

# The Pay Divide: (Why) Are U.S. Top Executives Paid More?

Finance Working Paper N°. 255/2009

August 2009

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ECGI Working Paper Series in Finance

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We thank Wayne Ferson, Vidhan Goyal, Geoffrey Tate, Randall Thomas; seminar participants at Cal State Fullerton, CEMFI, Michigan State University, University of British Columbia, Universidad Carlos III, University of Southern California; and participants at the 2009 UCLA-USC finance day and 2009 IDC Caesarea Conference for helpful comments. We thank Breno Schmidt, Paulo Falcão and Pedro Henriques for outstanding research assistance. This research is supported by a research grant from the Fundação para a Ciência e Tecnologia (FCT/POCI 2010).

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## Abstract

We use new data from recently expanded disclosure rules to analyze the level and structure of compensation for CEOs in 27 countries. We show that U.S. CEOs earn more than their foreign counterparts. The U.S. “pay premium” is explained by differences in firm, industry, and governance characteristics, and the intensive use of incentive compensation in U.S. firms, which in turn seems related to strong legal enforcement and security-market regulation. In addition, we document that CEO pay worldwide is converging to U.S. levels as the premium was sharply reduced from 2000 to 2006.

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Keywords: Executive pay, International pay differences, Corporate governance

JEL Classifications: G32, G34, G38

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While the United States' status as "the" preeminent economic superpower is increasingly challenged by the European Union and emerging Asian economies, there is one sector where U.S. dominance seems fairly secure: top executive compensation. U.S. executives are paid significantly more than their foreign counterparts, and receive a greater share of their compensation in the form of stock options, restricted shares and performance-based bonuses (Abowd and Bognanno (1995), Abowd and Kaplan (1999), Murphy (1999), Conyon and Murphy (2000), Thomas (2003, 2008), Bryan, Nash, and Patel (2006), and Muslu (2008)).

Attempts to document empirically the precise magnitude and determinants of the alleged U.S. "pay premium" have been plagued by international differences in rules regulating the disclosure of executive compensation. While the U.S. has required detailed disclosures on executive compensation since the 1930s (with significantly expanded disclosure rules introduced in 1978, 1993, and 2006), the majority of other countries have historically required reporting (at most) the aggregate cash compensation for the top-management team, with no individual data and little information on the prevalence of equity or option grants. Cross-country studies of the U.S. pay premium have largely been based on aggregate cash pay, small-sample comparisons where individual data are available, or countrywide estimates provided by consulting firms.<sup>1</sup>

The disclosure situation has improved markedly in recent years. Canada, for example, adopted U.S.-style disclosure rules in October 1993, and disclosure rules in the United Kingdom (U.K.) were expanded to include stock option and equity grants in 1997.<sup>2</sup> Regulations mandating disclosure of executive pay in Australia were introduced in 2004.<sup>3</sup> And, in October 2004 the European Union (EU) Commission recommended that all listed companies in the EU report details on individual compensation packages, including equity and option grants. While the Commission recommendations are not binding, the Commission reported that most EU countries

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<sup>1</sup> Studies have analyzed aggregate executive pay in Japan (Kaplan (1994a)), China (Kato and Long (2005)), Portugal (Fernandes (2008)), and Korea (Kato, Kim, and Lee (2003)) and individual data in the U.K. (Conyon and Murphy (2000)) and Canada (Zhou (2000)). Abowd and Bognanno (1995) use Towers Perrin's estimates on the competitive level and structure of pay for a hypothetical executive in a mid-size manufacturing firm in different countries.

<sup>2</sup> Canadian rules disclosure requirements were initially promulgated by the Ontario Securities Commission (see Zhou, 2000), but now promulgated by the Canadian Securities Administrators and cover all listed Canadian firms. The 1997 expansion of disclosure requirements in the U.K. followed the Greenbury and Hampel reports; see Conyon and Murphy (2000).

<sup>3</sup> Australian disclosure is governed primarily by AASB 1024 (June 2004), but ASX Listing Rule 4.1 (May 2003) and Section 300.A of the Corporations Act (July 2004) also impact pay disclosure; see Finch (2006).

adopted pay disclosure rules by 2007.<sup>4</sup> Similar disclosure requirements were adopted in a variety of other countries in Asia and Africa.

In this paper, we use data from the recently expanded disclosure rules to conduct a comprehensive international comparative analysis of the 2006 compensation for chief executive officers (CEOs) in 4,164 firms in 27 countries.<sup>5</sup> These 4,164 firms represent more than 80% of the market capitalization of all firms in these 27 countries. Our initial focus is analyzing whether U.S. CEOs are, indeed, paid more than similar executives in similar firms situated elsewhere in the world. We first document that U.S. CEOs receive total compensation (including grant-date values of options and restricted shares) that is, on average, 170% higher than received by their foreign counterparts, and 118% higher after controlling for firm size and industry. The U.S. pay premium is reduced to 43% after also controlling for firm performance, stock-price volatility, institutional and insider ownership, board structure and corporate governance, and reduced to 40% after also controlling for CEO biographic characteristics. Thus, there still is a significant U.S. pay premium after we control for a wide spectrum of firm, industry, governance, and CEO biographic characteristics.

We find that a significant part of the observed U.S. pay premium reflects differences in the structure of compensation. The average CEO in U.S. receives 42% of his pay in the form of options or stock, more than the double of the average in other countries (20%). Once we control for the ratio of incentive compensation to total compensation, we find that the U.S. pay premium falls to a statistically insignificant 12%. Overall, we find that the U.S. pay premium can be explained by U.S. firms being different, in particular in their higher use of incentive-based compensation.

Our finding that the observed U.S. pay premium is in part “explained” by the fact that U.S. CEOs have different pay structures raises the question: Why do U.S. executives receive more incentive compensation (and particularly more equity-based compensation)? We cannot identify

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<sup>4</sup> See EU Commission, 2007, “Report on the application by Member States of the EU of the Commission Recommendation on directors’ remuneration,” Commission Staff Working Document 13 July 2007. Although not in the EU, Norway and Switzerland also adopted EU-style disclosure rules. In the case of Switzerland, individual compensation is reported only for the “highest-paid” executive who might not be the CEO.

<sup>5</sup> We use the term “CEO” to refer to the highest-ranking executive in each firm, regardless of whether the firm uses the “chief executive officer” or some other designation.

firm-level agency-theoretic determinants of the use of incentive compensation, suggesting that the differences across countries are driven by country factors (rather than by firm or individual CEO characteristics). However, we find that the use of equity-based incentives is highest in common-law countries, countries with high levels of law enforcement (including enforcement of insider-trading rules) and strong security market regulations.

Finally, we present evidence that the U.S. pay premium is declining amid a broad convergence in international pay practices. In particular, we show that the U.S. premium (after controlling for company, industry, and CEO characteristics, but before controlling for the structure of pay) was reduced from 187% to 43% between 2000 and 2006.

Our cross-country study documents a variety of new patterns on CEO pay practices around the world. We find that the positive relationship between pay and firm size documented in the U.S. is pervasive across countries, but that the elasticity of CEO pay to firm size is higher in the U.S. than in other countries. We find also that CEO pay is negatively related to insider ownership but positively related to institutional ownership. In addition, we show that internationalization increases CEO pay: compensation is higher when foreign sales (as a fraction of total sales) are higher, and when these foreign firms are cross-listed on U.S. exchanges or are part of the MSCI World index.

The remainder of the paper is organized as follows. Section I describes our sample, data sources and definitions of variables. Section II presents our analysis of whether the observed U.S. pay premium is explained by firm and CEO-specific characteristics. Section III analyzes the use of incentive pay. Section IV examines the evolution of the U.S. pay premium in 2000-2006. Section V presents robustness checks. Section VI explores country-level determinants that may explain both the observed differences in pay levels and pay structures after controlling for firm, industry, and CEO characteristics. Section VII concludes.

## **I. Data**

### *A. CEO Compensation*

Our primary data source for compensation for U.S. CEOs is Compustat's ExecComp database, while our primary source for CEOs of firms based outside the U.S. is BoardEx (compiled by the

U.K.-based firm Management Diagnostics Limited). BoardEx is the leading database on board composition of publicly listed firms, and includes detailed biographic information on individual executives and board members in nearly 50 countries (including countries that do not have mandatory disclosure requirements for executive compensation).<sup>6</sup> We focus on the individual identified by BoardEx as the highest-ranking executive in each firm, and use the term “CEO” to describe this executive, regardless of whether the firm uses “chief executive officer” or some other designation (such as “managing director” or “executive chairman”). In addition to providing biographic information, BoardEx also includes detailed compensation data for top executives – including salaries, other pay, bonuses, payouts under long-term plans, option grants, and share grants.

To supplement the BoardEx data, we manually collected pay data from company filings for the largest firms in all countries with pay-disclosure requirements, using Annual Reports, Proxy Statements (or their equivalent, such as “Management Information Circulars” in Canada), and SEC Form 20F for foreign companies that are cross-listed in the U.S.. Specifically, we built a sample of firms in each country to ensure that we could cover at least the 30 largest publicly listed firms in that country (ranked by market capitalization) or a cumulative 80% of that country’s stock market capitalization for the 2006 fiscal year. For Canada and Australia (where BoardEx has complete coverage on board composition and biographical information but scant pay data), we manually collect compensation data for approximately 200 firms in each country. For our manually collected data, we value stock grants using the grant-date market value and option grants using the grant-date Black-Scholes value.<sup>7</sup>

For U.S. firms, we use ExecuComp compensation data rather than data from BoardEx to maintain comparability with the existing literature on U.S. CEO pay. However, two aspects of BoardEx’s compensation calculation deserve special mention, and bias our results *against*

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<sup>6</sup> The BoardEx data are used in Cohen, Frazzini, and Malloy (2008) to study links between CEOs and mutual fund managers in the U.S. and in Ferreira and Matos (2008b) to study board links between banks and firms worldwide.

<sup>7</sup> In valuing options, we use the company-reported fair value if available, and otherwise follow ExecuComp’s pre-2006 valuation methodology as close as possible. In particular, options are valued using the Black-Scholes formula with the following inputs: (1) standard deviation of 60-months stock returns (or as many months as possible) for the volatility; (2) average three-year dividend yield; (3) risk-free rate on government securities issued in each country with a maturity approximating 70% of the option maturity; (4) exercise price equals market price; (5) expiration date is assumed to be 70% of the full maturity (as a partial adjustment for early exercise).

identifying a U.S. pay premium. First, instead of providing grant-date values for stock option grants (as in ExecuComp and our manually collected data), BoardEx computes the value of options granted using the closing stock price on the last trading day of the fiscal year rather than the stock price on the grant date. Since 2006 was a generally positive year for the stock markets in the countries included in our study, valuing options using fiscal year-end stock prices (a la BoardEx) produces a slightly higher value than using grant-date prices. Second, for performance share plans (in which the number of restricted shares awarded is based on realized performance), BoardEx computes the value based on the maximum (rather than the target or minimum) shares that can be awarded under the plan, again multiplied by the end-of-fiscal-year closing stock price. The bias here is small – since relatively few U.S. companies offered performance-share plans in 2006 – but nonetheless biases our results against finding a U.S. premium. However, in our robustness tests in Section V below, we show that measuring pay for U.S. CEOs using BoardEx rather than ExecuComp does not alter the main findings of our study.

We exclude firms without complete compensation data and firms from 22 countries with fewer than five firms with compensation data.<sup>8</sup> This leaves us with 4,527 firms in 27 countries but, of these, only 4,164 firms can be matched to Datastream/Worldscope and have reported sales (which we use for our primary size adjustment). These 4,164 firms represent 82% of the market capitalization of all firms in these 27 countries covered by Datastream, indicating that we are able to grasp the lion's share of firms in the countries included in our study.<sup>9</sup> In our regression analyses, we eliminate 366 CEOs serving in their first year to avoid data anomalies reflecting compensation for multiple positions (for CEOs promoted internally) and partial-year compensation and signing bonuses or grants (for CEOs hired from outside). Therefore, our analyses below are based on a final sample of 3,798 CEOs from 27 countries.

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<sup>8</sup> The 21 countries excluded due to too few observations are Argentina, Brazil, Columbia, Chile, Czech Republic, Egypt, Greece, Hungary, Indonesia, Japan, South Korea, Mexico, Peru, Philippines, Pakistan, Portugal, Russian Federation, South Korea, Sri Lanka, Taiwan, Turkey, and Venezuela.

<sup>9</sup> The firms in our sample had a total market capitalization of \$27 trillion and the combined market capitalization of these countries was \$37 trillion in December 2006. The world market capitalization was \$46 trillion in December 2006, so firms in our sample still represent nearly of overall world market capitalization.



Table I summarizes by geographic region our data sources and provides sample averages for compensation, firm and CEO variables.<sup>10</sup> Table A.1 in the Appendix provides country-by-country statistics, and Appendix B provides detailed definitions for all variables used in our analyses. As shown in Panel A of Table I, most of our data are from ExecuComp (U.S) or BoardEx (non-U.S.), but we have been able to complement these sources with 732 firms for which we have collected compensation information manually from company filings as described above.

Panel B of Table I summarizes CEO pay data, showing (for example) that average 2006 compensation for U.S. CEOs is nearly \$5.5 million, or about 170% higher than the \$2.0 million average compensation for Non-U.S. CEOs. We measure total compensation as the sum of salaries, other compensation, bonuses, performance-share awards, and the value of equity and options granted during the year, measured at calendar year-end for BoardEx firms and at grant date for U.S. firms and our 669 manually collected firms.<sup>11</sup> All monetary values in Table I (and throughout the paper) are converted into U.S. dollars using the relevant exchange rate as of the close of the fiscal year.

Panel B of Table I also shows that U.S. CEOs receive a greater fraction of their pay in the form of equity and non-equity incentives than do their foreign counterparts. Incentive pay includes both equity-based incentive plan awards (stock and options awards) and non-equity incentive pay (bonus and other cash payments awarded if company meets a specified accounting or share price target). Non-incentive pay represents fixed values paid independently of the firm's performance, and includes the annual salary plus other compensation (e.g. benefits).

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<sup>10</sup> Geographic regions are defined as follows: North America (U.S., Canada), U.K., Euro Zone (France, Germany, Netherlands, Italy, Ireland, Belgium, Spain, Finland, Austria), Nordic (Sweden, Norway, Denmark), Oceania (Australia, New Zealand), Asia (Hong Kong, Singapore, Thailand, China, India, Malaysia) and Other (South Africa, Switzerland, Poland, Israel).

<sup>11</sup> Our measure of total pay for US firms is similar to TDC1 in ExecuComp, which is frequently used in other studies. It is important to note also that we take into account that while the majority of firms have reported under the new FAS123(R) reporting requirements, there are still some firms reporting under the old rules. This is flagged in ExecuComp by OLD\_DATAFMT\_FLAG="TRUE". For these firms the data definitions are: salary = salary; other pay = othann + allothtot; equity incentives pay = rstkgmnt + shrtargxprcc + option\_awards\_blk\_value; options = option\_awards\_blk\_value; non-equity incentive pay = bonus + valtarget.

## *B. Firm Characteristics*

Panel C of Table I summarizes the firm characteristics used in our analyses; country-by-country statistics are provided in Appendix Table A.2. We draw stock market and accounting information for the firms in our sample from Datastream/Worldscope. We match the firms in our sample to Datastream using CUSIP codes (for U.S. firms) and ISIN codes (for non-U.S. firms), and finally using company names. Our primary regressions include a variety of firm characteristics frequently used in the CEO pay literature, including firm size (sales), performance (return on assets, stock return), valuation (Tobin Q), risk (standard deviation of returns) and liquidity (turnover). We follow the literature on defining these variables (e.g., Core, Holthausen, and Larcker (1999)) and use values for the year prior to the compensation data (i.e., 2005). To avoid the influence of outliers, we “winsorize” financial ratios at the bottom and top 1% levels.

Given the international dimension of our study, we look at additional determinants of executive pay not commonly used in single-country studies. In particular, we investigate the role of international visibility measures such as the extent of firms’ operations abroad (ratio of foreign sales to total sales) and whether the firms’ shares are part of the MSCI All-Country world index (widely used as a benchmark by international investors). For non-U.S. firms, we explore the effect of cross-listing on a U.S. stock exchange, since U.S. cross-listings have been shown to have unique governance benefits and a positive effect on firm valuation (Doidge, Karolyi, and Stulz (2004, 2008)), and since we suspect that foreign firms cross-listing in the U.S. are more likely to benchmark compensation practices to those in U.S. firms.<sup>12</sup>

Another potential source of considerable variation across firms around the world is their ownership structure and corporate governance. To examine these effects, we obtain the percentage of shares held by firms’ insiders from Datastream/Worldscope and shares held by institutional investors from FactSet/Lionshares. Insider ownership is the percentage of shares in the hands of shareholders who hold 5% or more of the outstanding shares, which encompasses officers, directors (and their immediate families), trusts, another corporation, pension plans and shares held by other individuals (Dahlquist, Pinkowitz, Stulz, and Williamson (2003)).

