The Impact of CEO Long-term Equity-based Compensation Incentives on Economic Growth in Collectivist versus Individualist Countries

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Abstract

This study examines the impact of the prevalence of long-term equity-based chief executive officer (CEO) compensation incentives on GDP growth, and we address the moderating role of individualist

versus collectivist cultures on this relationship. We argue that long-term incentives given to CEOs in some firms may convey to other CEOs that they too may be able to receive such incentives and rewards if they emulate the incentivized and rewarded CEOs. In a longitudinal study across 22 nations over a 5-year period, we find that the higher proportion of CEOs in a country are awarded long-term equity-based incentive compensation, the greater future real GDP growth, particularly in collectivist countries.

1. Introduction

The 2008–09 global financial crisis triggered a debate about the use of equity-based incentives in chief executive officer (CEO) compensation. One central argument against the use of such incentive-based CEO compensation is that it appears to have only a small or negligible impact on firm-level performance (see, e.g., Murphy 1999; Oxelheim and Randøy 2005; Frydman and Saks 2010; Minnick, Unal, and Yang 2011), particularly when firms have weak corporate governance (Qin 2012). We elevate the issue to the country level—asking whether CEO incentives are good for country-level "performance." A motivation for this study is Bowe, Filatotchev, and Marshall's (2010) call for research on how "different national business traditions and cultural traits can interact with the workings of financial institutions, thereby moderating the relationship between governance, finance and business strategy." Specifically, we look at how "different national business traditions" interact with the financial "institution" of long-term equity-based incentives in CEO compensation, and how it is potentially moderated by "cultural traits" of collectivist versus individualist cultures.

We argue that the finding of a lack of a strong positive effect between executive long-term equity-based compensation incentives (i.e., stock options, restricted stock and performance shares) and firm performance does not imply there is not a positive effect from these incentive schemes on the economic growth of a country. In fact, we make the case that one can expect significant national variation in the effectiveness of long-term compensation incentives, as such incentives are institutionally embedded at the national level (Bruce, Buck, and Main 2005).

We see two main reasons for the existence of a positive national growth effect. First, in response to the empirical support of a weak link between CEO incentives and firm performance and the implicit implication that it does not spur economic growth, we stress the need to explicitly address this issue in a broader theoretical approach involving country-based effects. We propose that a considerable part of the overall economic benefits from long-term equity-based compensation incentives in firms is their spillover effects to the national level, as it leads to wealth-creating decision-making beyond the focal firms. We argue that when a CEO in one firm has long-term compensation incentives this leads to

changes in the behavior of CEOs of rival firms, and leads to a positive spillover effect on these other CEOs and their firms' performance. Over time, the effects of the CEO incentives cascade through the economy as CEOs and/or aspiring CEOs are motivated to make wealth-creating economic decisions. The economic rationale is that the higher the percentages of CEOs with long-term incentive remuneration, the better the economic performance at the national level. Specifically, we add to the literature by extending the arguments from tournament theory (Lazear and Rosen 1981; Blanes-i-Vidal and Nossel 2011), addressing *within-firm* effects of executive compensation, to include between-firm effects creating wider overall economic benefits. We claim that *between-firm* effects can be seen as a learning process by CEOs and/or aspiring CEOs in other firms, and thus label our new theory *vicarious agency*.

Second, existing research has only partly addressed the international business nature of top-management compensation incentives (Strange et al. 2009; Oxelheim and Randøy 2013). Hence, there is a need to address how executive incentives represent a means to enhance firm productivity in one country more than in other countries. Fundamentally, we argue that top-management long-term equity-based compensation incentives have the potential to change the common corporate culture of a country in line with the "modernization theory" of Inglehart (1997). We propose, however, that this effect is influenced by the relative degree of individualism/collectivism of the national culture. The cultural context of collectivism would typically lead to less focus on individual top management incentives, but the impact of such incentives within the cultural norm of collectivism might be bigger. For example, in the United States such incentives are expected, and thus produce less impact, whereas in China offering long-term equity-based executive compensation incentives differentiates the firm in terms of wealth-creating corporate goals as well as enhances the recruitment of talented executives. Furthermore, when new practices are introduced in collectivist cultures, such as China, this can be expected to produce stronger social influence across firms, as demonstrated by Li and Tang (2010).

The paper is organized as follows. In Section 2 we review the general issue of CEO incentives and national growth. In Section 3 we present the hypothetical construct of vicarious agency, exploring the relation of CEO long-term equity-based incentive compensation to national economic prosperity. Section 4 reports predictive analysis relating CEO incentive pay to national GDP growth in general, and investigates the impact of the relative national societal level of individualism/collectivism upon the many facets of this dynamic. Section 5 is a discussion of the policy implications of our findings. Section 6 concludes the paper and suggests future research.

2. CEO long-term compensation incentives and national growth

Agency theory focuses on how incentives work within the firm to align interests between owners and managers. Managerial power theory presents another view of the linkage

between owners and managers, suggesting executive incentives are not necessarily structured to alter executive behavior in a firm-level wealth-creating direction (Bebchuk and Fried 2003).

Standard agency theory predicts that CEO long-term performance compensation incentives affect firm performance. A tenet of normative agency theory (Jensen and Meckling 1976) is that individual firms should index executive compensation to remove market-wide effects. Relative performance evaluation posits executive compensation reward only the part of firm performance for which the executive can claim some control and responsibility. Executive incentive awards should not reflect the benefit or loss arising from overall financial market performance over which the executive has no control (Bertrand and Mullainathan 2001). Furthermore, managerial long-term compensation incentives are more effective at inducing wealth-creating decisions when formulated in line with the economic psychology of incentives—specifically, considering how executives prefer less risky, less uncertain, and more immediate forms of rewards (Pepper and Gore 2014).

The literature addressing relative performance measurement suggests that CEOs perceived to be highly talented are in demand by competing firms and as a consequence accrue higher wages from their own firms than might be justified by firm performance under their leadership (Rajgopal, Shevlin and Zamora 2006). Chang, Dasgupta and Hilary (2010), however, demonstrate that CEO compensation may reflect CEOs' abilities and be correlated with firm performance.

