression results from Tobit models. The dependent variable is the ratio of option-based compensation to cash compensation (MIX). Regression 1 examines the relation between country-specific, macro-factors (i.e., institutional and legal characteristics) and the equity mix in management compensation. Regression 2 includes firm-specific factors (that reflect the agency costs of debt) in addition to the macro-determinants. Regression 3 contains the macro-determinants and proxies to measure the agency costs of equity. In Regression 4, we include the macro-determinants and all of the micro-determinants (representing both the agency costs of debt and equity). See Table 5 for definitions of explanatory variables. We also include industry and year controls but do not report coefficient values. Standard errors are in parentheses.

Independent Variables	Regression 1	Regression 2	Regression 3	Regression 4
Intercept	-2.762*** (0.703)	-3.376*** (0.845)	-3.882*** (0.963)	-3.842*** (0.989)
Debt-Cap	-2.343*** (0.787)	-2.907*** (0.874)	-2.560 *** (0.863)	-2.556*** (0.866)
Shareholder Rights Index (SRI)	0.400*** (0.085)	0.445*** (0.096)	0.442 *** (0.092)	0.461*** (0.095)
Free Cash Flow (FCF)		-1.306 (1.180)		-1.040 (1.272)
Altman's Z		0.039** (0.012)		0.036** (0.015)
Short-Term Debt/Total Debt (STD)			-0.714 (0.508)	-0.789 (0.510)
Market-to-Book Ratio (MVBV)			0.263 *** (0.068)	0.171** (0.079)
Firm Size			0.014 (0.052)	0.011 (0.056)
Number of Censored Observations	808	698	703	688
Total Number of Observations	989	849	860	838

*** denotes significance at the 1 percent level

** denotes significance at the 5 percent level

Table 8**Regression Results Explaining Non-U.S. Firms' Equity Mix as a Percent of Total Compensation**

Table 8 presents regression results from Tobit models. The dependent variable is the ratio of option-based compensation to total compensation (PCT), where total compensation is the sum of cash compensation, option compensation, restricted stock and long-term incentive compensation. Regression 1 examines the relation between country-specific, macro-factors (i.e., institutional and legal characteristics) and the equity mix in management compensation. Regression 2 includes firm-specific factors (that reflect the agency costs of debt) in addition to the macro-determinants. Regression 3 contains the macro-determinants and proxies to measure the agency costs of equity. In Regression 4, we include the macro-determinants and all of the micro-determinants (representing both the agency costs of debt and equity). See Table 5 for definitions of explanatory variables. We also include industry and year controls but do not report coefficient values. Standard errors are in parentheses.

Independent Variables	Regression 1	Regression 2	Regression 3	Regression 4
Intercept	-0.811*** (0.214)	-0.963*** (0.248)	.1.160*** (0.284)	-1.127*** (0.289)
Debt-Cap	-0.718*** (0.240)	-0.872*** (0.258)	-0.765*** (.254)	-0.760*** (0.253)
Shareholder Rights Index (SRI)	0.114*** (0.026)	0.127*** (0.028)	0.124*** (0.027)	0.129*** (0.028)
Free Cash Flow (FCF)		-0.326 (0.352)		-0.230 (0.377)
Altman's Z		0.013** (0.004)		0.011*** (0.004)
Short-Term Debt/Total Debt (STD)			-0.194 (0.150)	-0.213 (0.149)
Market-to-Book Ratio (MVBV)			0.085*** (0.020)	0.056** (0.023)
Firm Size			0.008 (0.015)	0.005 (0.016)
Number of Censored Observations	808	698	703	688
Total Number of Observations	989	849	860	838

*** denotes significance at the 1 percent level

** denotes significance at the 5 percent level