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<sup>12</sup> Data on non-U.S. firms listed on U.S. exchanges (Level 2 and 3 ADRs) are obtained from the major depository institutions: Citibank, Bank of New York Mellon, JP Morgan, and Deutsche Bank. We also add cases of non-U.S. firms with ordinary listings on U.S. exchanges (as is the case with several Canadian and Israeli firms).

Unfortunately, we cannot isolate the stock ownership of just the CEO or top executives. The institutional investors' data have been previously used in Matos and Ferreira (2008a) to study the role of institutions (mutual funds, pension funds, bank trusts) in corporations around the world. Panel C of Table I shows that insider ownership averages 36% for the non-U.S. firms in our sample and (compared to only 16% for U.S. firms), while institutional ownership represents only 24% for the non-U.S. firms (compared to 85% for U.S. firms). Thus, U.S. corporations display high institutional ownership with few insider block owners, in stark contrast to corporations of other countries, where there are typically dominant shareholders (in line with La Porta, Lopez-de-Silanes, and Shleifer (1999)).

We also examine how CEO pay varies with characteristics of the board of directors. Decisions over the level and composition of executive compensation are the ultimate responsibility of the firms' board of directors. The role of strong boards on corporate activities and corporate value has been highlighted in previous studies (Denis and McConnell (2002) and Dahya, Dimitrov, and McConnell (2008)). For each firm in our sample, we use BoardEx for the board size (number of executive and supervisor directors), board independence (fraction of independent directors over board size), the diversity of nationalities among board directors (nationality mix), and the average current and past board seats in other quoted corporations held by current board members. In addition, we identify if the CEO is simultaneously the chairperson of the board. As shown in Panel C of Table I, there is considerable variation in board composition across the world.

### *C. CEO Characteristics*

BoardEx provides employment histories and personal attributes of the CEOs which may affect the level and composition of compensation. For each top executive, this data source gives resume-like information including: biographical data (name, age, nationality); current board positions; past employment and board positions (with starting and ending dates); educational background (including degrees earned); and a variety of other information. To the best of our knowledge, this is the first study to provide such a comprehensive picture of a large international population of top executives. Our methodology for constructing the individual characteristics

used in our analysis is illustrated in Appendix C with the example of James Dimon, President/CEO at JP Morgan Chase & Co in December 2006.

In addition, we proxy for a CEO's human capital using his educational background. We summarize a CEO's education into three variables: "CEO college dummy" that equals one if the CEO has a bachelor's degree or higher, and zero otherwise; "CEO graduate dummy" that equals one if the CEO has a MBA, Masters, JD or PhD degree; and "CEO U.S. MBA dummy" that equals one if the CEO has a MBA degree from a U.S. university. The U.S. MBA dummy is motivated by the rise in business education among CEOs in recent decades, which may explain the trend in CEO pay (Frydman (2007), Murphy and Zabojnik (2008)).

Panel D of Table I provides sample averages on the biography, professional experience, and educational background of U.S. CEOs versus their foreign peers. Table A.3 provides average CEO characteristics per country. U.S. top executives are older and have spent more time in their current position and in the same industry than have their counterparts in foreign firms.<sup>13</sup> U.S. CEOs are less likely to have been hired from outside the firm: 37% of U.S. CEOs are appointed from outside compared to 49% elsewhere. U.S. CEOs also have higher-level education degrees and only fall short of their counterparts with respect to their foreign experience (i.e., whether the CEOs worked outside of their home country).

## **II. The U.S. Pay Premium**

We start our analysis of the U.S. pay premium by comparing raw compensation values for CEOs of U.S. firms with their counterparts in non-U.S. companies. Panel A of Table I shows that the average total compensation for U.S. CEOs in our sample is \$5.5 million while for non-U.S. CEOs in our sample it is only \$2 million. Thus, in our sample and without controlling for any firm or industry characteristics, U.S. top executives are paid on average 170% more than non-U.S. top executives.

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<sup>13</sup> We use 12 industry portfolios of Fama-French (Consumer Non-Durables, Consumer Durables, Manufacturing, Energy, Chemicals, Business Equipment, Telecom, Utilities, Shops, Healthcare, Money & Finance, Other). The mapping between 4-digit SIC codes and the 12 industries are available in Ken French's website: [http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data\\_Library/det\\_12\\_ind\\_port.html](http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_12_ind_port.html).

Panel A of Table I also presents sample means of pay variables by region. North America (U.S. and Canada) have the highest CEO total pay relative to companies in the rest of the world. In addition, the use of incentive-based pay varies substantially across regions. There is a much greater use of equity-based pay in North America. The average CEO in North America receives 40.5% of his pay in the form of stock and option awards, nearly double the average in the U.K. (24.9%) and more than triple the 13.7% average in the “Euro Zone” (all European Union countries with the exception of the U.K. and “Nordic” countries).

The U.S. CEO pay premium implied by Table I ignores differences in firm size and industry long-documented to be important determinants of the level of executive compensation (Baker, Jensen and Murphy (1998), Murphy (1999), Hall and Murphy (2003), Gabaix and Landier (2006)). Indeed, Panel B of Table I shows that the average U.S. firm has higher sale revenues than companies in other countries, which suggests that the 170% U.S. pay premium is overstated. In order to analyze cross-country differences in CEO pay after adjusting for size and industry, we regress the logarithm of Total Compensation on the logarithm of Sales (in U.S. dollars), industry dummies and 27 country dummies. We then take a hypothetical firm with \$1 billion sales (approximately equal to the median sales in our sample) in an “average” industry (formed by multiplying each estimated industry dummy variable by the proportion of our sample firms in each industry) and estimate the average CEO total pay for each country using the estimated coefficients on the 27 country dummy variables. This estimate for a hypothetical mid-size firm is similar in spirit to the Towers Perrin’s estimates used in Abowd and Bognanno (1995) and Abowd and Kaplan (1999) as estimates for CEO pay in different countries.

Figure 1 shows the size and industry-adjusted total pay per country. Countries are sorted in descending order in terms of total estimated pay. U.S. executives come at the top with a CEO of a U.S. company with \$1 billion in sales predicted to earn total compensation of \$2.7 million annually in 2006. This is substantially more than CEOs of similar firms situated in other countries. The highest-paid countries are dominated by Anglo-Saxon nations such as Ireland (#4 at \$1.9 million), the U.K. and Canada (#5 and #6 at \$1.8 million) and Australia (#7 at \$1.7 million). Switzerland (#3 at \$1.9 million) is the first continental European country in the top ranking of countries by total pay.

### *A. Can Firm Characteristics Explain the U.S. CEO Pay Premium?*

Table II presents our primary test on the existence of a U.S. CEO pay premium relative to the rest of the world. Compensation levels are expected to increase with firm size and to vary with other firm attributes. U.S. CEOs control more resources but also the governance and ownership structure of U.S. corporations may imply that CEOs have greater authority than non-U.S. CEOs (Thomas (2002)). Therefore, we need to analyze total compensation levels controlling for firm characteristics. To this end, we estimate the following cross-sectional regression:

$$\begin{aligned} \text{Log (Total Compensation}_i) = & \alpha + \beta_1 (\text{U.S. Dummy}) + \beta_2 (\text{Firm Characteristics}_i) \\ & + \text{Industry dummies} + \varepsilon_i \end{aligned} \quad (1)$$

Our main variable of interest is “U.S. Dummy” which evaluates the pay-level differential of U.S.-based top executives over those from other countries. The OLS regression includes fixed effects for 12 Fama-French industries and standard errors are clustered at the country level to take into account that residuals may not be independent within a country. Table II reports the results of this regression for all firms in our sample (columns (1)-(5)) and separately for U.S. and non-U.S. firms (columns (6) and (7)). The purpose of the last two columns is to analyze if there are different drivers of pay for U.S. and for non-U.S. firms.

Column (1) of Table II reports the results from estimating equation (1) controlling only for firm size and industry. This is similar to what we have used to estimate size and industry-adjusted pay in Figure 1 but now using just one country dummy for the U.S.. The  $R^2$  of 0.44 indicates that almost half of the variation in compensation across CEOs in the 27 countries is explained by size, industry, and whether or not the firm is located in the U.S.. The coefficient on the U.S. dummy of 0.7801 implies that predicted CEO pay is 118% ( $= e^{0.7801} - 1$ ) higher in the U.S. than in other countries after controlling for size and industry.

In column (2) of Table II, we introduce other commonly used firm-level factors affecting executive pay and find that pay levels are positively associated with growth opportunities (Tobin Q), and negatively to risk (volatility of stock returns). The relation between firm performance and total pay is mixed depending if we consider return on assets (negative) or stock returns (positive) to measure performance. The U.S. dummy coefficient drops from 0.7801 in column

(1) to 0.6407 in column (2) once we control for these firm characteristics, but it is still highly significant and indicates a U.S. pay premium of 90%.

Given that this is an international study, we want to control for the market in which the firm operates. Large multinational firms may hire their top executives from a world managerial labor market. Furthermore, firms that operate or finance their activities internationally may use peer groups that encompass other international companies when they set their CEO pay and potentially adopt also more “U.S.-style” pay packages. In column (3) of Table II we find that total pay is indeed correlated with the percentage of foreign sales. Besides the product market, we measure if the firm has access to international capital markets, as proxied by being a member of the MSCI World index (MSCI dummy), as these firms have a broader investor clientele. We find that the MSCI dummy coefficient is also positive and significant, which is consistent with the view that CEO pay is positively related with the extent of a firm’s internationalization. Interestingly, internationalization variables widen the U.S. pay premium as non-U.S. firms are “more international” than U.S. firms.

Another determinant of pay is the corporate governance arrangements in the firm (e.g., Core, Holthausen, and Larcker (1999)). Column (4) of Table II shows that CEO pay levels are related to the ownership structure. We find that institutional ownership is positively associated to CEO total pay. In addition, we find that CEOs are paid less if there are large insider shareholders in the firm. Overall, the result in Table II may reflect the actions of controlling shareholders to monitor and limit high levels of CEO pay, or alternatively may reflect that founding CEOs who own large amounts of stock set lower pay and reduced incentive compensation. Accounting for ownership structure helps reduce the U.S. pay gap considerably to 0.4403 (i.e., a 55% premium).

Another dimension of governance is the composition of the firm’s board of directors. In column (5) of Table II, we find that larger boards tend to be associated with higher CEO pay, consistent with the idea that larger boards are poorer monitors (Yermack (1996)). Additionally, the results in Table II shows that boards composed of directors who have had many board seats in the past and that have more diverse nationality backgrounds are associated with higher CEO pay. These findings are consistent with “busy” directors and “international benchmarking” leading to higher CEO pay.

We conclude that board composition and ownership structure help to explain why U.S. executives are paid more than their counterparts. Having controlled for several firm-level aspects, the U.S. dummy in column (5) of Table II falls to 0.3569 but is still statistically significant at the 5% level and represents a 43% premium of U.S. CEOs relative to non-U.S. CEOs. The R-squared of the regressions increases from 44% in column (1) to 57% in column (5). Thus, firm characteristics other than firm size go some way in explaining total pay and the U.S. pay premium, but do not completely explain them.

In Panel A of Figure 2, we estimate, for each country, the pay predicted to be earned by a CEO of our hypothetical firm with \$1 billion sales and average firm characteristics in our sample. This is similar to Figure 1 but we now control for other firm characteristics besides size and industry. We adopt the specification in column (5) of Table II with the “U.S. dummy” replaced by a set of 27 country dummies. We then use estimated coefficients for size and other firm controls (measured at sample means), as well as country dummies, to estimate average Log(Total Compensation) by country. To allow a comparison with the size-adjusted results in Figure 1 we keep the same ordering of countries. U.S. executives still come out as the best paid but the pay premium is significantly reduced.<sup>14</sup>

To better understand differences in pay setting for U.S. top executives versus their counterparts, we present separate regressions for U.S. and non-U.S. firms in columns (6) and (7) of Table II, respectively. We observe that the elasticity of CEO pay to firm size is higher in the U.S., and while some characteristics act similarly (MSCI dummy, institutional ownership, board size, board connectedness), others are correlated with pay only outside the U.S. (Tobin Q, insider ownership, board nationality mix). One important issue where the U.S. differs is the relation between CEO pay and the case where CEOs hold also the position of chairman of the board. Columns (6) and (7) show that “CEO-Chairman dummy” impacts compensation positively in the U.S. but negatively in foreign countries. Other differences between the U.S. and other countries is that CEO pay is negatively related to leverage in the U.S., but not outside of the U.S..

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<sup>14</sup> Several countries are missing in Figure 2 for lack of data on all the firm-level variables needed to estimate regression (5) of Table II.



One other issue that we explore in column (7) of Table II is whether CEOs from non-U.S. firms that are cross-listed on U.S. stock exchanges get higher pay. Interestingly, there is strong evidence of a U.S. cross-listing pay premium among non-U.S. firms. The effect is economically significant with a premium of 0.1923, which corresponds to 21% additional pay.<sup>15</sup> In Section III below, we find that CEOs of foreign firms cross-listed in the U.S. receive more of their pay in the form of equity or stock options than CEOs of counterpart firms not cross-listed. We speculate that firms cross-listing in the U.S. are more likely to benchmark compensation practices to those in U.S. firms. Our findings suggest that previous international pay comparisons based only on 20F filings from foreign companies cross-listing in the U.S. (e.g., Bryan, Nash, and Patel (2006)) significantly under-estimate the U.S. pay premium.

#### *B. Can CEO Characteristics Explain the U.S. CEO Pay Premium?*

U.S. CEOs are in charge of larger corporations with different characteristics, but may also have a different job market or outside opportunities. To assess whether any special attributes of U.S. executives may explain the higher pay levels they earn, we control for CEO biographic characteristics. For example, U.S. manager skills may be more transferable and less firm specific than skills of non-U.S. managers. Such general management skills can be particularly valuable in the recent context of technological and regulatory change (Rajan and Zingales (2001)). Broader skill sets may command higher pay in the marketplace (Murphy and Zabojnik (2004, 2008)). We examine factors like education, industry experience, and career paths. If pay differentials are driven by market forces, then characteristics that make U.S. CEOs more valuable may carry a pay premium. To this end, we add CEO characteristics to regression equation (1):

$$\begin{aligned} \text{Log (Total Compensation}_i) = & \alpha + \beta_1 (\text{U.S. Dummy}) + \beta_2 (\text{Firm Characteristics}_i) \\ & + \beta_3 (\text{CEO Characteristics}_i) + \text{Industry dummies} + \varepsilon_i \quad (2) \end{aligned}$$

In Table III we report results for the analysis of the U.S. pay premium including CEO characteristics as explanatory variables. Regressions include the same firm characteristics used in column (5) of Table II. Coefficients of firm characteristics are not shown to conserve space.

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<sup>15</sup> Omitting the “U.S. cross-listing dummy” from the regression does not change significantly the coefficients on other firm variables

Column (1) of Table III shows that age, gender, and nationality of CEOs are not significantly related to pay levels. Column (2) of Table III introduces professional experience. We find that CEO pay is higher for CEOs who have previous experience abroad and who have had more board positions in the past in other firms. The dummy variable for whether a CEO has been a top executive in other firms is negatively related to pay levels. These results are weaker when analyzing separately the sub-sample of U.S. firms and non-U.S. in columns (4) and (5). In column (3) we consider the CEO educational background. Only an MBA education in a U.S. school seems to be correlated with higher CEO pay. Columns (4) and (5) estimate regressions separately for U.S. and non-U.S. firms and show some divergences on pay practices. CEOs classified as foreign receive lower pay in the U.S., but marginally higher pay outside the U.S. These pay differentials could be explained by some CEO cross-country migration around the world but we leave it as an open question at this point.

Overall, the “U.S. dummy” remains statistically significant after controlling for CEO characteristics and the magnitude of the coefficient in Table III is very similar to that in column (5) of Table II that only considers firm characteristics. The estimated coefficient on the U.S. dummy variable of 0.3353 in column (3) of Table III, which represents a 40% premium for U.S. CEOs (this compares with a 43% premium in column (5) of Table II). Thus, differences in CEO skills and experience explain a small proportion of the U.S. pay premium. Indeed, given the imperceptible increase in the R-squared from column (5) in Table II to column (3) in Table III (which simply adds variables to the earlier specification), we find weak evidence that CEO-specific characteristics help to explain higher CEO pay levels in the U.S..<sup>16</sup>

In Panel B of Figure 2, we conduct a similar hypothetical \$1 billion sales firm exercise, now controlling for sales as well as firm and CEO characteristics. The procedure is the same described above for Figure 1. The results in Panel B are not substantially different from Panel A of Figure 2 but the U.S. pay premium is now 40%, still statistically significant at the 5% level.