Few studies have analyzed the between-firm effects of incentive pay practices. One exception is the ratchet effect (Freixas, Guesnerie, and Tirole 1985) extended to the area of executive pay, making the case that one executive's pay is affected by other executives' pay—typically within the same executive labor market—which we argue is mostly confined within a country even if it is in the same industry. Similar to managerial power theory, the ratchet effect is driven by "what the CEO can get" (managerial power at the between-firm level) rather than how it affects motivation and wealth-creating incentive alignment between managers and owners at the firm level (the agency theory argument in general and the tournament theory in particular).

The ratchet effect represents a misanthropic view with a race to the top of compensation without any related increase of efforts. Kuhnen and Tymula (2012) offer insight into the ratchet effect in executive pay through a behavioral economic simulation. They demonstrate that feedback may induce a ratcheting effect in productivity, mainly because of the competition to be at the top of the rank hierarchy.

A natural experiment of the bidding-up or ratchet effect occurred in 2005. German authorities, following International Financial Reporting Standards, changed regulations, forcing

Figure 1. Conceptual categorization of executive pay theories and proposed economic growth effects

		Executive compensation incentives good for economic growth?	
		Yes (philanthropic view)	No (misanthropic view)
Level of analysis	Between-firms	Vicarious agency theory	Ratchet effect theory
	Within-firms	Agency theory/ tournament theory	Managerial power theory

German-listed firms to disclose each executive member's pay. An empirical analysis done by Stadtmann and Wissmann (2008) confirms such pay increase effects from increased pay transparency in Germany. These findings open the analysis to consideration of the determination of the CEO's compensation not only with respect to their own firm's performance, but also to the behavior of competing firms, or even to the overall economy (Oxelheim, Wihlborg, and Zhang 2012).

We suggest that existing executive pay studies are too narrow in their theoretical scope to capture effects at the national level. To visualize the contribution, we conceptualize in Figure 1 executive pay theory in relation to two dimensions: level of analysis and the extent that executive incentives contribute to national economic growth.

The underlying implication for country-level economic growth is that appropriate long-term equity-based CEO incentives (with relative performance evaluation) should be good for economic growth. Specific to managerial incentives, Bloom and Van Reenen (2010) examine CEO incentive pay and firms' productivity (a broader definition of firm performance than equity price performance) and find a positive relationship. The results hold only among some studies of small groups of firms, however. Even though the positive relationship between firm-level CEO incentives and firm performance is relatively weak, as long as a relationship exists, higher firm performance can have direct and indirect positive effects on national prosperity.[1] In contrast, incentive awards based on CEOs' serendipitous good fortune, namely, luck (Oyer 2004), managerial power (Qin 2012), or ability to skim corporate wealth through poor governance (Bertrand and Mullainathan 2001), should be bad for overall economic growth.

The difference between the agency and managerial power theories including the between-firm ratchet effect can be seen as philosophical. The agency theory reflects a philanthropic

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1 This should hold even in the absence of non-competitive firm behavior.

view when it comes to wealth-creating efforts as a result of incentives, and the managerial power theories are misanthropic, not leading to wealth-creating efforts as a result of incentives.

Although the agency and tournament theories' argument for motivation and incentives through compensation is typically in a within-firm context, the vicarious agency theory presented in the next section considers the between-firm motivational effects and the spill-over impact of executive compensation incentives in other firms, particularly within the same country.

3. Hypothetical construct of vicarious agency

The relation between CEO long-term equity-based incentives and the financial performance of a CEO's firm has been found by past research to have a weak link; nevertheless, this study posits that aggregate firm performance within a country may be enhanced by ubiquitous implementation of CEO pay incentives within that country.

The dynamics of the relation between the relative frequency of CEO equity-based incentive pay and aggregate firm performance within the same country are complex. We argue that there is a link between a CEO's motivation to enhance the financial performance of their firm and the carrot of future incentives and other rewards for having done so. Accordingly, we hypothesize that when CEO "A" sees CEO "B" richly rewarded by the pleased board of directors, then CEO "A," believing that they may be similarly rewarded, may be motivated to work harder learning from the rewarded CEO's behavior, so as to please their own board and thereby receive similar rewards as those achieved by CEO "B."

The philosophical view on human behavior here is similar to the one adopted in tournament theory. "Vicarious agency" is the term we choose for the between-firm context to describe the dynamics of CEO "A" being motivated as a consequence of observing CEO "B" receiving a large compensation bonus. In so doing, we borrow the term "agency" from classic economic agency theory (Jensen and Meckling 1976) and the term "vicarious" from classic social learning theory in psychology (Bandura 1977). The notion is that CEOs learn vicariously by observing the consequences of other CEOs' behavior. Bandura's concept of social learning theory posits that individuals learn from observing the consequences of other individuals' behavior. We argue that CEOs, and/or potential CEOs, having observed rewarded CEOs, engage in imitation and behavioral modeling to seek similar rewards. By combining the dynamics of agency theory and social learning theory, we arrive at our hypothetical construct: vicarious agency.

Within a national network, incentive rewards to one CEO may have cascading effects through vicarious agency, motivating numerous other CEOs to work with greater vigor

in pursuit of enhancing their firms' performance. The overall enhanced motivation of multiple CEOs will thus result in overall improvement of national prosperity. Thus, our hypothesis is somewhat akin to what happens in a chain reaction in physics. Two or three CEOs see rewards given to another CEO. They then enhance their efforts in hopes of similar rewards. Some succeed, and, in turn, their rewards are noted by other CEOs, who then enhance their efforts, and the chain reaction grows. Not all CEOs succeed and not all firms prosper, but more do prosper than might have if the incentives did not exist. The chain reaction reaches a critical mass, and the nation prospers overall. This is similar to concepts of dissemination of board of director practices observed by Bouwman (2011).

To summarize, we posit that the existence of CEO long-term equity-based incentive compensation not only influences firms' executives who receive these incentives, but also motivates executives in competing firms, enhancing the competitive rivalry, and producing economic prosperity as a whole. If true, one expects to find a positive relation between the frequency of the use of such long-term equity-based compensation incentives in an economy and economic growth of that economy in the following time period.[2] This is also supported by past research that highlights the complex relation between CEO compensation in one firm and the behavior of competing firms and the actors within those other firms (e.g., Rajgopal, Shevlin, and Zamora 2006). Based on this argument we formulate Hypothesis 1.