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<sup>16</sup> When we run a specification with only firm size and CEO individual characteristics (and none of the firm characteristics used in Table II), we find that the coefficient on the U.S. dummy is still 0.5727, which corresponds to a U.S. pay premium of 77%. This is similar to the premium with only firm size as a control.

### III. Are U.S. Executives Paid Differently?

One salient and well-documented difference between CEO pay in the U.S. and the rest of the world is that U.S. executives receive a larger portion of their pay in the form of stock options, restricted shares, and other performance-based incentives. For example, Table I shows that equity-based pay accounts for over 41% of pay for the average U.S. CEO, but only 20% for the average non-U.S. CEO. And, while 57% of U.S. CEOs receive stock options, only 22% of non-U.S. CEOs receive options. Although these differences are substantial, the “pay structure” gap between U.S. and foreign CEOs has shrunk significantly in recent years, as more countries have loosened restrictions on equity-based pay and more companies have adopted U.S.-style incentive plans. We will examine the convergence of pay practices across countries later in Section IV. In this section, we explore whether the U.S. pay premium documented in Section II is largely an artifact of cross-country differences in pay structures.

#### *A. Is the Story of U.S. CEO Higher Pay The Story of Higher Incentive Pay?*

The significant differences in the structure of pay between U.S. and foreign executives have important consequences for our interpretation of the U.S. pay premium. In particular, our measure of total compensation is meant to approximate the expected *opportunity cost* to shareholders of the CEO’s pay package. However, our measure does not approximate the value of the package from the perspective of a risk-averse and undiversified CEO who presumably does not hedge the risk of the package.<sup>17</sup> Thus, for example, while the opportunity cost to shareholders of giving an additional \$100 in base salary is the same as the opportunity cost of giving \$100 in restricted stock, a risk-averse and undiversified CEO will prefer to be paid a certain salary to be awarded risky stocks, and will predictably discount the value of the stocks. Put differently, all else equal, we expect that CEOs at companies with riskier pay will receive higher expected levels of pay to compensate for the increased risk.

To test whether pay structure differences may help explain international differences in pay, we estimate the following OLS regression:

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<sup>17</sup> For examinations of the distinction between the company’s cost and the executive’s value of equity-based compensation, see Lambert, Larcker and Verrecchia (1991), Meulbroek (2001), and Hall and Murphy (2002).

$$\begin{aligned} \text{Log (Total Compensation}_i) = & \alpha + \beta_1 (\text{U.S. Dummy}) + \beta_2 (\text{Firm Characteristics}_i) \\ & + \beta_3 (\text{CEO Characteristics}_i) + \beta_4 (\text{Pay Structure}_i) + \text{Industry dummies} + \varepsilon_i \end{aligned} \quad (3)$$

Table IV presents the results. All regressions in this table include the firm and CEO control variables of column (3) of Table III (coefficients not shown). Column (1) shows that when we add the ratio of Incentive Pay to Total Compensation as an explanatory variable, the “U.S. dummy” is substantially reduced to 0.1133 and it is no longer statistically significant at the 5% level. The R-squared also goes up substantially relative to those in Table III.<sup>18</sup> Indeed, differences in pay structures appear to be, at least, as important as firm characteristics, in explaining the observed U.S. pay premium.

Even without firm and CEO control variables, pay structure goes a long way to explain the U.S. pay premium. In unreported regressions, we add the fraction of pay linked to performance to our base regression in column (1) of Table II and find that the U.S. dummy coefficient is reduced from 0.7801 to 0.3351. Thus, just using firm size and pay structure the implied U.S. pay premium reduces from 118% to 40%, but it is still significant at the 5% level and the R-squared increases from 44% to 63%.

In column (2) of Table IV, we differentiate between equity-based pay (common stock and stock option awards) and non-equity incentives (cash payment plans based on accounting or share price targets). We expect that CEO pay will be positively related to both of these variables, and expect a higher coefficient on the equity-pay variable since equity pay is traditionally riskier than bonuses based on accounting returns. Consistent with our prediction, we find that while both variables are associated with higher CEO compensation, the coefficient on equity-based pay is higher than the coefficient on non-equity-based pay. In column (3) we can see that the use of option plans also has a positive effect in total pay. In columns (4) and (5) we find support for our findings on higher pay if compensation is incentive-based for both U.S. and non-U.S. firms, even though the sensitivity of total pay to the use of incentives seems to be higher in the U.S. versus the rest of the world.

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<sup>18</sup> Specifications in Table 5 include all firm and CEO characteristics as in column (3) of Table 4.

In Panel C of Figure 2, we re-calculate the hypothetical \$1 billion sales exercise, but now also controlling additionally for pay structure. The specification is similar to that of column (1) of Table V but replacing the U.S. dummy with 27 dummies for each country in our sample. U.S. CEOs now cease to be at the top in the world in terms of CEO total pay. Indeed, and is illustrated in Panel C of Figure 2, the U.S. pay gap largely disappears after controlling for differences in pay structures, in addition to firm, industry, and corporate governance differences.

Figure 3 summarizes the progress we made in explaining the U.S. CEO pay gap. We start with the original ratio of 170% between average Total Compensation for U.S. and Non-U.S. CEOs from Table I. The U.S. pay gap drops to 118% when pay levels are adjusted for size and industry, and further drops to about 40% when we take into account other firm characteristics differences (in particular in firm's internationalization, ownership structure, and corporate governance arrangements) in Table II. In contrast, CEO characteristics seem to add little to explain the gap as we found in Table III. Pay structure, and in particular incentive-oriented pay, seems to be an important determinant of the U.S. pay gap and pushes the gap down to just 12%, which is statistically insignificant at the 5% level as shown in Table IV.

### *B. What Determines CEO Pay Structure?*

So far we have documented that U.S. executives are paid more because they run larger firms with different characteristics, but also because of a higher use of performance pay. Thus, the next logical question is: what explains the greater use of incentive pay in the U.S.?

Table V offers a preliminary exploration of this issue. We regress incentive pay variables on the same set of variables used to explain total pay, to see if there are potentially interesting correlations in the data. As pay ratios are naturally bounded between zero and one, we use Tobit specifications in these tests.

The “U.S. dummy” is positive and significant in all incentive pay ratio regressions, confirming the more intense use of incentive compensation for CEOs in the U.S., even after controlling for firm, industry, governance, and CEO characteristics. Equity-based incentives seem to be driven by different forces than non-equity-based incentives, but effects may be somewhat mechanical given our findings on equity-incentive pay if there is little variation in non-incentive pay across countries. Insider ownership is negatively associated with the use of equity incentive pay, as

controlling shareholders may not want to give up control of their firms and will resist giving equity to professional managers. In contrast, we find that institutional ownership is positively associated with incentive pay, consistent with Hartzell and Starks' (2003) finding that concentrated institutional shareholdings are positively correlated with pay-for-performance in the U.S. Turnover, MSCI membership and board connectedness are also positively associated with the use of equity-based incentives. Stock volatility and CEO age are negatively related to the use of equity incentives. Column (5) of Table V shows that similar findings apply to the use of options. Results in column (4) are often different for non-equity incentive pay.

Columns (1)-(5) of Table VI include proxies for most of the determinants of equity-based incentives suggested by agency theory. But, as documented by Yermack (1995), agency-theoretic variables have little explanatory value in predicting the use of equity-based compensation in publicly traded firms. Conyon and Murphy (2000) consider (and ultimately reject) a variety of agency-theoretic explanations for the relative importance of equity-based pay in the U.S. versus the U.K., including differences in risk aversion (higher risk aversion would lead to lower dependence on equity-based pay), the "noise" in stock-price-based performance measures (higher noise would lead to less equity-based pay), or the marginal productivities of CEOs (higher marginal productivities would lead to more equity-based pay). To our knowledge, there is no reason to expect that U.S. CEOs are less risk-averse than their foreign counterparts, that the U.S. stock markets are systematically more informative than the other major international stock markets, or that U.S. CEOs have inherently superior ability or higher marginal productivity. However, while there is no reason to suspect that U.S. CEOs are more able or more productive, U.S. CEOs *may* have more decision rights and influence over corporate results than do their non-U.S. counterparts. Unfortunately, traditional agency theory provides no guidance on why production functions or hierarchical structures should vary across international boundaries.

Finally, Columns (6) and (7) of Table V explore U.S. versus non-U.S. differences in the determinants of equity-based CEO pay. We find, for example, significant U.S. versus non-U.S. differences in the relations between CEO incentive pay and foreign sales and the fraction of

independent directors.<sup>19</sup> Also, insider ownership and the CEO-chairman dummy negatively related to equity-based pay outside the U.S. These results suggest that the mechanism underlying the use of incentive compensation in the U.S. versus other countries is significantly different and not easily explained by standard economic determinants.

#### **IV. Is the U.S. Pay Premium Disappearing?**

We also study the evolution of the U.S. pay premium in the 2000-2006 period. Ideally, we would have liked to have annual observations for all the firms in all 27 countries we have used in our 2006 analysis. However, there are big challenges to build a balanced panel data set of firms with CEO compensation going back many years. As we have explained in the introduction, disclosure standards have improved dramatically in recent years. For example, the European Union (EU) has recommended that listed companies report details on individual compensation packages, but this recommendation is not binding and implementation has been delayed in a number of countries until 2007. Similar issues occur in other countries. Thus for the earlier years, our primary data source for non-U.S. firms (BoardEx) includes historical pay data only for firms that chose to voluntarily report these figures, which may introduce a selection bias in the sample of non-U.S. firms. Despite these shortcomings, we examine CEO total pay for each year in 2000-2006, based on ExecuComp data for U.S. firms and BoardEx data for non-U.S. firms. We start our analysis in 2000 as it is the earliest year available in BoardEx.

Table VI presents our historical comparisons of the U.S. pay premium. We present estimates of OLS cross-sectional regressions of  $\log(\text{CEO total compensation})$  by year. We use the specification of column (1) of Table III that includes firm and CEO control variables (coefficients not shown). Table VI shows that our sample includes 949 firms in 2000 and 2,573 firms in 2006.<sup>20</sup> Our main finding is that CEO pay worldwide is converging to U.S. pay levels. Indeed, there a significant reduction of the “U.S. dummy” coefficient in columns (1)-(7) of Table VI that control for firm and CEO characteristics. The “U.S. dummy” coefficient drops from

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<sup>19</sup> Although the point estimates are not always “significantly positive” for the U.S. and “significantly negative” for other countries, the difference is statistically significant.

<sup>20</sup> In 2000, 67% of the firms used in the regression of column (1) are from the U.S.. (a total of 638 firms). In 2006 the percentage of U.S. firms decreases to 46% (column 7) because BoardEx progressively covers more non-U.S. firms over time.

1.0559 (suggesting a U.S. pay premium of 187%) to 0.3543 (U.S. pay premium of 43%). In columns (8)-(14) we additionally control for the structure of pay. As before, the “U.S. dummy” coefficient is much lower and statistically insignificant in almost every year. We also observe a drop in the estimated “U.S. dummy”. Finally, columns (15) and (16) of Table VI present the results of pooled panel regressions in 2000-2006. The panel regression results are consistent with our primary findings.

Figure 4 plots the evolution of the U.S. pay premium over time. The estimated “U.S. dummy” coefficients in Table VII are converted to U.S. pay premiums. The figure shows the convergence of pay around the world to the U.S. level of pay. The premium is reduced by three-fourths from 2000 to 2006. Overall, our findings are consistent with the existence of an increasingly important international managerial market for CEOs.

## **V. Robustness Checks**

In Table VII we conduct several other robustness checks of our main results. All regressions use firm characteristics, CEO characteristics, and pay structure as explanatory variables as in Table IV. In columns (1) and (2) of Table VII we use total assets and market capitalization as alternative measures for firm size and find that the “U.S. dummy” is also statistically insignificant once we control for the structure of pay. A second concern is that the distribution of executive pay may be heavily skewed. We address this concern using least-absolute deviation regression (median regression) instead of least squares. Median regressions are also more robust to the presence of outliers. In column (3) we find that the “U.S. dummy” coefficient is insignificant. In unreported regressions, we estimate regressions for the 1<sup>st</sup> quartile and the 3<sup>rd</sup> and also find that our results are also robust.

We use ExecuComp data for U.S. CEO pay and Boardex data for non-U.S. CEO pay. As we described in the Section II, the BoardEx methodology results in total compensation values that are generally higher than those in ExecuComp, thus biasing our results *against* finding a U.S. premium. In column (4) of Table VII we find that the “U.S. dummy” is only marginally significant and the coefficient is not very different from the coefficient in column (1) of Table IV (and the U.S. pay premium is 19%). The number of observations in this specification increases as more firms are covered in BoardEx than in ExecuComp.



Next, we compare CEO compensation at constant purchasing power across countries. We take the purchasing power parity (PPP) adjustment factor in 2006 from the World Development Indicators (WDI) database. Most countries in our sample had higher costs of living than the U.S. in 2006, in particular Nordic countries (e.g., the cost of living in Denmark is 44% higher than in the U.S.), the U.K. (20% higher), and continental Europe countries (where the only exception is Spain with a 5% lower cost of living than in the U.S.). We divide CEO's dollar total compensation by the PPP factor. In column (5) of Table VIII, we find that adjusting for purchasing power actually increases the U.S. pay premium from 12% (in column (1) of Table IV) to 29% (in column (5) of Table VII).

A popular way to quantify relative CEO pay across countries is to measure pay relative to the average worker wage in each country. We gather data on average wage per hour and the number of hours of work per week from the International Labour Organization (ILO). The average CEO in our sample earns 150 times more than average worker pay, but only about 65 times more outside of the U.S. Column (6) of Table VII shows that the U.S. pay gap becomes significant implying a pay premium of 43%, even after controlling for pay structure differences, when we measure CEO total pay relative to the average worker wage.

As final robustness checks, in column (7) of Table VII we exclude financials and utilities because of different pay practices in those sectors. We find that the U.S. pay premium remains insignificant when we exclude these sectors. Column (8) of Table VIII includes in the sample the CEOs serving in their first year. As described in Section I, we have filtered these observations from the sample in our main tests because there may be anomalies reflecting compensation for multiple positions (for CEOs promoted internally) and partial-year compensation and signing bonuses (for CEOs hired from outside). When we include CEOs serving in their first year, we find that the U.S. premium becomes significant but its economic magnitude is not very different from before.

We also perform a variety of other robustness checks (not tabulated). We use 2-digit SIC industries dummies as an alternative to the Fama-French industry classification. We use a three-year window to estimate stock returns and volatility. We find consistent results in both cases. We also evaluate the U.S. pay premium using “propensity-score” matching. We match each foreign firm to a U.S. firm by industry and “propensity-score” estimated using a probit regression that

gives the likelihood that a firm with given characteristics is non-U.S. (following Aggarwal, Erel, Stulz, and Williamson (2008)). We conclude that there is no sizeable “pay gap” when we match U.S. firms to non-U.S. firms when we use firm characteristics, CEO characteristics, and pay structure in the matching procedure.

## **VI. Do Country Characteristics Explain Differences in CEO Pay?**

Results so far indicate that the difference in the use of equity-based pay for U.S. CEOs cannot be explained only by firm size, other firm characteristics, and CEO-specific characteristics, but also by difference in the structure of pay. Differences in pay composition are likely to be heavily influenced by country-level factors, namely the economic, law, and institutional environment of each country. Table VIII examines country-level determinants of CEO compensation levels and structure. Columns (1) to (6) show results of OLS cross-sectional regressions of the log CEO total pay including firm and CEO characteristics (as in Table III) and including pay structure (as in Table IV), in addition to the country factors.

We find that the level of economic development in a country, proxied by gross domestic product income per capita, does not necessarily translate into higher CEO pay (see column (1)-(6)). We next consider the effect of laws and legal environment. We use a common-law legal origin dummy and the International Country Risk Guide (ICRG) law and order index. La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) argue that investor protection and corporate governance is stronger in common-law countries as opposed to civil-law countries. The law and order index measures the quality of the legal environment and law enforcement (see Bekaert, Harvey, and Lundblad (2005) for details). In column (1) of Table IX, we find that CEOs in countries with a common-law legal origin receive higher pay. When we control for incentive pay in column (2), the common-law (and the U.S.) dummy is not significant in CEO pay levels, which suggests that the higher pay in common law countries is explained by more incentive pay. The law and order coefficient is also positive and significant. In columns (3) and (4) we obtain similar results if we use the anti-self dealing index of Djankov, La Porta, Lopez-De-Silanes, and Shleifer (2008) in alternative to the legal origin variable.