Hypothesis 1: There is a positive relation between the prevalence of CEOs receiving long-term equity-based compensation incentives in a nation and the real GDP growth of that nation.

Highlighting the importance of specific cultural dimensions to global business, Hofstede (1980, 2001) provides the research community with an initial set of four dimensions of cultural variation: power/distance, uncertainty/avoidance, masculinity/femininity, and individualism/collectivism (I/C). Of these, the dimension sparking the greatest interest among researchers in international business has been I/C (e.g., Bochner 1994; Triandis 1995; Li and Tang 2013; Gray, Kang, and Yoo 2013). Given the importance and research legacy of the I/C cultural dimension in international business research, we investigate links this dimension may have on the theoretical construct of vicarious agency and Hypothesis 1. From Hofstede's (2001) catalogue of I/C research findings:

(1) The more individualist societies are, in general, the wealthier they are compared with more collectivist societies.

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2   Please note, we use frequency of stock options, restricted stock and performance shares incentives, not the monetary amount of incentives. Excessive incentives are not argued to be better than moderate incentives.

(2) Individualist societies have economies based on individual interests, whereas collectivist societies' economies are based on collective interests.

(3) Collectivist societies prefer reward allocation based on equality for in-group and equity for out-group, whereas individualist societies prefer reward allocation based on equity for all.

(4) Treating friends better than others is normal and ethical in collectivist societies, although such favoritism is considered unethical in individualist societies.

(5) In collectivist societies, personal relationships prevail over task and company in business dealings, whereas company and task prevail over personal relationships in business dealings in individualist societies.

(6) Collectivist societies exhibit large differences in the distribution of wealth, whereas wealth is distributed more equally across sectors of the economy in individualist societies.

These six I/C points can be used to understand the implications of this cultural dimension for our theoretical model of vicarious agency. Items 1 and 2 imply that societies with a strong individualist orientation are more likely to result in outcomes supporting Hypothesis 1, but items 3 through 6 support the notion that collectivist societies are more likely to have a greater effect from the dynamics of vicarious agency in Hypothesis 1.

Li and Tang (2013) report that executive hubris is stronger in the more collectivist Chinese society than in the more individualist society of the United States. Executive hubris is defined as an executive's exaggerated self-confidence or pride (Hiller and Hambrick 2005). The cultural context of collectivism may lead to situations where social influences are more likely to condone the manifestation of executive hubris in business decisions involving diverse strategic corporate decisions, from excessive premiums paid for acquisitions to greater acceptance of CEO long-term equity-based incentive compensation.

We consider the role of the in-group network of CEOs fundamental to the dynamics of vicarious agency. The social influences surrounding in-group networking among CEOs, be it through family ties, social settings, on the golf course, or as members of each other's board of directors, imply that CEO long-term incentives occur more easily, frequently, and with less adverse societal reaction in collectivist cultures. This leads us to impart greater significance to Hofstede's catalogue of points 3 and 4. Hofstede's point 3 argues for more restrictive utilization of CEO incentives in collectivist societies such that they are limited to members of in-groups, such as top executives. Hence we formulate Hypothesis 2.

Hypothesis 2: *There is a stronger relation between the prevalence of CEO long-term equity-based compensation incentives and real GDP growth in collectivist cultures than in individualist cultures.*

4. Empirical results

4.1 Variables and data

The dependent variable is the percentage of real GDP growth (GDPGR) reported by the International Monetary Fund's World Economic Outlook. GDPGR is in constant (inflation adjusted) national currency.

We have two explanatory variables. First is the percentage of firms in a country providing long-term equity-based incentive remuneration in the form of stock options, restricted stock, and performance shares with typical vesting periods of three to five years, to their CEOs (LTIREM). Data are obtained from surveys by Towers Perrin between 2001 and 2005 for 22 countries. Towers Perrin surveyed their clients for the years 2001, 2004, and 2005. Their clients were mainly large firms; hence, our study has a potential bias toward large firms. Because the Towers Perrin data on long-term equity-based incentive plans is missing for the years 2002 and 2003, we observe the country-by-country trends and approximate the missing values by interpolation.[3] Towers Perrin stopped providing the survey data after 2005, restricting our study period to 2001–05, except that the dependent variable GDPGR stops in 2006 ($t + 1$). Our second explanatory variable is the cultural dimension of I/C as measured by Hofstede's individualism index value (INDIVCOLLECT). The data source is Hofstede's *Cultures Consequences* (1980, 2001).

Based on past research on economic growth, we identify four control variables to reduce the risk of making incorrect inferences. First, we include investment to real GDP per capita in 2005 constant prices (INVRATIO). This is the only variable found in prior studies of economic growth that survives specification bias in an extreme bound analysis setting (Levine and Renelt 1992). These data are from Penn World Table Version 6.3. (Heston, Summers, and Aten 2009). The second control variable is the Fraser Institute freedom index (LEGAL). It measures the country's legal system and security of property rights, and is associated with economic growth (e.g., Goldsmith 1995). The third control variable is the Fraser Institute freedom index measuring the country's labor market regulation (LABOR). Both LEGAL and LABOR are measured on a zero-to-ten scale, with higher values indicating a greater degree of freedom. These two variables are motivated by the

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3 In analyzing the Towers Perrin data for 2001, 2004, and 2005 it is clear that the percentage of firms providing long-term equity-based incentive pay to their CEOs does not vary wildly from year to year, but changes slowly and gradually; clear trends are visible from 2001 to 2004 on a country by country basis. Using interpolation assumes a linear trend from 2001 to 2004, which keeps our errors of approximation small, since most countries experience only a 5–20 percent change from 2001 to 2004. Without interpolation, our estimators will be less efficient and the standard errors larger as the information from 2002 and 2003 regarding the covariance between our independent variables investment's share of real GDP per capital in 2005 constant prices, legal structures, and labor market regulations and the dependent variable, real growth in GDP, is lost.

research initiative of the Canadian Fraser Institute.[4] The fourth control variable is the population's general education. Following Mork, Wolfenson, and Yeung (2004) in their study of the relation between economic growth and billionaire innovators, we control for each country's general education level (EDUCATION). It is the average years of schooling for the population age 15 years and older. We also control for other unobservable country effects via the use of country random disturbance terms in our random effects models.