In columns (5) and (6) of Table VIII, we consider different aspects of a country regulatory environment. We consider the director enforce index and the compensation disclose index (La

Porta, Lopez-de-Silanes, and Shleifer (2006))) to proxy for the level of liability to which key officers are exposed to by law and the required level of executive compensation disclosure. We find a positive association between total pay and the levels of compensation disclosure and director liability; notice that the U.S. scores high in both indices. We also include a dummy that indicates whether a country has strongly enforced insider-trading laws (Bhattacharya and Daouk (2002)). Insider trading does not seem to explain pay levels. Finally, we consider labor regulation, in particular the level of protection offered by collective relations laws (Botero, Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2004)). We find that CEO pay is lower in countries with friendlier collective labor laws and countries where labor unions are more powerful, such as in Continental Europe countries (e.g., France and Germany).

Columns (7)-(12) of Table VIII show results of Tobit regressions for incentive and equity-incentive pay ratios. We usually find that the variables that explain higher pay also explain a higher use of incentive compensation. We find that equity-based pay is more often used in countries with common law legal origin and with higher investor protection. Common-law countries like the U.K., Canada and Australia have similar country-level governance structures to those in place in the U.S. and this seems to be related to greater use of stock-based incentive schemes. We conclude that (equity) incentives are predominant in common law countries, countries with higher levels of law enforcement, and stronger security market regulations.

## **VII. Conclusion**

Although anecdotal or small-sample evidence has often concluded that U.S. executives are paid more than their foreign counterparts, comprehensive analyses of cross-country differences in CEO pay have been hindered by the lack of detailed individual-level data on executive salaries, bonuses, and equity-based compensation. Recent and sweeping changes in international disclosure rules have provided the necessary comparison data, sometimes available in compiled data sets but often only available in country- or company-specific corporate filings. In this paper, we exploit several sources of available data and are ultimately able to obtain detailed fiscal-year 2006 compensation information for CEOs in 3,798 firms across 27 countries.

We find that top executives in the U.S. are paid more than their counterparts in foreign companies. Differences in firm, industry, corporate governance, and CEO characteristics go a

long way in explaining the U.S. pay premium, but the premium remains statistically significant at 40% once we control for these characteristics. Moreover, we find that after controlling for firm size and other firm characteristics, the remaining cross-country difference in pay levels is explained by differences in the structure of pay: CEOs are paid more in firms with a higher percentage of incentive pay (particularly equity-based pay), plausibly reflecting pay premiums demanded by risk-averse and undiversified executives who would prefer a dollar in base salary to a dollar in performance-based compensation. CEOs in the U.S. receive a much larger fraction of their pay through equity-based pay (primarily stock options and restricted shares), thus helping to explain the observed U.S. pay premium.

However, the fact that the observed U.S. pay premium is in part “explained” by the fact that U.S. CEOs have different pay structures raises the question: Why do U.S. executives receive more incentive compensation (and particularly more equity-based compensation)? We cannot identify firm-level agency-theoretic determinants of the use of incentive compensation, suggesting that the differences across countries are largely driven by country-level factors. We find evidence that securities markets and labor laws, and the overall quality of the institutional environment, is related to the level and structure of executive pay. To the extent that such differences disappear in the world economy, we predict that compensation structures and pay levels will also converge.

We are hesitant to declare that the U.S. will necessarily continue its dominance in the executive-pay arena, thus avoiding an awkward title of “*Were U.S. Top Executives Paid More?*”. First, as we have shown, the U.S. premium primarily reflects important cross-sectional differences in the use of equity-based pay. Second, there is substantial evidence of a slow-but-steady convergence in international pay practices, as the rest of the world emulates U.S.-style pay packages. As recently as 1984, for example, Towers Perrin reported that equity-based compensation was non-trivial only in Canada, France, the U.K. and the U.S. (Towers Perrin (1988), Abowd and Bognanno (1995), Conyon and Murphy (2002)). Indeed, using stock options to compensate executives was prohibited in Japan until 1997 and in Germany until 1998.<sup>21</sup> As we have shown in this paper (recall Table I and Table A.1), by 2006 equity-based pay represents at least 8% of average pay for CEOs in 23 of our 27 sample countries, and incentive pay (equity and non-

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<sup>21</sup> Peter Landers, “Sharing the Wealth: Tokyo to Legalize Stock Options,” *Far Eastern Economic Review* (29 May 1997); Sven Tishendorf, “Planning for Stock Options in Germany,” *International Tax Review* (1 December 1998).

equity) represents at least 20% of pay in all of our sample countries. Moreover, we document that CEO pay premium was sharply reduced from 2000 to 2006. The U.S. remains the unquestioned leader in incentive pay, but the results of our paper show that the world managerial labor market is converging, and we predict that pay levels will be likewise converging.

As further evidence of a global convergence, the historical U.S. monopoly on the controversy surrounding CEO compensation has also disappeared, representing (interestingly) both a cause and effect of the expanded international disclosure rules regarding top-executive compensation. Most recently, in the 2008 financial meltdown and consequent bailout, several countries in addition to the U.S. have imposed implicit or explicit restrictions on executive compensation, especially for executives in bailed-out firms.<sup>22</sup> For example, CEOs (and other top executives) from bailed-out firms in the U.S. were prohibited from receiving termination-relation severance payments or incentive compensation that provided incentives to take “unnecessary and excessive risks,” and the deduction firms could take as a compensation expense was capped at \$500,000. In France, Germany, and the Netherlands executives from failed firms were prohibited (or limited) from receiving severance payments upon termination. Australian and U.K. CEOs of failing institutions were barred from pay practices that might promote excessive risks, and Sweden and Germany imposed explicit limits on the level of executive pay.

Finally, many critics of CEO pay (notably Bebchuk and Fried (2004)) have argued that executive pay is excessive because there is no real market for executives, who in turn can effectively set their own pay levels. Indeed, Bebchuk, Fried, and Walker (2002) cite the relatively high pay of U.S. CEOs relative to their foreign counterparts as evidence for their assertion. In contrast, the evidence in this paper shows that pay practices are converging – especially among firms with operation abroad, firms with access to international capital markets, and firms cross-listed on U.S. exchanges – suggests an increasingly important international managerial labor market for CEOs.

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<sup>22</sup> The details for non-U.S. firms are summarized in JoAnn S. Lublin and Mike Esterl, “Executive Pay Curbs Go Global,” Wall Street Journal (21 October 2008), A1.

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**Table I**  
**Sample Means of CEO Compensation Level and Composition and Firm Characteristics**

Panel A presents the number of sample firms per geographical region. Panel B presents sample means of the level and composition of CEO compensation as of 2006 (in US\$). Panel C provides sample means for the characteristics of firms. Panel D presents sample mean for biographic characteristics of CEOs. Refer to Appendix B for variables definitions.

	U.S.	Non-U.S.	Difference t-statistic	North America	U.K.	Euro Zone	Nordic	Oceania	Asia	Other
Panel A: Number of Firms										
Nr. of firms (Execucomp/ BoardEx)	1,407	2,025	-	1,411	1,182	602	188	7	7	35
Nr. of firms (Company filings)	0	732	-	175	0	35	6	183	254	79
Nr. of firms (Total)	1,407	2,757	-	1,586	1,182	637	194	190	261	114
Coverage (% of market capital.)	84.9	77.0	-	84.3	93.6	81.2	79.4	85.1	57.9	89.3
Nr. of firms (Total excl. first year)	1,285	2,513	-	1,451	1,077	580	172	181	233	104
Panel B: Compensation										
Total compensation	5,496,757	2,033,088	18.85	5,219,934	1,695,999	2,661,730	1,399,267	2,259,046	1,136,749	3,095,730
Salary/Total	0.290	0.513	-24.12	0.294	0.521	0.546	0.620	0.475	0.499	0.473
Other pay/Total	0.052	0.077	-6.49	0.056	0.087	0.054	0.103	0.098	0.054	0.049
Non-incentive pay/Total	0.342	0.590	-25.43	0.350	0.608	0.600	0.723	0.573	0.552	0.522
Equity incentive pay/Total	0.415	0.197	22.89	0.405	0.249	0.137	0.082	0.178	0.086	0.203
Non-equity incentive pay/Total	0.244	0.213	4.36	0.246	0.143	0.263	0.195	0.249	0.361	0.295
Incentive pay/Total	0.658	0.410	25.43	0.650	0.392	0.400	0.277	0.427	0.448	0.498
Options dummy	0.571	0.217	23.20	0.573	0.176	0.157	0.145	0.393	0.198	0.282

**Table I: continued**

	U.S.	Non-U.S.	Difference t-statistic	North America	U.K.	Euro Zone	Nordic	Oceania	Asia	Other
Panel C: Firm Characteristics										
Sales (\$ billion)	6.108	3.788	4.54	5.878	2.100	8.032	2.527	2.147	2.562	4.635
Leverage	0.209	0.208	0.14	0.212	0.180	0.248	0.211	0.260	0.216	0.137
Tobin Q	2.095	1.990	2.22	2.084	2.081	1.728	2.243	1.979	1.983	2.137
Return on assets	0.058	0.033	4.84	0.060	-0.013	0.050	0.065	0.085	0.097	0.095
Stock return volatility	0.299	0.311	-1.81	0.295	0.362	0.265	0.324	0.246	0.283	0.261
Stock return	0.108	0.283	-11.11	0.133	0.162	0.355	0.603	0.245	0.322	0.447
Turnover	2.218	0.792	36.23	2.050	0.874	0.702	1.057	0.748	0.567	0.612
MSCI dummy	0.350	0.280	4.42	0.371	0.123	0.350	0.320	0.417	0.391	0.669
U.S. cross-listing dummy	n.a.	0.103	n.a.	n.a.	0.047	0.136	0.070	0.074	0.076	0.176
Foreign sales	0.218	0.306	-8.14	0.228	0.265	0.391	0.427	0.236	0.251	0.289
Insider ownership	0.161	0.358	-24.85	0.165	0.320	0.409	0.324	0.357	0.564	0.407
Institutional ownership	0.853	0.235	84.70	0.819	0.240	0.224	0.291	0.105	0.130	0.210
Domestic institutional ownership	0.818	0.134	100.00	0.766	0.192	0.067	0.184	0.022	0.024	0.051
Foreign institutional ownership	0.063	0.102	-10.04	0.079	0.048	0.156	0.108	0.083	0.107	0.169
Board size	9.496	9.311	1.31	9.612	7.047	11.892	9.541	8.378	12.345	13.153
Fraction of independent directors	0.837	0.534	46.97	0.831	0.457	0.540	0.672	0.599	0.674	0.653
CEO-chairman dummy	0.595	0.151	30.04	0.572	0.073	0.366	0.018	0.000	0.111	0.127
Nationality mix	0.055	0.151	-14.37	0.065	0.118	0.190	0.143	0.151	0.188	0.450
Past board positions	1.185	1.069	5.51	1.178	1.130	1.030	1.049	0.770	0.288	0.951
Current board positions	1.976	1.822	6.73	1.982	1.732	1.917	1.960	1.924	1.525	2.023
Panel D: CEO Characteristics										
CEO age	55.448	52.340	11.19	55.399	51.058	54.292	50.071	53.495	55.738	52.200
CEO male dummy	0.978	0.980	-0.34	0.978	0.975	0.982	0.994	0.990	0.984	0.987
CEO foreign dummy	0.018	0.091	-8.55	0.021	0.083	0.109	0.058	0.078	0.071	0.231
CEO external hire dummy	0.371	0.490	-6.82	0.372	0.571	0.460	0.523	0.495	0.111	0.289
CEO time in role	8.535	7.060	6.02	8.536	6.702	7.498	6.018	7.018	9.781	7.348
CEO time in firm	16.564	12.026	12.04	16.462	10.910	13.261	10.571	11.674	20.616	15.377
CEO time in sector	20.326	14.503	14.40	20.255	13.648	16.373	12.470	14.114	16.569	13.928
CEO other industry experience dumn	0.460	0.449	0.61	0.457	0.434	0.493	0.461	0.364	0.563	0.513
CEO other country experience dumnr	0.139	0.457	-19.87	0.165	0.439	0.451	0.403	0.568	0.563	0.586
Past CEO experience dummy	0.338	0.277	3.66	0.345	0.224	0.342	0.286	0.375	0.250	0.316
CEO past board positions	0.701	0.763	-1.18	0.706	0.665	1.184	0.817	0.420	0.014	0.450
CEO current board positions	1.654	1.494	3.93	1.659	1.326	2.136	1.688	1.261	0.159	0.752
CEO college dummy	0.861	0.599	16.78	0.846	0.551	0.778	0.832	0.660	0.079	0.433
CEO graduate dummy	0.521	0.309	12.56	0.505	0.276	0.382	0.561	0.282	0.056	0.280
CEO U.S. MBA dummy	0.345	0.038	25.45	0.331	0.029	0.056	0.006	0.044	0.036	0.089

**Table II**  
**Regression of CEO Total Compensation on Firm Characteristics**

Estimates of OLS cross-sectional regressions of the log CEO total compensation as of 2006 are shown. Refer to Appendix B for variables definitions. Robust t-statistics adjusted for country-level clustering are in parentheses. Coefficients significant at the 5% level are in boldface.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All firms					U.S. firms	Non-U.S. firms
U.S. dummy	0.7801 <b>(5.35)</b>	0.6407 <b>(3.75)</b>	0.7994 <b>(4.13)</b>	0.4403 <b>(2.75)</b>	0.3569 <b>(3.28)</b>		
U.S. cross-listing dummy							0.1923 <b>(2.76)</b>
Sales (log)	0.2962 <b>(12.48)</b>	0.2962 <b>(8.87)</b>	0.2138 <b>(6.74)</b>	0.1989 <b>(6.11)</b>	0.1771 <b>(8.13)</b>	0.2477 <b>(5.87)</b>	0.1604 <b>(7.82)</b>
Leverage		0.0804 (0.36)	0.1047 (0.50)	0.1549 (0.86)	0.1773 (1.30)	0.4345 <b>(3.10)</b>	-0.0230 (-0.22)
Tobin Q		0.0453 <b>(3.41)</b>	0.0106 (0.59)	0.0127 (0.72)	0.0171 (0.95)	-0.0087 (-0.29)	0.0453 <b>(3.30)</b>
Return on assets		-0.8003 <b>(-3.31)</b>	-0.6300 <b>(-3.24)</b>	-0.4500 <b>(-2.44)</b>	-0.0101 (-0.08)	-0.1763 (-0.59)	0.1364 (0.60)
Stock return volatility		-0.7517 <b>(-3.21)</b>	-0.6610 <b>(-3.25)</b>	-0.5027 <b>(-2.63)</b>	-0.2560 <b>(-2.32)</b>	-0.2733 (-1.23)	-0.3293 <b>(-2.16)</b>
Stock return		0.1447 <b>(2.89)</b>	0.1597 <b>(3.26)</b>	0.1543 <b>(3.71)</b>	0.1063 (1.70)	0.0642 (0.50)	0.1621 <b>(2.57)</b>
Turnover		0.1153 (1.58)	0.1003 (1.76)	0.0575 (1.69)	0.0459 (1.85)	0.0312 (0.89)	0.1557 <b>(3.96)</b>
MSCI dummy			0.5353 <b>(4.99)</b>	0.4839 <b>(4.94)</b>	0.4010 <b>(6.08)</b>	0.3972 <b>(5.44)</b>	0.2478 <b>(2.85)</b>
Foreign sales			0.4170 <b>(4.25)</b>	0.3437 <b>(3.49)</b>	0.0896 (1.64)	0.2656 <b>(2.92)</b>	0.0479 (0.77)
Insider ownership				-0.8592 <b>(-5.57)</b>	-0.5760 <b>(-4.61)</b>	-0.0646 (-0.38)	-0.5512 <b>(-5.30)</b>
Institutional ownership				0.3932 <b>(3.40)</b>	0.2886 <b>(4.50)</b>	0.2509 <b>(1.99)</b>	0.3060 <b>(1.99)</b>
Board size					0.0282 <b>(4.70)</b>	0.0300 <b>(2.00)</b>	0.0351 <b>(5.06)</b>
Fraction of independent directors					0.1588 <b>(2.44)</b>	0.1980 (0.89)	0.1000 (0.96)
CEO-chairman dummy					0.0309 (0.30)	0.1813 <b>(2.99)</b>	-0.1735 <b>(-2.34)</b>
Nationality mix					0.4679 <b>(4.72)</b>	0.1956 (0.89)	0.5297 <b>(5.59)</b>
Past board positions					0.1182 <b>(3.88)</b>	0.0881 <b>(2.41)</b>	0.1227 <b>(2.42)</b>
Current board positions					0.0867 <b>(2.00)</b>	0.0708 (1.44)	0.0448 (0.80)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Standard errors clustered by country	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,798	3,555	3,555	3,150	2,698	1,155	1,543
R-squared	0.44	0.45	0.48	0.50	0.57	0.42	0.57

**Table III**  
**Regression of CEO Total Compensation on Firm and CEO Characteristics**

Estimates of OLS cross-sectional regressions of the log CEO total compensation as of 2006 are shown. Regressions include also the firm control variables used in column (5) of Table II (coefficients not shown). Refer to Appendix B for variables definitions. Robust t-statistics adjusted for country-level clustering are in parentheses. Coefficients significant at the 5% level are in boldface.