Table 1 reports descriptive statistics. Descriptive statistics for LTIREM are for the years data are provided by Towers Perrin: 2001, 2004, and 2005. We do not use interpolated data for the years 2002 and 2003 in the descriptive statistics. The GDPGR statistics are presented for years 2002 through 2006, because our hypotheses relate LTIREM in year t affecting GDPGR in year $t + 1$. Lagging LTIREM reduces the problem of endogeneity to focus on the impact long-term equity-based executive incentive pay has on real GDP growth, rather than focusing on whether high rates of economic growth cause more firms to use such incentive pay. INDIVCOLLECT, INVRATIO, EDUCATION, and both Fraser Institute freedom indices, LEGAL and LABOR, are measured for the years 2002 through 2006.

We examine the variables on a country-by-country basis, as well as subsamples of 11 individualist countries and 11 collectivist countries. The average annual real GDP growth rate (GDPGR) ranges from 10.1 percent in China to 0.7 percent in Italy. The mean percentage of firms with long-term equity-based incentive remuneration ranges from 100 percent in Canada and 96.7 percent in the United States, the United Kingdom (UK), and the Netherlands to 16.7 percent in India. The mean investment to real GDP per capita, INVRATIO, ranges from 10.3 percent in South Africa to 43.0 percent in South Korea. For the zero-to-ten scale of the Fraser Institute Freedom Indices, LEGAL ranges from an average score of 3.86 for Argentina to 8.95 for the Netherlands, and LABOR ranges from an average score of 3.39 for Germany to 8.51 for Hong Kong. The average years of total schooling ranges from a low of 4.59 years for India to a high of 12.87 years for the United States. Hofstede's individualism index value (INDIVCOLLECT) ranges from a low of 18 for South Korea to a high of 91 for the United States. Over the whole 22-country sample, the mean percentage of firms with long-term equity-based incentive remuneration averages 68.7 percent, and the mean annual real GDP growth rate averages 3.5 percent and the Hofstede individualism index value averages 57.50. For the economic control variables, INVRATIO averages 26.8 percent, LEGAL averages 7.25, LABOR averages 5.65, and EDUCATION averages 9.69 years.

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4 We follow a common research tradition to control for indices of this kind, making explicit that the validity is conditioned upon an assumption about equidistance. See Canadian Fraser Institute (http://www.freetheworld.com/).

Table 1. Descriptive statistics on long-term equity-based incentive compensation and economic statistics

Country	LTIREM (%) Mean	Std. dev.	GDPGR (%) Mean	Std. dev.	INVRATIO (%) Mean	Std. dev.	LEGAL Mean	Std. dev.	LABOR Mean	Std. dev.	EDUCATION Mean	Std. dev.	INDIVCOLLECT Mean	Std. dev.
Panel A: Individualist countries with INDIVCOLLECT > 65 (N = 11)														
Australia	88.3	2.9	3.3	0.6	33.5	2.7	8.86	0.17	6.54	0.38	11.86	0.04	90.00	0.00
Belgium	88.3	11.5	1.9	0.9	29.1	0.9	7.53	0.32	4.83	0.25	10.40	0.09	75.00	0.00
Canada	100.0	0.0	2.7	0.5	27.8	2.2	8.46	0.16	6.85	0.34	11.86	0.28	80.00	0.00
France	93.3	2.9	1.7	0.6	26.9	0.7	7.53	0.11	5.31	0.32	9.83	0.13	71.00	0.00
Germany	75.0	13.2	0.9	1.2	23.8	0.8	8.80	0.14	3.39	0.77	11.39	0.49	67.00	0.00
Italy	71.7	18.9	0.7	0.8	31.4	0.4	6.29	0.70	4.58	1.09	9.08	0.11	76.00	0.00
Netherlands	96.7	5.8	1.4	1.2	25.6	1.1	8.95	0.27	5.58	0.59	10.80	0.03	80.00	0.00
Sweden	65.0	5.0	3.0	1.2	22.2	0.6	8.71	0.46	3.82	0.66	11.40	0.12	71.00	0.00
Switzerland	81.7	18.9	1.7	1.5	31.0	0.2	8.75	0.17	7.12	0.79	9.63	0.04	68.00	0.00
U.K.	96.7	2.9	2.6	0.6	23.2	0.4	8.82	0.32	6.99	0.38	9.26	0.13	89.00	0.00
U.S.	96.7	2.9	2.7	0.8	27.0	0.7	7.84	0.22	7.72	0.54	12.87	0.06	91.00	0.00
Panel B: Collectivist countries with INDIVCOLLECT ≤ 65 (N = 11)														
Argentina	53.3	11.5	4.9	8.8	15.8	3.0	3.86	0.61	4.46	0.65	9.04	0.12	46.00	0.00
Brazil	55.0	13.2	3.2	1.7	13.5	1.0	4.86	0.43	4.37	0.50	7.00	0.22	38.00	0.00
China	26.7	7.6	10.1	0.7	32.4	1.3	5.44	0.44	4.24	0.57	7.52	0.16	20.00	0.00
Hong Kong, SAR	65.0	15.0	5.6	2.9	26.8	1.8	7.68	0.39	8.51	0.22	9.74	0.19	25.00	0.00
India	16.7	5.8	7.6	2.0	18.4	2.2	6.23	0.30	5.76	0.58	4.59	0.15	48.00	0.00
Japan	28.3	11.5	1.7	0.9	32.9	0.9	7.74	0.45	6.73	0.60	11.19	0.11	46.00	0.00
Mexico	40.0	21.8	2.8	1.7	24.9	0.8	4.73	0.79	5.18	0.66	8.23	0.24	30.00	0.00
Singapore	80.0	10.0	6.1	2.4	31.3	5.3	8.36	0.21	6.74	1.11	8.40	0.14	20.00	0.00
South Africa	65.0	8.7	4.3	0.9	10.3	0.9	6.76	0.28	5.52	0.26	8.13	0.17	65.00	0.00
South Korea	65.0	5.0	4.8	1.4	43.0	0.3	6.71	0.56	4.67	0.74	11.38	0.13	18.00	0.00
Spain	63.3	11.5	3.3	0.5	35.7	1.0	6.64	0.28	5.31	0.51	9.66	0.14	51.00	0.00
Panel C: Whole sample (N = 22), individualist (N = 11), and collectivist (N = 11) countries														
Whole sample	68.7	25.7	3.5	3.1	26.8	7.5	7.3	1.5	5.7	1.43	9.7	1.9	57.5	23.9
Individualist	86.7	14.1	2.1	1.2	27.7	3.9	8.2	0.9	5.7	1.49	10.8	1.2	78.0	8.5
Collectivist	50.8	21.8	5.0	3.6	25.9	9.9	6.3	1.4	5.7	1.37	8.6	1.9	37.0	14.9
Panel D: Tests of equality of mean between individualist and collectivist countries														
t-test value	−7.951		5.638		−1.285		−8.740		−0.412		−7.160		−17.748	
p-value	0.0000		0.0000		0.2014		0.0000		0.6809		0.0000		0.0000	
ANOVA F-test	63.218		31.787		1.652		76.394		0.170		51.268		314.989	
p-value	0.0000		0.0000		0.2014		0.0000		0.6809		0.0000		0.0000	