	(1)	(2)	(3)	(4)	(5)
	All firms			U.S. firms	Non-U.S. firms
U.S. dummy	0.3543 <b>(3.37)</b>	0.3802 <b>(3.50)</b>	0.3353 <b>(2.87)</b>		
Sales (log)	0.1905 <b>(9.72)</b>	0.1875 <b>(8.90)</b>	0.1860 <b>(9.15)</b>	0.2463 <b>(5.89)</b>	0.1685 <b>(9.28)</b>
CEO age	-0.0037 <b>(-1.86)</b>	-0.0031 <b>(-0.82)</b>	-0.0024 <b>(-0.56)</b>	0.0055 <b>(0.93)</b>	-0.0056 <b>(-2.02)</b>
CEO male dummy	0.0717 <b>(1.09)</b>	0.0667 <b>(1.03)</b>	0.0720 <b>(1.06)</b>	0.1604 <b>(1.18)</b>	0.0994 <b>(0.85)</b>
CEO foreign dummy	0.0786 <b>(0.84)</b>	0.0521 <b>(0.49)</b>	0.0486 <b>(0.47)</b>	-0.3214 <b>(-1.92)</b>	0.1502 <b>(1.85)</b>
CEO external hire dummy		0.0230 <b>(0.77)</b>	0.0181 <b>(0.62)</b>	0.0310 <b>(0.48)</b>	-0.0088 <b>(-0.20)</b>
CEO time in role		-0.0037 <b>(-0.57)</b>	-0.0037 <b>(-0.57)</b>	-0.0139 <b>(-1.50)</b>	0.0069 <b>(1.58)</b>
CEO time in firm		-0.0032 <b>(-1.82)</b>	-0.0027 <b>(-1.47)</b>	-0.0029 <b>(-0.68)</b>	-0.0042 <b>(-1.17)</b>
CEO time in sector		0.0039 <b>(1.44)</b>	0.0034 <b>(1.15)</b>	-0.0006 <b>(-0.20)</b>	0.0044 <b>(1.04)</b>
CEO other industry experience dummy		0.0460 <b>(1.37)</b>	0.0353 <b>(0.90)</b>	-0.0348 <b>(-0.47)</b>	0.0760 <b>(2.42)</b>
CEO other country experience dummy		0.0674 <b>(2.40)</b>	0.0671 <b>(2.32)</b>	0.0551 <b>(0.75)</b>	0.0657 <b>(1.33)</b>
Past CEO experience dummy		-0.0756 <b>(-2.27)</b>	-0.0707 <b>(-2.14)</b>	-0.1261 <b>(-1.65)</b>	-0.0294 <b>(-0.63)</b>
CEO past board positions		0.0198 <b>(1.94)</b>	0.0188 <b>(1.96)</b>	0.0344 <b>(1.53)</b>	0.0086 <b>(0.62)</b>
CEO current board positions		-0.0189 <b>(-0.96)</b>	-0.0213 <b>(-1.13)</b>	0.0311 <b>(0.96)</b>	-0.0238 <b>(-1.16)</b>
CEO college dummy			0.0763 <b>(0.81)</b>	0.3113 <b>(2.07)</b>	-0.0183 <b>(-0.27)</b>
CEO graduate dummy			-0.0130 <b>(-0.34)</b>	-0.0298 <b>(-0.42)</b>	0.0120 <b>(0.28)</b>
CEO U.S. MBA dummy			0.1014 <b>(3.75)</b>	0.0544 <b>(0.78)</b>	0.0470 <b>(0.38)</b>
Firm characteristics	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes
Standard errors clustered by country	Yes	Yes	Yes	No	Yes
Observations	2,573	2,543	2,543	1,149	1,394
R-squared	0.57	0.57	0.57	0.44	0.58

**Table IV**  
**Regression of CEO Total Compensation on Firm and CEO Characteristics and Pay Structure**

Estimates of OLS cross-sectional regressions of the log CEO total compensation as of 2006 are shown. Regressions include the firm control variables and CEO characteristics of column (3) of Table III (coefficients not shown). Refer to Appendix B for variables definitions. Robust t-statistics adjusted for country-level clustering are in parentheses. Coefficients significant at the 5% level are in boldface.

	(1)	(2)	(3)	(4)	(5)	
		All firms		U.S. firms	Non-U.S. firms	All firms
U.S. dummy	0.1133 (1.73)	0.1239 (1.90)	0.2003 (1.80)			0.3351 <b>(4.09)</b>
Sales (log)	0.1538 <b>(9.21)</b>	0.1576 <b>(9.77)</b>	0.1844 <b>(8.95)</b>	0.1804 <b>(4.99)</b>	0.1447 <b>(8.16)</b>	0.2147 <b>(13.03)</b>
Incentives/Total compensation	1.9722 <b>(5.48)</b>			2.6481 <b>(13.59)</b>	1.4930 <b>(11.40)</b>	2.1846 <b>(8.16)</b>
Non-equity incentives/Total compensation		1.6886 <b>(7.76)</b>	0.5573 <b>(3.47)</b>			
Equity incentives/Total compensation		2.0469 <b>(5.07)</b>				
Option dummy			0.4490 <b>(4.77)</b>			
Firm characteristics	Yes	Yes	Yes	Yes	Yes	No
CEO characteristics	Yes	Yes	Yes	No	No	No
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Standard errors clustered by country	Yes	Yes	Yes	Yes	No	No
Observations	2,543	2,543	2,543	1,149	1,394	3,798
R-squared	0.71	0.72	0.60	0.70	0.68	0.63

**Table V**  
**Regression of CEO Pay Structure**

Estimates of cross-sectional regressions of the CEO pay structure as of 2006 are shown. Refer to Appendix B for variables definitions. Robust t-statistics are in parentheses. Coefficients significant at the 5% level are in boldface.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All Firms				U.S. Firms		Non-U.S. Firms
	Tobit [Incentives /Total]	Tobit [Incentives /Total]	Tobit [Equity incentives /Total]	Tobit [Non-equity incentives /Total]	Probit [Option dummy]	Tobit [Equity incentives /Total]	Tobit [Equity incentives /Total]
U.S. dummy	0.1130 <b>(5.26)</b>	0.1245 <b>(5.16)</b>	0.0982 <b>(2.89)</b>	0.0615 <b>(3.16)</b>	0.7349 <b>(2.88)</b>		
U.S. cross-listing dummy							0.1177 <b>(2.69)</b>
Sales (log)	0.0277 <b>(7.63)</b>	0.0192 <b>(4.35)</b>	0.0065 (1.03)	0.0205 <b>(5.63)</b>	-0.0378 (-1.07)	0.0206 <b>(2.06)</b>	0.0044 (0.49)
Leverage	-0.0360 (-1.16)	-0.0089 (-0.28)	-0.0253 (-0.56)	0.0229 (0.90)	-0.3275 <b>(-4.37)</b>	0.0737 (1.32)	-0.1304 (-1.79)
Tobin Q	0.0038 (0.87)	-0.0032 (-0.71)	-0.0047 (-0.71)	-0.0012 (-0.31)	-0.0229 (-1.85)	-0.0113 (-1.38)	-0.0020 (-0.19)
Return on assets	-0.0647 (-1.40)	-0.0788 (-1.71)	-0.2461 <b>(-3.81)</b>	0.1197 <b>(3.03)</b>	-0.5481 <b>(-4.53)</b>	-0.1748 (-1.81)	-0.3185 <b>(-3.44)</b>
Stock return volatility	-0.0902 <b>(-2.33)</b>	-0.0857 <b>(-2.21)</b>	-0.1597 <b>(-2.80)</b>	0.0103 (0.33)	-0.2445 (-0.83)	-0.2111 <b>(-2.69)</b>	-0.1326 (-1.57)
Stock return	0.0572 <b>(4.25)</b>	0.0608 <b>(4.27)</b>	0.0185 (0.90)	0.0449 <b>(3.88)</b>	-0.0139 (-0.29)	0.0777 <b>(2.64)</b>	0.0170 (0.57)
Turnover	0.0121 <b>(2.29)</b>	0.0105 <b>(2.02)</b>	0.0171 <b>(2.36)</b>	-0.0007 (-0.17)	0.0150 (0.48)	0.0171 <b>(2.25)</b>	0.0296 (1.58)
MSCI dummy	0.0780 <b>(5.39)</b>	0.0689 <b>(4.39)</b>	0.1149 <b>(5.22)</b>	-0.0361 <b>(-2.86)</b>	0.3828 <b>(3.06)</b>	0.0794 <b>(2.92)</b>	0.1045 <b>(2.74)</b>
Foreign sales	0.0463 <b>(2.44)</b>	0.0104 (0.50)	-0.0085 (-0.29)	0.0185 (1.10)	-0.0914 (-0.52)	0.1193 <b>(2.70)</b>	-0.0766 (-1.82)
Insider ownership	-0.1531 <b>(-5.86)</b>	-0.1554 <b>(-5.37)</b>	-0.3085 <b>(-7.32)</b>	-0.0037 (-0.16)	-0.3735 (-1.79)	-0.0996 (-1.55)	-0.3557 <b>(-5.59)</b>
Institutional ownership	0.1402 <b>(4.98)</b>	0.1156 <b>(4.11)</b>	0.1747 <b>(4.42)</b>	-0.0137 (-0.61)	0.2802 (0.87)	0.1146 <b>(2.61)</b>	0.2637 <b>(3.48)</b>
Board size		0.0033 (1.59)	-0.0036 (-1.21)	0.0064 <b>(3.87)</b>	0.0176 (0.68)	0.0087 (1.67)	-0.0067 (-1.63)
Fraction of independent directors		0.0603 (1.73)	0.0838 (1.66)	0.0090 (0.32)	0.4555 (1.81)	0.2086 <b>(2.60)</b>	-0.0018 (-0.03)
CEO-chairman dummy		0.0215 (1.62)	-0.0054 (-0.28)	0.0106 (0.99)	0.0322 (0.35)	0.0111 (0.51)	-0.0526 (-1.45)
Nationality mix		0.1009 <b>(2.72)</b>	0.0860 (1.63)	0.0642 <b>(2.15)</b>	0.2827 (1.06)	-0.0760 (-0.92)	0.1505 <b>(2.03)</b>
Past board positions		0.0188 <b>(2.26)</b>	0.0214 (1.83)	-0.0002 (-0.03)	-0.0494 (-1.22)	0.0144 (0.95)	0.0200 (1.10)
Current board positions		0.0264 <b>(2.28)</b>	0.0565 <b>(3.44)</b>	-0.0144 (-1.54)	0.1284 (1.76)	0.0416 (1.94)	0.0489 (1.93)
CEO age		-0.0050 <b>(-6.58)</b>	-0.0054 <b>(-4.96)</b>	-0.0018 <b>(-2.88)</b>	-0.0096 <b>(-2.70)</b>	-0.0052 <b>(-3.68)</b>	-0.0054 <b>(-3.22)</b>
CEO male dummy		0.0500 (1.30)	0.0565 (1.03)	0.0118 (0.38)	0.2692 <b>(2.50)</b>	0.0270 (0.40)	0.0846 (0.95)
CEO foreign dummy		0.0008 (0.03)	0.0462 (1.28)	-0.0332 (-1.61)	0.0253 (0.21)	-0.0071 (-0.09)	0.0711 (1.55)
Firm characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CEO characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,150	2,573	2,573	2,573	2,573	1,155	1,418



**Table VI**  
**Regression of CEO Total Compensation by Year**

Estimates of OLS cross-sectional regressions of the log CEO total compensation by year are shown. Columns (15) and (16) present results of pooled panel regression. Regression specifications include also the firm and CEO control variables used in column (1) of Table III (coefficients not shown). Refer to Appendix B for variables definitions. Robust t-statistics adjusted for country-level clustering are in parentheses. Coefficients significant at the 5% level are in boldface.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	2000	2001	2002	2003	2004	2005	2006	2000	2001	2002	2003	2004	2005	2006	Panel 2000- 2006	Panel 2000- 2006
U.S. dummy	1.0559 <b>(4.86)</b>	1.0167 <b>(5.18)</b>	0.8268 <b>(4.49)</b>	0.6723 <b>(4.83)</b>	0.5194 <b>(3.73)</b>	0.5237 <b>(3.68)</b>	0.3543 <b>(3.37)</b>	0.3173 (1.51)	0.4171 <b>(2.07)</b>	0.2051 (0.91)	0.1718 (1.66)	0.0909 (0.82)	0.1754 (1.40)	0.1113 (1.91)	0.6298 <b>(4.30)</b>	0.1773 (1.32)
Sales (log)	0.2117 <b>(7.16)</b>	0.2233 <b>(5.57)</b>	0.2279 <b>(9.80)</b>	0.2202 <b>(10.90)</b>	0.2524 <b>(12.57)</b>	0.2447 <b>(19.86)</b>	0.1905 <b>(9.72)</b>	0.1808 <b>(10.73)</b>	0.1450 <b>(4.53)</b>	0.1751 <b>(8.43)</b>	0.1724 <b>(12.23)</b>	0.2019 <b>(16.37)</b>	0.2003 <b>(8.15)</b>	0.1593 <b>(9.93)</b>	0.2243 <b>(14.71)</b>	0.1792 <b>(24.37)</b>
Incentives/Total compensation								2.7688 <b>(8.96)</b>	2.5440 <b>(6.28)</b>	2.4588 <b>(5.26)</b>	2.2759 <b>(11.02)</b>	2.3057 <b>(8.20)</b>	2.1356 <b>(4.47)</b>	1.9661 <b>(5.58)</b>		2.2905 <b>(6.18)</b>
Firm characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CEO characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Std errors clustered by country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	949	1,177	1,474	1,833	2,069	2,162	2,573	949	1,177	1,474	1,833	2,069	2,162	2,573	12,237	12,237
R-squared	0.50	0.56	0.53	0.61	0.55	0.55	0.57	0.74	0.76	0.72	0.79	0.72	0.69	0.71	0.54	0.72