Source: Authors' calculations.

Notes: This table presents the mean and standard deviation of variables LTIREM (percent of firms with long-term equity-based incentive remuneration, i.e., stock options, restricted stock and performance shares), GDPGR (annual real GDP growth), INVRATIO (investment share of real GDP per capita), LEGAL (Fraser Institute legal structure index), LABOR (Fraser Institute labor market regulation index), EDUCATION (average years of total schooling for the population age 15 y and up), and INDIVCOLLECT (Hofstede's individualism index value) for each of the 22 countries as well as for the whole sample and subgroups, the 11 individualist countries, and the 11 collectivist countries. The time period for all the variables except LTIREM (2001, 2004 and 2005) is from 2002–06.

The descriptive statistics indicate that firms in the 11 individualist countries are statistically different from those in the 11 collectivist countries, as seen in panel D of Table 1. For the individualist relative to the collectivist countries we find, at the 1 percent statistical significance level, that the percentage of firms with long-term equity-based executive incentive pay is higher, the real GDP growth rate is lower, the degree of freedom afforded by the legal structure and security of property rights is higher, the average years of total schooling is higher, and of course the Hofstede individualism index value is higher. Not statistically significantly different between the collectivist and individualist countries are the per capita investment to GDP ratio (INVRATIO) and labor market regulation index (LABOR).

4.2 Methodology

To test Hypothesis 1, we use panel data and perform a cross-sectional country-based time series regression with random effects. We relate the impact of long-term equity-based CEO incentive pay in one year on the real rate of growth in GDP in the following year as well as the modifying effect of a country's measure of I/C on the relation between long-term equity-based incentive pay for CEOs and the real rate of economic growth. Because Hofstede's INDIVCOLLECT values do not change over time for our 22 countries, we are precluded from using a fixed effects model as the INDIVCOLLECT values capture some of the differences between the countries.[5] Alternatively, we utilize a random effects model, which includes a random disturbance term, μ_i, representing a collection of factors omitted in our model that are specific to each country. These random disturbance terms are constant through time and enable us to pool the results from the various countries and focus on the relation between lagged LTIREM, GDPGR, and INDIVCOLLECT while reducing the bias that would otherwise result in our coefficients' estimates being influenced by unmeasured variables that are correlated with the GDP growth rate and would distort the between country variability. To reduce the risk of miss-specifying our model by omitting any economic variables, we include the four control variables: INVRATIO, LEGAL, LABOR, and EDU (the natural log of EDUCATION). The model used is:

$$
\begin{aligned}
\mathrm{GDPGR}_{it} = \gamma_0 + \gamma_1 \mathrm{LTIREM}_{i(t-1)} + \gamma_2 \mathrm{INVRATIO}_{it} + \gamma_3 \mathrm{LEGAL}_{it} + \gamma_4 \mathrm{LABOR}_{it} \\
+ \gamma_5 \mathrm{EDU}_{it} + \gamma_6 \mathrm{INDIVCOLLECT}_{it} + \mu_i + \varepsilon_{it}
\end{aligned}
\tag{1}
$$

where i represents the ith country, t denotes years 2002 through 2006, and the μ_i terms are the random disturbance terms for country i.

To test Hypothesis 2, we use our model in equation (1) with the sample split into two even groups by Hofstede's individualism index value; the subsamples consist of 11

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5   Including both fixed-effects dummy variables and Hofstede's INDIVCOLLECT in the same regression results in perfect multicollinearity.

Table 2. Support of Hypothesis 1

$$\text{GDPGR}_{it} = \gamma_0 + \gamma_1 \text{LTIREM}_{i(t-1)} + \gamma_2 \text{INVRATIO}_{it} + \gamma_3 \text{LEGAL}_{it}$$
$$+ \gamma_4 \text{LABOR}_{it} + \gamma_5 \text{EDU}_{it} + \gamma_6 \text{INDIVCOLLECT}_{it} + \mu_i + \varepsilon_{it}$$

Panel least squares regression results on GDP growth

All countries (N = 22)	
Intercept	0.1736
	(3.8176)***
LTIREM(−1)	0.0642
	(3.2085)***
INVRATIO	0.1225
	(2.0856)**
LEGAL	−0.0007
	(−0.2172)
LABOR	0.0014
	(0.5733)
LN(EDUCATION)	−0.0794
	(−3.1835)***
INDIVCOLLECT	−0.0007
	(−3.0895)***
No. of panel observations	110
Adjusted R^2	0.1575
F-statistic	4.3956***
Durbin Watson statistic	1.4221**

Notes: This table presents the panel least squares regression results using random effects for all 22 countries. The countries include Argentina, Australia, Belgium, Brazil, Canada, China, France, Germany, Hong Kong, India, Italy, Japan, Mexico, Netherlands, Singapore, South Africa, South Korea, Spain, Sweden, Switzerland, UK, and the United States. All regressions are run with five years of data: 2001–05 if lagged, and 2002–06 if not lagged.