**Table VII**  
**Robustness of Regression of CEO Total Compensation**

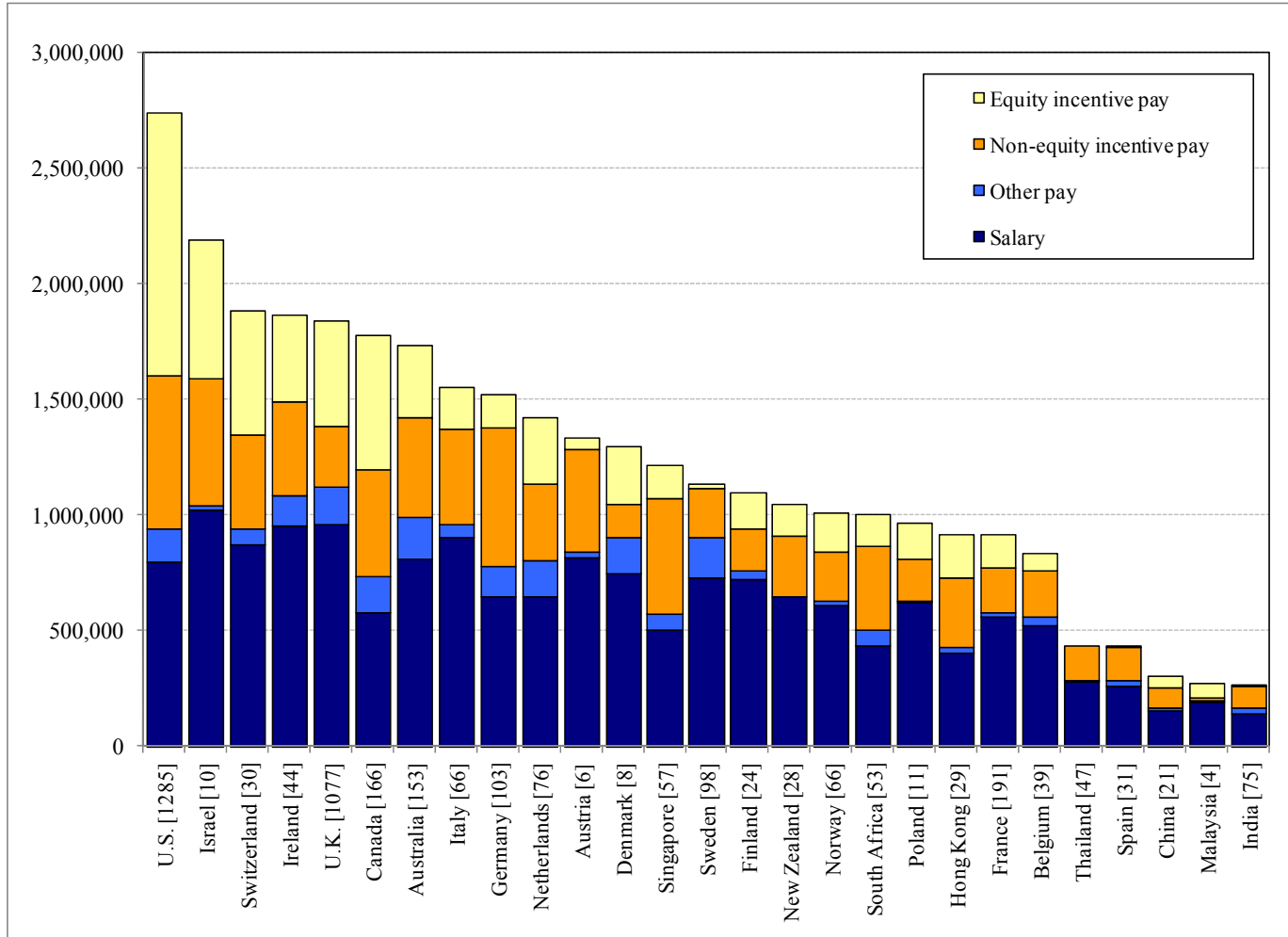
Estimates of OLS cross-sectional regressions of the log CEO total compensation as of 2006 are shown. Regressions include the firm and CEO control variables used in column (1) of Table IV (coefficients not shown). Robust t-statistics adjusted for country-level clustering are in parentheses. Coefficients significant at the 5% level are in boldface.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Size = Assets	Size = Market capital.	Median regression	U.S. BoardEx	Total compen. PPP adjusted	CEO compens./ average worker salary	Excludes financials and utilities	Includes CEO first year
U.S. dummy	0.0830 (1.15)	0.0510 (0.74)	0.0159 (0.34)	0.1772 <b>(1.96)</b>	0.2552 <b>(4.39)</b>	0.3581 <b>(6.30)</b>	0.1364 (1.80)	0.2000 <b>(3.09)</b>
Sales (log)			0.1684 <b>(20.54)</b>	0.1898 <b>(10.59)</b>	0.1571 <b>(9.82)</b>	0.1527 <b>(8.96)</b>	0.1488 <b>(8.15)</b>	0.1592 <b>(10.56)</b>
Total assets (log)	0.1986 <b>(7.38)</b>							
Market capitalization (log)		0.2283 <b>(9.88)</b>						
CEO first year dummy								-0.2160 (-1.28)
Incentives/Total compensation	1.9833 <b>(5.71)</b>	1.9451 <b>(5.49)</b>	2.1525 <b>(52.81)</b>	1.6507 <b>(5.78)</b>	1.9870 <b>(5.52)</b>	1.9836 <b>(5.23)</b>	1.9203 <b>(4.62)</b>	1.8826 <b>(6.56)</b>
Firm characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CEO characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Standard errors clustered by country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,543	2,543	2,543	2,786	2,543	2,501	2,098	2,760
R-squared	0.72	0.72		0.73	0.73	0.74	0.71	0.70

**Table VIII**  
**Country-Level Determinants of CEO Compensation Levels and Structure**

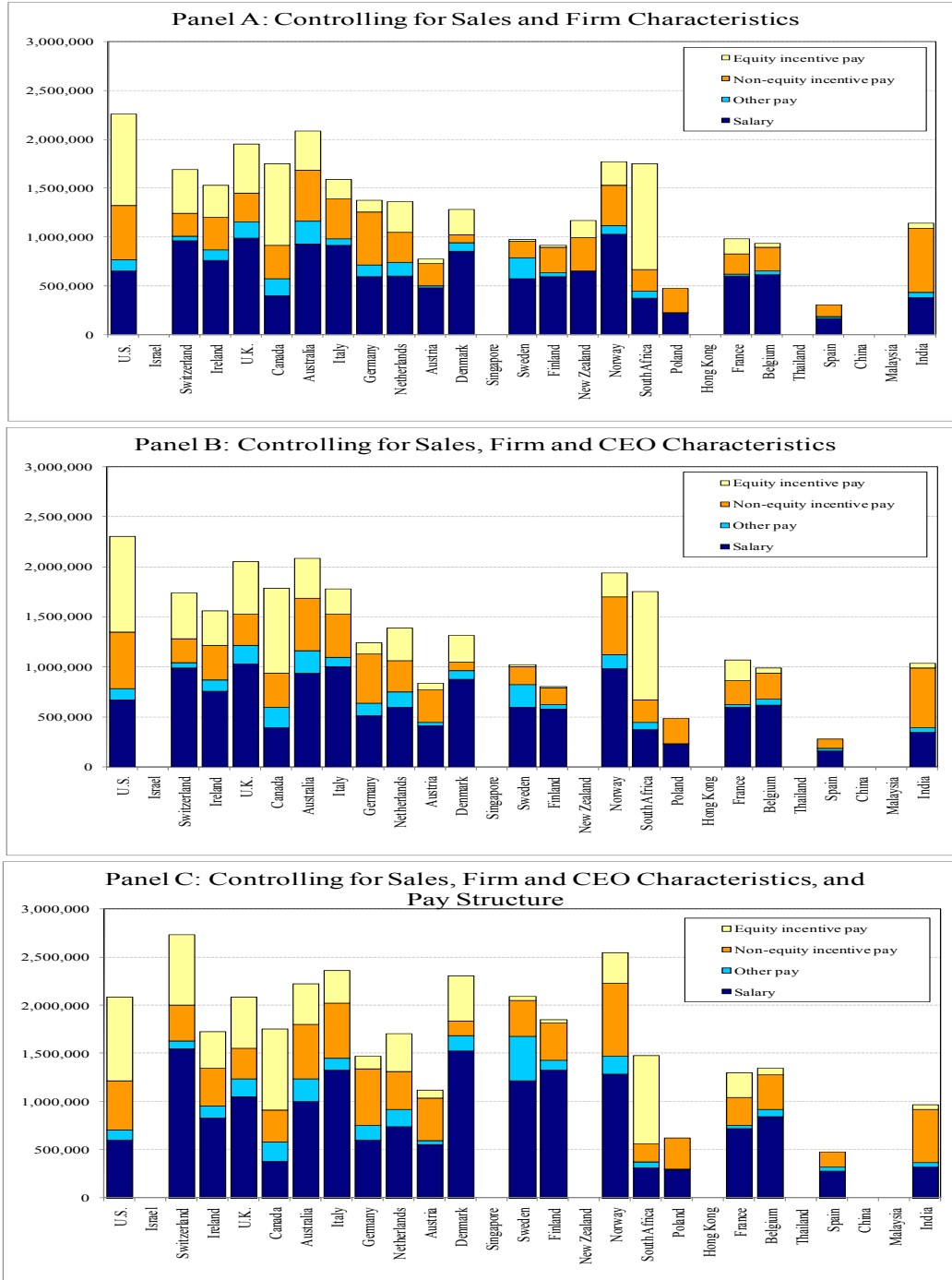
Estimates of cross-sectional regressions of CEO pay levels and pay structure as of 2006 are shown. Columns (1)-(6) show results for OLS cross-sectional regressions of the log CEO total compensation. Columns (7)-(12) estimate Tobit regressions for pay structure ratios. Regressions include the firm and CEO control variables used in column (3) of Table III (coefficients not shown). Refer to Appendix B for variables definitions. Robust t-statistics are in parentheses. Coefficients significant at the 5% level are in boldface.

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Total comp.	Total comp.	Total comp.	Total comp.	Total comp.	Total comp.	Tobit [Incentives /Total]	Tobit [Equity incentives /Total]	Tobit [Incentives /Total]	Tobit [Equity incentives /Total]	Tobit [Incentives /Total]	Tobit [Equity incentives /Total]
U.S. dummy	0.1780 <b>(2.71)</b>	0.0567 (0.94)	0.3436 <b>(6.20)</b>	0.0996 <b>(2.02)</b>	0.1154 (1.67)	-0.0378 (-0.52)	0.0605 <b>(2.27)</b>	-0.0442 (-1.19)	0.1276 <b>(4.99)</b>	0.1094 <b>(3.07)</b>	0.0763 <b>(2.86)</b>	-0.0166 (-0.45)
Sales (log)	0.2026 <b>(11.91)</b>	0.1627 <b>(11.17)</b>	0.2053 <b>(12.43)</b>	0.1642 <b>(11.41)</b>	0.2007 <b>(11.21)</b>	0.1612 <b>(10.97)</b>	0.0243 <b>(5.46)</b>	0.0149 <b>(2.37)</b>	0.0249 <b>(5.57)</b>	0.0166 <b>(2.64)</b>	0.0239 <b>(5.37)</b>	0.0151 <b>(2.41)</b>
Incentives/Total compensation		1.9335 <b>(5.19)</b>		1.9306 <b>(5.19)</b>		1.9372 <b>(5.14)</b>						
GDP per capita	-0.2461 (-1.30)	-0.1220 (-0.93)	-0.2955 (-1.75)	-0.1274 (-1.01)	0.1122 (0.72)	0.1701 (1.22)	-0.0641 (-1.67)	-0.0150 (-0.27)	-0.0890 <b>(-2.35)</b>	-0.0687 (-1.26)	-0.0276 (-0.77)	0.0448 (0.88)
Common law dummy	0.4200 <b>(4.92)</b>	0.1071 (1.30)					0.1710 <b>(8.30)</b>	0.4011 <b>(12.78)</b>				
Law and order			0.7039 <b>(5.56)</b>	0.2202 (1.87)					0.2604 <b>(7.58)</b>	0.6213 <b>(12.01)</b>		
Anti self-dealing	0.3430 <b>(2.23)</b>	0.3587 <b>(2.97)</b>	0.3850 <b>(2.64)</b>	0.3618 <b>(3.25)</b>			-0.0081 (-0.36)	-0.0289 (-0.85)	0.0140 (0.65)	0.0168 (0.51)		
Director enforce					0.4206 <b>(2.67)</b>	0.5105 <b>(2.81)</b>					-0.0341 (-0.77)	-0.0555 (-0.87)
Compensation disclose					0.5430 <b>(2.09)</b>	0.1038 (0.44)					0.2420 <b>(5.20)</b>	0.5937 <b>(8.09)</b>
Enforcement of insider trading laws					-0.0666 (-0.47)	0.1985 (1.35)					-0.1531 <b>(-3.23)</b>	-0.2952 <b>(-4.33)</b>
Collective laws index					-1.3772 <b>(-5.22)</b>	-1.0214 <b>(-5.39)</b>					-0.1979 <b>(-2.89)</b>	-0.5507 <b>(-5.39)</b>
Firm characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CEO characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Standard errors clustered by country	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
Observations	2,543	2,543	2,543	2,543	2,541	2,541	2,543	2,543	2,543	2,543	2,541	2,541
R-squared	0.59	0.72	0.59	0.72	0.59	0.72						



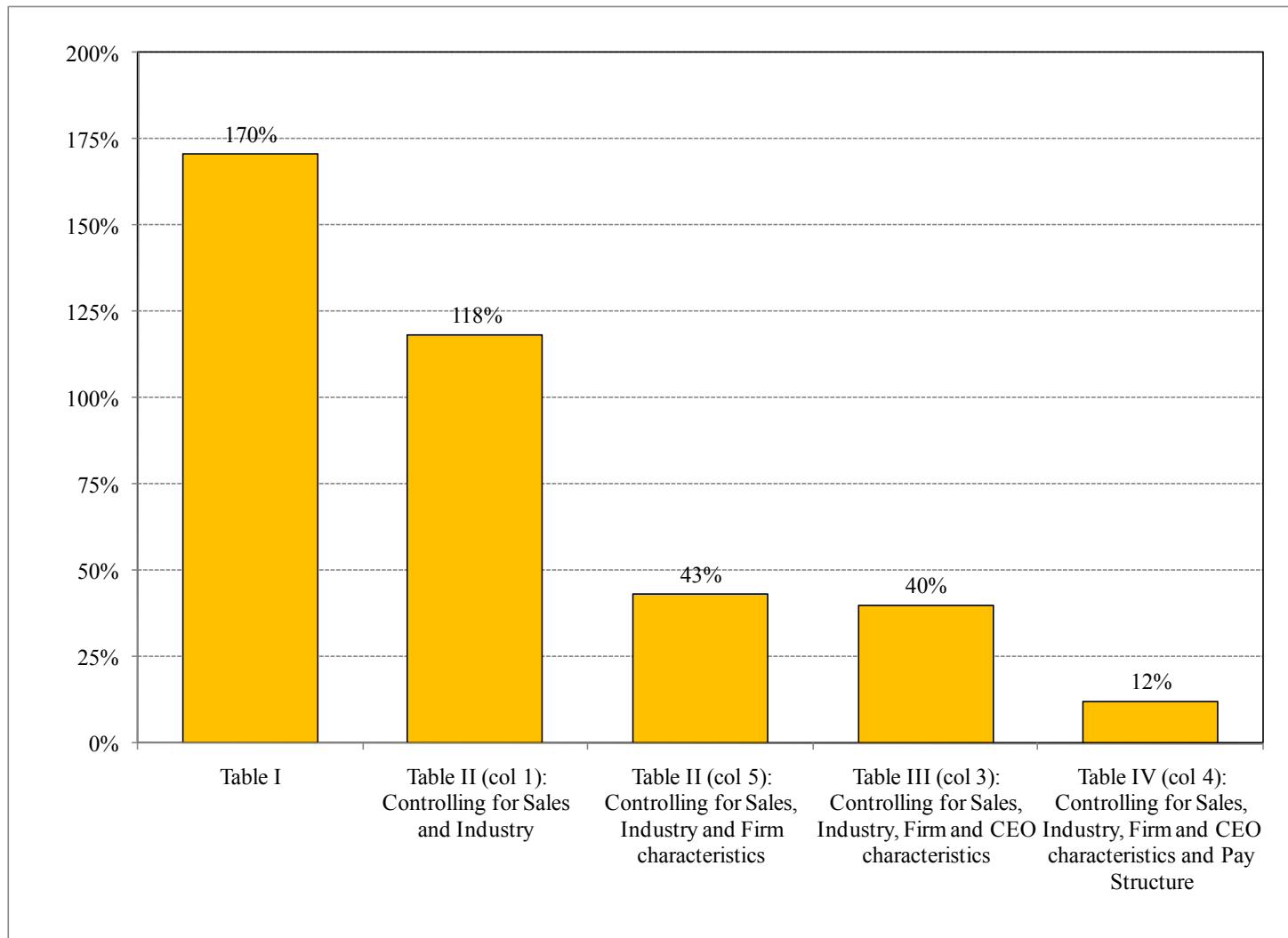
**Figure 1: CEO Total Compensation Controlling for Sales and Industry**

This figure compares CEO pay in US\$ in each country controlling for firm size (sales) and industry. The sample fiscal year is 2006. We regress the logarithm of total compensation on the logarithm of sales and 12 industry and 27 country dummies. For each country, we estimate the US\$ pay for a CEO running a hypothetical firm with \$1 billion sales using the estimated coefficient for pay-size sensitivity and that country's dummy variable, controlling for "average" industry (similarly to Table II, column (1)). Countries are sorted in descending order in terms of total estimated pay. The number of firms with compensation data in each country is shown in brackets.