Numbers in parentheses are t-statistics.

**Statistically significant at $\alpha = 5$ percent level and ***statistically significant at $\alpha = 1$ percent level. The cross-section random effects are not reported as they sum to zero and are not relevant to the discussions.

collectivist countries with INDIVCOLLECT scores less than or equal to 65 and 11 individualist countries with INDIVCOLLECT scores greater than 65. Because Hofstede's INDIVCOLLECT values do not change over time for our 22 countries, the 11 collectivist countries and 11 individualist countries are consistent throughout our five-year sample. Bifurcating our sample into collectivist and individualist countries illuminates the impact of Hofstede's individualism index value on the direction and magnitude of the impact of long-term equity-based incentive remuneration for CEOs on a country's real GDP growth rate.

4.3 Empirical results for Hypothesis 1

Table 2 reports the results from equation (1). Our results indicate that long-term compensation incentives for executives enhance national economic prosperity. In our 22-nation sample we find a positive and statistically significant (at the 1 percent level) relation between the prevalence of long-term incentives for higher-level executives and national economic prosperity.[6] The regression coefficient of 0.0642 on lagged LTIREM also

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6 Using clustered standard errors our results are qualitatively the same because of the small number of years in our panel regressions.

indicates economic significance; if the proportion of firms in a country using long-term equity-based incentives for CEOs increases from 50 percent to 60 percent in one year, we expect to see an average increase of 0.64 percent in the annual growth rate of real GDP in the following year.[7] The regression coefficient on INVRATIO is positive and large in magnitude with significance at the 5 percent level. The regression coefficients on the two freedom indices, LEGAL and LABOR, are statistically insignificant, but the regression coefficients on both LN(EDUCATION) or EDU and INDIVCOLLECT are negative and statistically significant at the 1 percent level. Our results support Hypothesis 1 in that there is a significant positive relation between the percentage of firms offering CEO incentive compensation in year t and GDP growth rate in the subsequent year across our global sample of 22 nations.

4.4 Causality issues

The question remains whether our results support Hypothesis 1 or are simply a consequence of the fact that enhanced GDP may cause greater frequency of CEO incentive compensation. Such a reverse effect could be because in good economic times firms have greater slack and are therefore more able and likely to offer compensation incentives to their top executives. Of course, our use of lagged LTIREM relative to GDPGR in equation (1) helps to mediate against real GDP growth causing increased frequency of CEO incentive remuneration. Nevertheless, to address this we alter our model in equation (1) to reverse the relation and regress the frequency of firms providing long-term incentive remuneration to their CEOs on lagged real GDP growth including our other economic control variables. Our model of equation (1) now becomes:

$$\text{LTIREM}_{it} = \gamma_0 + \gamma_1 \text{GDPGR}_{i(t-1)} + \gamma_2 \text{INVRATIO}_{it} + \gamma_3 \text{LEGAL}_{it} + \gamma_4 \text{LABOR}_{it}$$

$$+ \gamma_5 \text{EDU}_{it} + \gamma_6 \text{INDIVCOLLECT}_{it} + \mu_i + \varepsilon_{it} \qquad (2)$$

The random effects model of Equation (2) enables us to pool the results from the various countries and focus on the relation between lagged GDPGR and LTIREM while reducing the bias that would otherwise result in our coefficients' estimates from unmeasured variables that are correlated with the frequency of long-term CEO incentive pay and distort the variability across countries. Our variable definitions are identical to our earlier model, except that t now denotes years 2001 through 2005 because LTIREM is no longer lagged.

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7 Our model is robust to the inclusion of alternative control variables, including the annual growth rate of newly invested capital from Datastream, the Fraser Institute's economic freedom index, and Transparency International's corruption perceptions index. Our unreported results find a positive and statistically significant relation between lagged long-term equity-based incentive pay for CEOs and the real GDP growth rate for all country samples and for all combinations including alternative control variables.

Table 3. Support of one-way causality in supporting Hypothesis 1. Panel least squares regression results on long-term equity-based incentive compensation

All countries (N = 22)	
Intercept	−1.8174
	(−5.6014)***
GDPGR(−1)	0.0791
	(0.3116)
INVRATIO	−0.7071
	(−2.1907)**
LEGAL	0.0340
	(2.2178)**
LABOR	0.0393
	(3.7283)***
LN(EDUCATION)	0.9602
	(5.5380)***
INDIVCOLLECT	0.0011
	(0.6530)
No. of panel observations	110
Adjusted R^2	0.3880
F-statistic	12.5169***
Durbin Watson statistic	0.5715***

Notes: This table presents the panel least squares regression results using random effects for all 22 countries. All regressions are run with five years of data: 2000–04 if lagged, and 2001–05 if not lagged. Numbers in parentheses are t-statistics.

**Statistically significant at $\alpha = 5$ percent level and ***statistically significant at $\alpha = 1$ percent level. The cross-section random effects are not reported as they sum to zero and are not relevant to the discussions.

The results from Equation (2) are reported in Table 3. If increases in GDP cause greater frequency of CEO incentive remuneration, we would expect to find a positive and significant regression coefficient for lagged real GDP growth GDPGR(−1). What we find instead is that the regression coefficient is insignificantly different from zero, suggesting that GDP growth is not causing a greater frequency of firms providing CEO equity-based incentive compensation. These results suggest that our results in Table 2 not only support Hypothesis 1 regarding a positive relation between the frequency of firms providing CEO incentive pay and the real GDP growth of the country, but also that the positive relation runs only in one direction, with increased frequency of CEO incentive remuneration leading increased real GDP growth of the country.

4.5 Empirical results for Hypothesis 2

To test Hypothesis 2, we use our model in equation (1), which includes Hofstede's individualism index values, INDIVCOLLECT, for the 22 countries. Our results in Table 2 support Hypothesis 2 via the negative and statistically significant relation at the 1 percent level between each country's Hofstede individualism index value and national economic prosperity. The regression coefficient on INDIVCOLLECT of −0.0007 indicates that an increase in a country's degree of individualism results in less GDP growth, or, conversely, that an increase in a country's degree of collectivism results in stronger GDP growth.