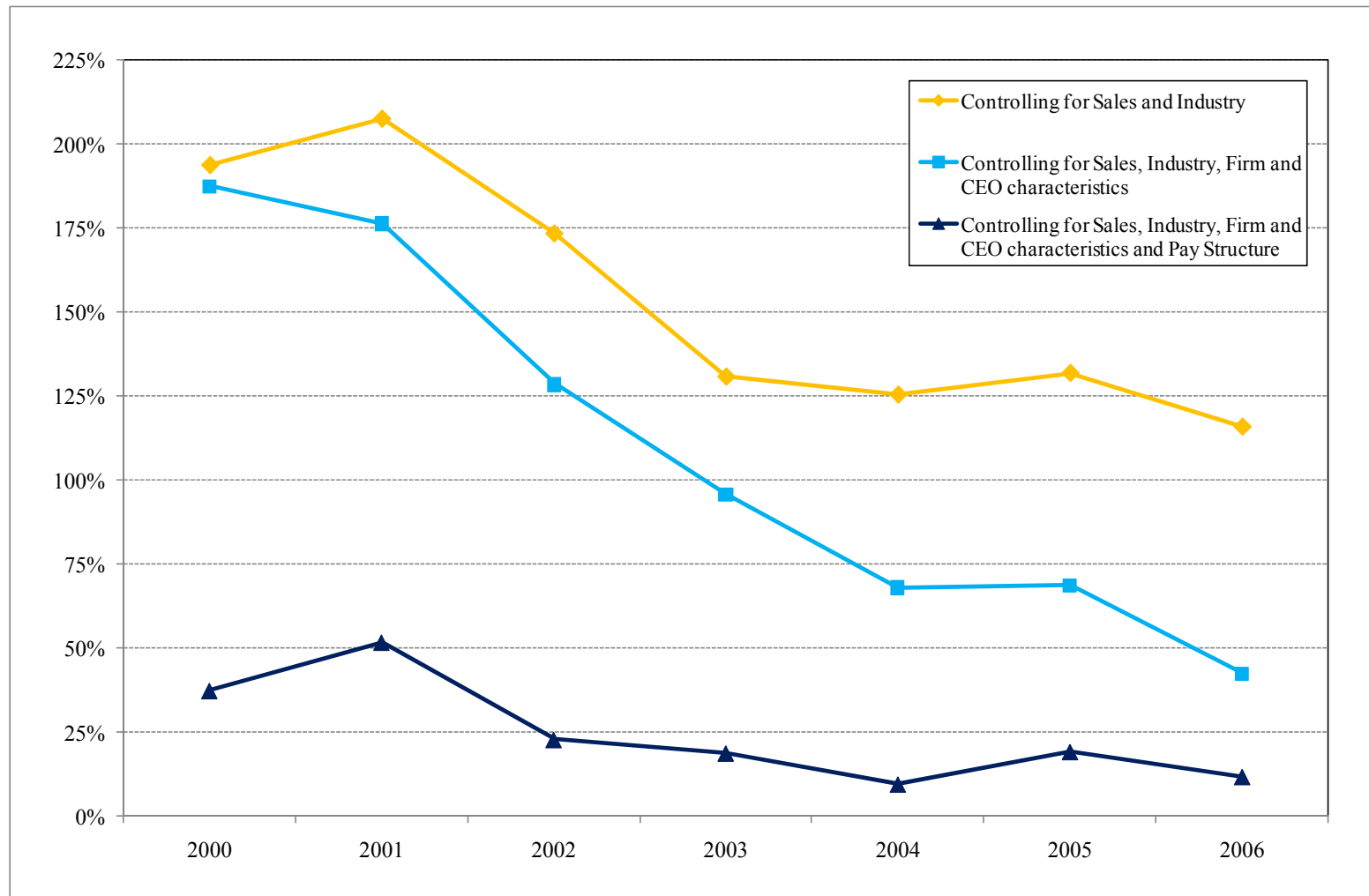
**Figure 2: CEO Total Compensation Controlling for Firm, CEO Characteristics and Pay Structure**

This figure estimated average CEO pay in US\$ in each country controlling for firm and CEO characteristics and pay structure. The sample fiscal year is 2006. In Panel A, we regress the logarithm of total compensation on the logarithm of sales and firm characteristics and 12 industry and 27 country dummies (similar to Table II). In Panel B, we add also CEO characteristics (similarly to Table III). In Panel C, we add also pay structure (similarly to Table IV). For each country, we estimate the US\$ pay for a CEO running a hypothetical firm with \$1 billion sales using the estimated coefficient for that country's dummy variable, controlling for average firm characteristics, CEO characteristics, pay structure and in an average industry. in our full sample.



**Figure 3: U.S. CEO Pay Premium**

This figure shows the contribution of each factor to explain the U.S. CEO pay premium (i.e. how much U.S. top executives earn more, on average and in percentage terms, than non-U.S. executives). Pay premium is calculated based on the estimated “U.S. dummy” coefficients from Tables II, III and IV.



**Figure 4: U.S. Total Pay Premium by Year**

This figure shows the contribution of each factor to explain the U.S. CEO pay premium in percentage by year in the period from 2000 to 2006. The estimated U.S. pay premium is plotted based on the estimated “U.S. dummy” coefficients for each yearly regression from Table VI. For this analysis, our sample of firms is less comprehensive than our main analysis for 2006 (of Tables II, II and IV) as it only includes firms for which we have data available each year in BoardEx.

## Appendix A.1

### Sample Means of Level and Composition of CEO Compensation by Country

The table presents the number and the mean level and composition of CEO pay in 2006 (in US\$) for the sample of firms per country. Refer to Appendix B for variables definitions.

Region	Country	Number of Firms			Coverage (% of Market Cap)	Total compen.	Non Incentive Pay				Incentive Pay								
		Execuc/ Boardex	Comp. filings	Total			Salary	Other pay	Non- incentive pay	Non- incentive /Total	Equity Incentives					Non-Equity Incentives			
											Options	Options/ Total	Options dummy	Equity incentive pay	Equity incentive /Total	Non-equity incentive	Non- equity Incentive /Total	Incentive pay	Incentive pay/Total
North America	U.S.	1,285	0	1,285	74.2	5,496,757	778,431	312,773	1,091,204	0.342	1,473,023	0.202	0.571	3,110,066	0.415	1,295,487	0.244	4,405,552	0.658
	Canada	4	162	166	70.7	3,077,057	622,378	330,292	952,670	0.410	740,634	0.189	0.584	1,391,724	0.330	732,664	0.260	2,124,387	0.590
U.K.	U.K.	1,077	0	1,077	88.1	1,695,999	502,675	105,197	607,872	0.608	58,675	0.060	0.176	754,316	0.249	333,811	0.143	1,088,127	0.392
Euro Zone	France	191	0	191	82.2	2,307,167	687,307	44,759	732,066	0.628	639,817	0.113	0.246	1,089,629	0.155	485,472	0.217	1,575,101	0.372
	Germany	103	0	103	66.4	3,270,518	878,795	351,952	1,230,746	0.509	27,903	0.010	0.049	776,630	0.098	1,263,141	0.393	2,039,772	0.491
	Netherlands	75	1	76	83.7	2,324,316	701,780	219,803	921,583	0.564	142,191	0.050	0.184	816,362	0.203	586,371	0.233	1,402,733	0.436
	Italy	65	1	66	75.8	4,942,702	1,520,091	242,844	1,762,936	0.620	1,568,667	0.083	0.182	2,190,667	0.115	989,100	0.265	3,179,766	0.380
	Ireland	43	1	44	98.8	1,808,402	654,887	112,754	767,642	0.580	17,636	0.042	0.114	589,796	0.202	450,964	0.218	1,040,760	0.420
	Belgium	38	1	39	61.5	1,447,748	601,008	104,468	705,476	0.664	120,356	0.063	0.077	261,782	0.088	480,490	0.247	742,272	0.336
	Spain	22	9	31	67.9	1,856,528	781,769	314,602	1,096,370	0.655	-	0.000	0.000	44,481	0.009	715,676	0.336	760,157	0.345
	Finland	13	11	24	51.7	2,195,207	1,519,183	59,326	1,578,508	0.695	72,537	0.053	0.150	351,179	0.140	265,519	0.165	616,698	0.305
	Austria	4	2	6	33.5	2,008,189	1,185,334	81,333	1,266,668	0.629	86,333	0.037	0.167	86,333	0.037	655,188	0.334	741,521	0.371
	Sweden	97	1	98	78.4	1,399,448	751,410	325,552	1,076,962	0.793	26,181	0.014	0.051	29,191	0.015	293,294	0.192	322,485	0.207
	Norway	64	2	66	87.9	1,276,788	427,709	16,240	443,949	0.622	245,188	0.132	0.242	360,310	0.168	472,529	0.210	832,839	0.378
	Denmark	6	2	8	36.0	2,407,513	1,567,583	193,816	1,761,399	0.696	394,244	0.162	0.500	452,897	0.192	193,216	0.112	646,113	0.304
Oceania	Australia	3	150	153	80.2	2,356,891	794,709	246,076	1,040,785	0.570	208,539	0.080	0.399	540,024	0.181	776,082	0.249	1,316,106	0.430
	New Zealand	2	26	28	54.8	762,015	459,375	-	459,375	0.618	32,195	0.030	0.300	79,820	0.130	222,820	0.252	302,641	0.382
Asia	Hong Kong	0	29	29	80.1	2,118,029	675,746	53,227	728,972	0.469	315,534	0.140	0.321	436,220	0.206	952,836	0.326	1,389,056	0.531
	Singapore	1	56	57	59.7	1,492,357	380,010	64,879	444,889	0.467	127,039	0.069	0.421	247,161	0.119	800,307	0.413	1,047,469	0.533
	Thailand	0	47	47	34.0	562,538	303,050	123	303,173	0.655	-	0.000	0.000	-	0.000	259,366	0.345	259,366	0.345
	China	3	18	21	30.9	737,217	288,297	11,369	299,666	0.537	15,485	0.019	0.063	202,395	0.151	235,156	0.312	437,551	0.463
	India	0	75	75	62.0	639,342	206,234	29,021	235,255	0.615	17,566	0.016	0.061	17,566	0.016	386,521	0.369	404,087	0.385
	Malaysia	2	2	4	6.8	2,738,089	69,009	5,598	74,607	0.720	2,653,928	0.250	0.250	2,653,928	0.250	9,554	0.030	2,663,482	0.280
Other	South Africa	6	47	53	78.0	1,722,313	521,338	92,587	613,925	0.500	43,532	0.025	0.212	555,522	0.139	552,866	0.362	1,108,388	0.500
	Switzerland	18	12	30	54.3	6,120,107	1,686,327	247,614	1,933,941	0.498	1,098,020	0.158	0.320	3,164,304	0.287	1,021,862	0.215	4,186,166	0.502
	Poland	1	10	11	32.6	1,269,836	564,195	16,629	580,824	0.652	159,032	0.091	0.250	433,288	0.159	255,725	0.188	689,013	0.348
	Israel	6	4	10	14.8	1,910,504	312,010	32,846	344,855	0.476	966,903	0.273	0.500	966,903	0.273	598,746	0.251	1,565,648	0.524
Total		3,129	669	3,798	71.9	3,227,938	675,200	203,400	878,600	0.504	656,854	0.117	0.339	1,571,463	0.272	777,875	0.224	2,349,338	0.496



## Appendix A.2

### Sample Means of Firm Characteristics by Country

This appendix presents sample means of firm characteristics as of 2006. Refer to Appendix B for variables definition.

Region	Country	Financials							International Visibility			Ownership		Corporate Governance					
		Sales (billion \$)	Leverage	Tobin Q	Return on assets	Stock return volatility	Stock return	Turnover	MSCI dummy	U.S. cross- listing dummy	Foreign sales	Insider owner.	Inst. owner.	Board size	Fraction of indep. directors	CEO- chairman dummy	National mix	Past board positions	Current board positions
North America	U.S.	6.108	0.209	2.095	0.058	0.299	0.108	2.218	0.350	0.000	0.218	0.161	0.853	9.496	0.837	0.595	0.055	1.185	1.976
	Canada	4.097	0.235	2.001	0.074	0.261	0.326	0.740	0.536	0.404	0.304	0.197	0.492	11.600	0.726	0.178	0.242	1.059	2.099
U.K.	U.K.	2.100	0.180	2.081	-0.013	0.362	0.162	0.874	0.123	0.047	0.265	0.320	0.240	7.047	0.457	0.073	0.118	1.130	1.732
Euro Zone	France	7.959	0.246	1.646	0.052	0.263	0.342	0.657	0.246	0.099	0.387	0.500	0.209	10.592	0.493	0.597	0.156	1.040	1.986
	Germany	12.384	0.210	1.770	0.039	0.288	0.373	0.137	0.379	0.175	0.408	0.378	0.271	16.583	0.656	0.320	0.158	0.895	1.717
	Netherlands	8.959	0.210	1.937	0.061	0.254	0.430	1.048	0.368	0.224	0.523	0.320	0.300	9.132	0.565	0.408	0.334	1.050	1.867
	Italy	7.756	0.322	1.495	0.039	0.236	0.271	1.170	0.379	0.076	0.245	0.436	0.144	12.803	0.494	0.138	0.110	1.289	2.115
	Ireland	1.678	0.247	1.965	0.019	0.347	0.303	0.666	0.364	0.205	0.472	0.239	0.280	9.909	0.486	0.070	0.270	0.812	1.574
	Belgium	2.945	0.235	1.645	0.081	0.210	0.183	0.422	0.359	0.051	0.276	0.458	0.132	10.128	0.506	0.053	0.169	1.100	2.346
	Spain	11.272	0.394	1.569	0.051	0.224	0.409	1.285	0.519	0.185	0.237	0.323	0.175	13.074	0.528	0.348	0.161	1.048	1.870
	Finland	3.965	0.191	1.569	0.076	0.271	0.497	0.985	0.600	0.150	0.557	0.289	0.272	12.600	0.619	0.133	0.375	1.486	2.043
	Austria	5.595	0.226	3.572	0.078	0.368	1.156	0.680	0.833	0.000	0.438	0.386	0.215	16.000	0.624	0.500	0.225	0.525	1.650
	Sweden	2.468	0.191	2.254	0.069	0.295	0.598	0.895	0.327	0.071	0.408	0.286	0.309	9.694	0.643	0.010	0.142	1.219	2.133
Nordic	Norway	2.359	0.230	2.224	0.055	0.381	0.621	1.338	0.242	0.061	0.454	0.377	0.271	8.788	0.735	0.015	0.148	0.565	1.457
	Denmark	4.636	0.287	2.252	0.091	0.212	0.517	0.782	0.875	0.125	0.432	0.363	0.229	13.875	0.509	0.143	0.133	0.783	1.717
Oceania	Australia	2.229	0.256	1.908	0.082	0.248	0.254	0.769	0.412	0.065	0.225	0.353	0.103	8.419	0.589	0.000	0.154	0.782	1.924
	New Zealand	0.890	0.322	3.063	0.127	0.215	0.087	0.412	0.500	0.200	0.406	0.438	0.127	7.900	0.716	0.000	0.000	0.100	1.900
Asia	Hong Kong	4.550	0.205	1.707	0.097	0.199	0.156	0.465	0.964	0.143	0.299	0.536	0.137	15.160	0.548				
	Singapore	1.066	0.196	1.649	0.081	0.260	0.279	0.542	0.439	0.018	0.406	0.630	0.111	10.558	0.712	0.000	0.000	0.300	1.000
	Thailand	1.120	0.312	1.405	0.086	0.302	0.096	1.061	0.538	0.000	0.128	0.499	0.058	16.000	0.649				
	China	8.172	0.163	1.560	0.078	0.279	0.052	1.536	0.438	0.125	0.044	0.663	0.209	13.500	0.655	0.333	0.433	0.500	1.533
	India	2.293	0.217	2.781	0.122	0.330	0.554	0.265	0.030	0.121	0.196	0.517	0.153	11.083	0.717	0.000	0.100	0.250	1.900
Other	Malaysia	1.324	0.150	1.139	0.059	0.361	0.616	0.330	0.500	0.000	0.221	0.530	0.119	6.250	0.656	0.000	0.000	0.000	1.400
	South Africa	3.045	0.128	1.831	0.119	0.256	0.492	0.526	0.750	0.135	0.180	0.406	0.167	14.840	0.633	0.000	0.433	0.950	2.150
	Switzerland	9.756	0.142	2.956	0.083	0.226	0.367	0.914	0.600	0.320	0.581	0.280	0.294	10.750	0.739	0.250	0.586	1.286	2.114
	Poland	0.815	0.229	1.696	0.116	0.289	0.494	0.181	0.750	0.000	0.000	0.731	0.153	17.125	0.589	0.000	0.700	0.500	1.400
	Israel	0.927	0.071	1.643	0.016	0.377	0.410	0.543	0.375	0.125	0.242	0.470	0.216	7.625	0.556	0.333	0.150	0.250	1.450
	Total	4.588	0.209	2.026	0.041	0.306	0.220	1.305	0.304	0.067	0.275	0.291	0.461	9.378	0.644	0.322	0.113	1.115	1.884

### Appendix A.3

#### Sample Means of CEO Characteristics by Country

This appendix presents means of CEO characteristics as of 2006 for the sample of firms per country. Refer to Appendix B for variables definition.

Region	Country	Personal			Experience							Other Boards		Education		
		CEO age	CEO male dummy	CEO foreign dummy	CEO external hire dummy	CEO time in role	CEO time in firm	CEO time in sector	CEO other industry experience dummy	CEO other country experience dummy	Past CEO experience dummy	CEO past board positions	CEO current board positions	CEO college dummy	CEO graduate dummy	CEO US MBA dummy
North America	U.S.	55.448	0.978	0.018	0.371	8.535	16.564	20.326	0.460	0.139	0.338	0.701	1.654	0.861	0.521	0.345
	Canada	54.689	0.978	0.067	0.378	8.568	14.712	18.941	0.397	0.714	0.492	0.817	1.754	0.622	0.278	0.085
U.K.	U.K.	51.058	0.975	0.083	0.571	6.702	10.910	13.648	0.434	0.439	0.224	0.665	1.326	0.551	0.276	0.029
Euro Zone	France	55.101	0.980	0.067	0.503	9.207	14.402	17.540	0.470	0.436	0.403	1.288	2.425	0.785	0.295	0.047
	Germany	53.122	1.000	0.078	0.444	6.084	11.912	14.163	0.578	0.378	0.344	1.011	2.136	0.800	0.522	0.033
	Netherlands	53.192	0.973	0.288	0.425	5.552	11.801	15.266	0.438	0.548	0.205	0.370	1.425	0.658	0.342	0.055
	Italy	59.200	0.980	0.060	0.580	8.709	13.202	18.813	0.560	0.360	0.540	2.184	2.592	0.840	0.240	0.080
	Ireland	50.452	0.976	0.167	0.333	7.607	15.618	17.179	0.390	0.463	0.195	0.548	1.310	0.762	0.333	0.024
	Belgium	52.871	0.968	0.097	0.387	7.702	13.889	18.268	0.387	0.548	0.290	1.786	2.786	0.871	0.516	0.161
	Spain	56.565	0.957	0.087	0.304	7.324	13.274	15.855	0.550	0.600	0.350	2.000	2.500	0.783	0.304	0.100
	Finland	52.708	1.000	0.000	0.583	5.004	10.356	11.009	0.667	0.429	0.286	2.143	1.857	0.833	0.792	0.000
	Austria	56.400	1.000	0.000	0.400	7.804	15.580	20.130	0.250	0.500	0.250	0.333	1.667	0.600	0.400	0.200
	Sweden	49.794	0.990	0.072	0.505	5.930	11.037	12.835	0.433	0.340	0.268	0.775	1.746	0.887	0.639	0.010
Nordic	Norway	49.490	1.000	0.039	0.569	5.458	8.894	10.946	0.540	0.520	0.300	0.563	1.438	0.745	0.412	0.000
	Denmark	58.143	1.000	0.000	0.429	11.310	16.319	18.310	0.286	0.429	0.429	2.000	1.667	0.714	0.571	0.000
	Oceania	Australia	53.392	0.990	0.072	0.515	7.125	11.352	14.243	0.356	0.563	0.435	1.294	0.701	0.299	0.046
Asia	New Zealand	55.167	1.000	0.167	0.167	3.758	21.425	2.275	1.000	1.000	1.000	0.000	0.333	0.000	0.000	0.000
	Hong Kong	59.036	1.000	0.071	0.179	12.588	22.788	3.667	0.500	0.500	0.500	0.000	0.000	0.036	0.000	0.000
Other	Singapore	56.043	0.957	0.130	0.130	8.890	17.308	20.467	0.667	1.000	0.000	0.000	0.071	0.087	0.043	0.100
	Thailand	58.720	1.000	0.040	0.040	11.571	24.333	0.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000
	China	49.105	1.000	0.053	0.105	4.743	14.556	6.519	0.333	0.333	0.333	0.067	0.200	0.105	0.105	0.000
	India	54.714	0.964	0.071	0.036	9.324	26.846	34.247	0.500	0.500	0.000	0.000	0.211	0.143	0.107	0.250
	Malaysia	49.333	1.000	0.000	0.667	10.806	11.750	13.278	0.667	0.333	0.667	0.000	1.500	0.333	0.333	0.000
	South Africa	52.289	1.000	0.089	0.178	7.882	19.669	12.017	0.545	0.727	0.273	0.231	0.308	0.200	0.133	0.100
	Switzerland	52.714	0.964	0.429	0.321	6.334	11.242	17.833	0.611	0.556	0.444	0.864	1.136	0.643	0.429	0.111
	Poland	51.000	1.000	0.250	0.500	5.063	8.417	10.625	0.000	0.500	0.000	0.000	2.000	0.500	0.250	0.000
	Israel	49.600	1.000	0.200	0.800	10.470	11.117	11.117	0.200	0.000	0.200	0.000	1.400	1.000	0.600	0.000
	Total	53.522	0.979	0.063	0.445	7.637	13.820	16.853	0.453	0.328	0.302	0.738	1.559	0.699	0.389	0.160

## Appendix B

### Definitions of Variables

Variable	Definition
Panel A: CEO Compensation	
Total compensation	Total CEO Compensation in US\$ (Execucomp for U.S. firms, Boardex and compamy filings for non-U.S. firms)
Salary	Salary in US\$ (Execucomp: salary, Boardex: salary)
Other pay	Other compensation in US\$ (Execucomp: other compensation, Boardex: other + dc_pension)
Non-incentive pay	Salary + other pay
Options	Options value in US\$ (Execucomp: grant-date fair value of option awards, Boardex: Black-Scholes option value)
Equity incentive pay	Stock and options awards in US\$ (Execucomp: grant-date fair value of stock awards + grant-date fair value of option awards, Boardex = market value of shares + long-term incentive plans + Black-Scholes option value)
Non-equity incentive pay	Non-equity incentive-plan compensation in US\$ (Execucomp: bonus + target value of non-equity incentive-plan compensation, Boardex: bonus)
Incentive pay	Equity incentive pay + Non-equity incentive pay
Non-incentive pay/Total	Ratio of non-incentive pay to total compensation
Options/Total	Ratio of options to total compensation
Options dummy	Dummy that equals one if if options value is positive, and zero otherwise
Equity incentive pay/Total	Ratio of equity incentive pay to total compensation
Non-equity incentive pay/Total	Ratio of non-equity incentive pay to total compensation
Incentive pay/Total	Ratio of non-incentive pay to total compensation
Panel B: Firm Characteristics	
U.S. dummy	Equals one if firm is based in the U.S.
Sales (log)	Log of sales in thousands of US\$ at the end of the previous year (WS item 01001)
Leverage	Total debt divided by total assets at the end of the previous year (WS item 03255 / WS item 02999)
Tobin Q	Sum of total assets (WS item 02999) plus market value of equity (WS item 08001) minus book value of equity (WS item 03501) divided by total assets at end of previous year
Return on assets	Ratio of net income before extraordinary items (WS item 01551) plus interest expenses (WS item 01151) to total assets (WS item 02999) at the end of the previous year
Stock return volatility	Annualized standard deviation of daily stock returns during the previous year (DS item RI)
Stock return	Stock return during the previous year (DS item RI)
Turnover	Share volume (DS item VO) divided by adjusted shares outstanding (DS items NOSH/AF) during the previous year
MSCI dummy	MSCI member dummy, which equals one if a firm is a member of the MSCI All-country World Index
U.S. cross-listing dummy	U.S. cross-listing dummy, which equals one if a firm is cross-listed on a U.S. exchange through an American Depositary Receipts program (major depository institutions) or direct listing of ordinary shares (source: U.S. stock exchanges)
Foreign sales	International annual net sales (WS item 07101) as a proportion of net sales (WS 01001) at the end of the previous year
Insider ownership	Number of shares held by insiders (shareholders who hold 5% or more of the outstanding shares like officers & directors and immediate families, other corporations or individuals ) as a proportion of the number of shares outstanding (WS item 08021)
Institutional ownership	Institutional ownership by all institutions as a percentage of market capitalization (LionShares)
Domestic institutional ownership	Institutional ownership by foreign institutions as a percentage of market capitalization (LionShares)
Foreign institutional ownership	Institutional ownership by domestic institutions as a percentage of market capitalization (LionShares)
Board size	Number of executive and non-executive directors (Boardex)
Fraction of independent directors	Ratio of the number of independent directors to board size (Boardex)
CEO-chairman dummy	Dummy that equals one if CEO is also the Chairman (Boardex)

## Appendix B: Continued

Variable	Definition
Nationality mix	Ratio of the number of different nationalities of directors to board size (Boardex)
Past board positions	Ratio of the number of past board positions (in other quoted firms) of board members to board size (Boardex)
Current board positions	Ratio of the number of current board positions (in quoted firms) of board members to board size (Boardex)
Panel C: CEO Characteristics	
CEO age	Age of CEO (Boardex)
CEO male dummy	Dummy that equals one if CEO is a male, and zero otherwise (Boardex)
CEO foreign dummy	Dummy that equals one if CEO nationality is different from the firm country headquarters, and zero otherwise (Boardex)
CEO first year dummy	Dummy that equals one if CEO is serving in his first year and zero otherwise (Boardex)
CEO external hire dummy	Dummy that equals one if CEO is externally hired, and zero otherwise (Boardex)
CEO time in role	Time as top executive in the firm (Boardex)
CEO time in firm	Time employed in the firm or one of its divisions or subsidiaries (Boardex)
CEO time in sector	Time of experience in the same industry (Boardex)
CEO other industry experience dummy	Dummy that equals one if CEO has worked in a different industry in the past, and zero otherwise (Boardex)
CEO other country experience dummy	Dummy that equals one if CEO has worked in different country in the past, and zero otherwise (Boardex)
Past CEO experience dummy	Dummy that equals one if CEO was top executive of a different firm in the past, and zero otherwise (Boardex)
CEO past board positions	Number of past board positions of the CEO (Boardex)
CEO current board positions	Number of current board positions of the CEO (Boardex)
CEO college dummy	Dummy that equals one if CEO has a bachelors degree or higher, and zero otherwise (Boardex)
CEO graduate dummy	Dummy that equals one if CEO has a MBA, Masters, JD or PhD degree, and zero otherwise (Boardex)
CEO U.S. MBA dummy	Dummy that equals one if CEO has a MBA degree from a U.S. university (Boardex)
Panel D: Country Variables	
GDP per capita	GDP per capita in US\$ (WDI)
Market capitalization/GDP	Stock market capitalization divided by gross domestic product (WDI)
Common law dummy	Dummy that equals one for countries with common law legal origin (La Porta et al. (1997))
Anti self-dealing	Average of ex-ante and ex-post private control of self-dealing (Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008))
Director enforce	Index of criminal sanctions applicable to the issuer's directors and key officers when the prospectus omits material information (La Porta, Lopez-de-Silanes, and Shleifer (2006))
Compensation disclose	Index of prospectus disclosure requirements regarding the compensation of directors and key officers (La Porta, Lopez-de-Silanes, and Shleifer (2006))
Enforcement of insider trading laws	Dummy that equals one if country has enforced insider trading laws, zero otherwise (Bhattacharya and Daouk (2002))
Collective laws index	Measures the protection of collective relations laws as the average of labor union power and he protection of workers during collective disputes. (Botero, Djankov, La Porta, Lopez-de-Silanes and Shleifer (2004))

## **Appendix C**

### **Example of CEO Characteristics Variables**

Our methodology for using BoardEx data to construct the individual characteristics used in our analysis is illustrated using the case of James Dimon, President/CEO at JP Morgan Chase & Co in December 2006. We construct several variables to summarize a CEO's professional experience. First, we measure "CEO time in role", which is the time he or she has been the top executive in the firm as of December 2006. In the case of James Dimon, this would be since December 2005, where he first took the title of CEO, so his "CEO time in role" equals one year. Second, we create a "CEO external hire dummy" that takes the value one if the CEO was externally hired (to account for transition period, we consider a CEO appointment in the first year of employment to be an external hire), and zero otherwise. For Mr. Dimon, this dummy equals zero as he joined the firm before December 2004. Third, we measure the CEO's industry experience. In the example, Mr. Dimon has worked his entire career since 1982 in the financial sector, so his "CEO time in sector" equals 25 years and his "CEO other industry experience dummy" equals zero. Additionally, we measure international professional experience. In the example, the "CEO other country experience dummy" equals zero as this executive has not worked abroad. Finally, we use a dummy variable to indicate if the CEO was top executive of other firms in the past. Mr. Dimon was previously CEO of Bank One (which was ultimately acquired by JP Morgan Chase) and therefore his "CEO has been Past CEO experience dummy" equals one. To make all these classifications, we need to match every firm in the resume to the universe of firms in several databases (Datastream and Compustat Global for publicly listed firms and Icarus and Orbis for private firms). Given this match, we are able to get the country where the firm is located and primary industry where it operates (to simplify industry groups, we use SIC codes and then classify any firm into one of the 12 Fama-French industry groups). For cases where BoardEx had no ISIN code information, we have matched the data using company names.

Director networks are potentially important mechanisms in setting CEO pay (Barnea and Guedj (2008)), and the BoardEx data allow us to measure the extent to which executives are connected in the corporate world. Specifically, we count the number of board positions the CEO has at present and in the past in other firms. We then add the board seats in other firms in December 2006 ("CEO current board positions") and all seats in the past but currently not active ("CEO past board positions"). In our example, Mr. Dimon has one current board seat at JP Morgan and a total of six seats in the past.

## Appendix C: Continued

Details									
DoB	Age	Gender	Nationality	Committee Roles		Last Period's Comp	Last Wealth	Total Wealth	
				Current	Historic	USD (000s)	USD (000s)	USD (000s)	
13 Mar 1956	50	M	American	0	5	50,277	n.a.	n.a.	

**Personal (as of Dec-06):**

- . age = 50
- . male dummy = 1
- . foreign dummy = 0

Current Positions					
Start Date	End Date	Organisation Name	Role	Role Description	Committees
31 Dec 2006	31 Dec 2006	JP MORGAN CHASE & CO (Q)	President/CEO (Brd - ED)		n.a.

Past Positions					
Start Date	End Date	Organisation Name	Role	Role Description	Committees
01 Jul 2004	31 Dec 2005	JP MORGAN CHASE & CO (Q)	President/COO (Brd - ED)		n.a.
07 Oct 1997	19 May 2005	YUM! BRANDS INC (Tricon Global Restaurants Inc 05/2002) (Q)	Independent Director (Brd - SD)		A, N, Ex, F, G
27 Mar 2000	01 Jul 2004	BANK ONE CORP (De-listed 07/2004) (Q)	Chairman/CEO (Brd - ED)		Ex
Nov 1997	Mar 2000	CITIGROUP GLOBAL MARKETS INC (Salomon Smith Barney Hldgs prior 04/2003) (Q)	Chairman/Co-CEO (Brd - ED)		n.a.
1996	1998	TRAVELERS-AETNA PROPERTY CASUALTY (Q)	Director (Brd - SD)		n.a.
Oct 1998	Nov 1998	CITIGROUP INC (Q)	President (Non-Brd)		n.a.
Jun 1995	Oct 1998	TRAVELERS GROUP INC (Q)	President/COO (Brd - ED)		n.a.
Jan 1996	Nov 1997	SMITH BARNEY MUN FD INC (Q)	Chairman/CEO (Brd - ED)		n.a.
Mar 1994	Jan 1996	SMITH BARNEY MUN FD INC (Q)	COO (Non-Brd)	Also Chief Administrative Officer	n.a.
May 1988	Jun 1995	TRAVELERS GROUP INC (Q)	CFO (Brd - ED)		n.a.
1986	1988	Commercial Credit Co (P)	Senior VP/CFO (Non-Brd)		n.a.
1982	1985	AMERICAN EXPRESS CO (Q)	Vice President (Non-Brd)		n.a.

**Professional Experience (as of Dec-06):**

- . time in role = 1
- . time in firm = 6.8
- . dummy external hire = 0
- . time in sector = 25
- . past CEO dummy = 1 (at Bank One)
- . other industry experience dummy = 0
- . other country experience dummy = 0

**Board Experience (as of Dec-06):**

- . past board positions = 6
- . current board positions = 1

## Appendix C: Continued

Current Other Activities		
Start Date	Organisation	Role
	Harvard Business School	Director
	National Centre on Addiction and Substance Abuse (CASA) (USA)	Director
	New York University School of Medicine	Trustee
	United Negro College Fund (UNCF)	Director
	University of Chicago	Committee Member

Past Other Activities			
Start Date	End Date	Organisation	Role
15 Feb 2001		University of Chicago	Trustee
		Chicago Community Trust (CCT)	Trustee
		Financial Services Roundtable (FSR)	Director
		Kennedy Center Corporate Fund	Vice Chairman
		National Association of Securities Dealers (NASD) (USA)	Board Member
		New York University Medical Center	Trustee
		Young Presidents' Organization (YPO)	Member

Education		
Date	Institute	Qualification
1982	Harvard Business School	MBA
1978	Tufts University	BA

Achievements		
Date	Organisation	Award/Achievement
2006	Time Magazine	One of the World's 100 Most Influential People
2002	Morningstar	CEO of the Year

Education degrees (as of Dec-06):

- . college degree dummy = 1
- . graduate degree dummy = 1
- . US MBA dummy = 1

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