Table 4. Support of Hypothesis 2

$$GDPGR_{it} = \gamma_0 + \gamma_1 LTIREM_{i(t-1)} + \gamma_2 INVRATIO_{it} + \gamma_3 LEGAL_{it}$$
$$+ \gamma_4 LABOR_{it} + \gamma_5 EDU_{it} + \gamma_6 INDIVCOLLECT_{it} + \mu_i + \varepsilon_{it}$$

Panel least squares regression results on GDP growth

	11 collectivist countries with INDIVCOLLECT ≤ 65	11 individualist countries with INDIVCOLLECT > 65
Intercept	0.2154	−0.0689
	(2.5572)**	(−1.1672)
LTIREM(−1)	0.1209	0.0143
	(3.1739)***	(0.8672)
INVRATIO	0.2866	−0.0652
	(2.5127)**	(−0.9867)
LEGAL	−0.0028	−0.0037
	(−0.4338)	(−1.4463)
LABOR	0.0005	0.0059
	(0.0965)	(2.9761)***
LN(EDUCATION)	−0.1369	0.0485
	(−3.1313)***	(1.9720)*
INDIVCOLLECT	0.0002	−0.0003
	(0.2718)	(−0.8032)
No. of panel observations	55	55
Adjusted R^2	0.1415	0.3068
F-statistic	2.4829**	4.9835***
Durbin Watson statistic	1.4812	1.9179

Notes: This table presents the panel least squares regression results using random effects for all 22 countries split into two subsamples: 11 collectivist countries and 11 individualist countries. All regressions are run with five years of data: 2001–05 if lagged, and 2002–06 if not lagged. Numbers in parentheses are t-statistics.

*Statistically significant at α = 10 percent level; **statistically significant at α = 5 percent level; ***statistically significant at α = 1 percent level.

Clearer support for Hypothesis 2, however, is demonstrated by splitting our sample into the 11 collectivist countries and 11 individualist countries as demarcated by Hofstede's individualism index values below or above, respectively, our 22-country sample median value of 65. Table 4 uses our model of equation (1) and demonstrates strong support for Hypothesis 2 by the much larger magnitude of the regression coefficient of lagged LTIREM for the 11 collectivist countries than the 11 individualist countries. The collectivist country regression coefficient of 0.1209 is over eight times the magnitude of the individualist country regression coefficient of 0.0143. In addition, the collectivist country regression coefficient of lagged LTIREM is significant at the 1 percent level whereas the individualist country regression coefficient is insignificant, also supporting Hypothesis 2. For the 11 individualist country subsample, both LABOR and LN(EDUCATION) have positive and significant regression coefficients.

4.6 Robustness tests of Hypotheses 1 and 2

Having addressed the causality issue with respect to Hypothesis 1 we turn to the influence of outliers in terms of the percent of firms offering long-term equity-based incentives in a country (i.e., stock options, restricted stock, and performance shares). Identifying the outliers for the 11 individualistic countries from Table 1, Sweden is the lowest with 65.0 percent of firms offering long-term incentives and Canada is the highest with 100

Table 5. Support of Hypothesis 1: Robustness tests

$$GDPGR_{it} = \gamma_0 + \gamma_1 LTIREM_{i(t-1)} + \gamma_2 INVRATIO_{it} + \gamma_3 LEGAL_{it}$$
$$+ \gamma_4 LABOR_{it} + \gamma_5 EDU_{it} + \gamma_6 INDIVCOLLECT_{it} + \mu_i + \varepsilon_{it}$$

Panel least squares regression results on GDP growth

	Omit Japan & Sweden 20 countries	Omit Singapore & Canada 20 countries	Omit four outliers 18 countries
Intercept	0.2038	0.1901	0.2244
	(4.0200)***	(3.8373)***	(4.1036)***
LTIREM(−1)	0.0753	0.0744	0.0873
	(2.9510)***	(3.4190)***	(3.1862)***
INVRATIO	0.1361	0.1275	0.1365
	(2.3276)**	(1.9903)**	(2.1679)**
LEGAL	−0.0020	0.0014	0.0002
	(−0.6279)	(0.4090)	(0.0688)
LABOR	0.0018	0.0006	0.0009
	(0.7077)	(0.2440)	(0.3356)
LN(EDUCATION)	−0.0958	−0.0896	−0.1079
	(−3.4665)***	(−3.2931)***	(−3.6089)***
INDIVCOLLECT	−0.0007	−0.0009	−0.0009
	(−3.1741)***	(−3.2590)***	(−3.4002)***
No. of panel observations	100	100	90
Adjusted R^2	0.176	0.147	0.165
F-statistic	4.534***	3.844***	3.932***
Durbin Watson statistic	1.375***	1.472**	1.417**

Notes: This table presents the panel least squares regression results using random effects for 18 or 20 of the original 22 countries as indicated. All regressions are run with five years of data: 2001–05 if lagged, and 2002–06 if not lagged. Numbers in parentheses are t-statistics.

**Statistically significant at $\alpha = 5$ percent level; ***statistically significant at $\alpha = 1$ percent level. The cross-section random effects are not reported as they sum to zero and are not relevant to the discussions.

percent of firms offering such incentives. Outliers chosen for the 11 collectivist countries are India[8] and Japan averaging 16.7 percent and 28.3 percent, respectively, of firms with long-term equity-based incentives and Singapore averages 80.0 percent.

Table 5 tests Hypothesis 1 using all 22 countries. We run three additional regressions: (1) omitting the two lowest countries of Japan and Sweden in each subsample, (2) omitting the two highest countries of Singapore and Canada in each subsample, and (3) omitting all four countries identified as outliers. The results are qualitatively the same in all three scenarios. Notably, there is even more support for Hypothesis 1 because in all three regressions the coefficient on lagged LTIREM not only continues to be significant at the 1 percent level but is greater than the 6.42 percent in Table 2, ranging from 7.44 percent to 8.73 percent. These three additional regressions also support Hypothesis 2 by the negative and significant at the 1 percent level coefficients for Hofstede's individualism index value. The magnitudes of the coefficients are virtually identical to the coefficient in Table 2 using all 22 countries.

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8   India for brevity reasons is excluded in the tables, but the result is qualitatively the same when India is substituted for Japan as the lowest of the collectivist countries' firms offering long-term equity-based incentives.

Table 6. Support of Hypothesis 2: Robustness tests for collectivist countries.

$$\text{GDPGR}_{it} = \gamma_0 + \gamma_1 \text{LTIREM}_{i(t-1)} + \gamma_2 \text{INVRATIO}_{it} + \gamma_3 \text{LEGAL}_{it}$$
$$+ \gamma_4 \text{LABOR}_{it} + \gamma_5 \text{EDU}_{it} + \gamma_6 \text{INDIVCOLLECT}_{it} + \mu_i + \varepsilon_{it}$$

Panel least squares regression results on GDP growth

	Omit Japan 10 countries	Omit Singapore 10 countries	Omit Japan & Singapore 9 countries
Intercept	0.2898	0.2456	0.3371
	(2.6658)**	(2.4869)**	(2.6919)**
LTIREM(−1)	0.1415	0.1375	0.1683
	(2.6632)**	(3.1740)***	(2.7520)***
INVRATIO	0.2614	0.3028	0.2594
	(2.3774)**	(2.2603)**	(2.0406)**
LEGAL	−0.0058	0.0016	−0.0014
	(−0.7895)	(0.2125)	(−0.1643)
LABOR	0.0002	−0.0016	−0.0018
	(0.0396)	(−0.2750)	(−0.2874)
LN(EDUCATION)	−0.1599	−0.1573	−0.1870
	(−3.0149)***	(−3.0495)***	(−3.0155)***
INDIVCOLLECT	−0.0001	−0.0001	−0.0006
	(−0.2392)	(−0.1308)	(−0.7286)
No. of panel observations	50	50	45
Adjusted R^2	0.099	0.163	0.128
F-statistic	1.899	2.589**	2.074*
Durbin Watson statistic	1.402	1.641	1.559

Notes: This table presents the panel least squares regression results using random effects for the 11 collectivist countries with INDIVCOLLECT ≤ 65. All regressions are run with five years of data: 2001–05 if lagged, and 2002–06 if not lagged. Numbers in parentheses are t-statistics.

*Statistically significant at α = 10 percent level; **statistically significant at α = 5 percent level; ***statistically significant at α = 1 percent level.

Tests of Hypothesis 2 are reported in Tables 6 and 7 by running the same regression in Table 2 but splitting the sample into the 11 individualist countries with Hofstede's individualism index value greater than 65 and the 11 collectivist countries with Hofstede's individualism index value less than or equal to 65. The three regressions run for the sensitivity analysis for the 11 collectivist countries are: (1) omitting Japan, (2) omitting Singapore, and (3) omitting both Japan and Singapore (Table 6). The coefficient on lagged LTIREM remains large in magnitude relative to the 1.43 percent coefficient for the individualist countries reported in Table 4, ranging from 13.75 percent to 16.83 percent, and larger than 12.09 percent reported in Table 4 for collectivist countries. The coefficient is significant at the 5 percent level when omitting Japan and significant at the 1 percent level for the other two scenarios. With both outliers removed the coefficient is 16.83 percent and significant at the 1 percent level.

The three regressions run for the sensitivity analysis for the 11 individualist countries are: (1) omitting Sweden, (2) omitting Canada, and (3) omitting both Sweden and Canada (Table 7). Although the coefficients are greater than the 1.43 percent reported in Table 4, ranging from 1.63 percent to 3.87 percent, they remain small relative to the collectivist regression coefficients. In contrast to the Table 4 results with all 11 individualist countries where the coefficient of lagged LTIREM is statistically insignificant, two of the three

Table 7. Support of Hypothesis 2: Robustness tests for individualist countries.

$$\text{GDPGR}_{it} = \gamma_0 + \gamma_1 \text{LTIREM}_{i(t-1)} + \gamma_2 \text{INVRATIO}_{it} + \gamma_3 \text{LEGAL}_{it}$$
$$\qquad + \gamma_4 \text{LABOR}_{it} + \gamma_5 \text{EDU}_{it} + \gamma_6 \text{INDIVCOLLECT}_{it} + \mu_i + \varepsilon_{it}$$

Panel least squares regression results on GDP growth

	Omit Sweden 10 countries	Omit Canada 10 countries	Omit Sweden & Canada 9 countries
Intercept	−0.0836	−0.0779	−0.0891
	(−2.2987)**	(−1.1119)	(−1.9240)*
LTIREM(−1)	0.0378	0.0163	0.0387
	(2.4899)**	(0.9263)	(2.2855)**
INVRATIO	0.0532	−0.0628	0.0540
	(1.0923)	(−0.7978)	(0.9026)
LEGAL	−0.0002	−0.0037	−0.0003
	(−0.1190)	(−1.3029)	(−0.1235)
LABOR	0.0032	0.0060	0.0036
	(2.0206)**	(2.8074)***	(1.9435)*
LN(EDUCATION)	0.0146	0.0522	0.0176
	(0.9021)	(1.8344)*	(0.8691)
INDIVCOLLECT	0.0000	−0.0003	0.0000
	(0.1864)	(−0.7924)	(−0.0305)
No. of panel observations	50	50	45
Adjusted R^2	0.442	0.303	0.407
F-statistic	7.470***	4.554***	6.023***
Durbin Watson statistic	2.114	1.956	2.128

Notes: This table presents the panel least squares regression results using random effects for the 11 individualist countries with INDIVCOLLECT > 65. All regressions are run with five years of data: 2001–05 if lagged, and 2002–06 if not lagged. Numbers in parentheses are t-statistics.

*Statistically significant at $\alpha = 10$ percent level; **statistically significant at $\alpha = 5$ percent level; ***statistically significant at $\alpha = 1$ percent level.

coefficients are now significant at the 5 percent level and the scenario omitting only Canada, the high outlier, continues to be statistically insignificant for the coefficient of lagged LTIREM.

The sensitivity analysis leads to the conclusion that leaving out the outlier countries does not change support for both Hypotheses 1 and 2. The results are not being driven by the outlier countries of Japan and Singapore for the collectivist countries or the outlier countries of Sweden and Canada for the individualist countries. In fact, support for both hypotheses is strengthened with the removal of the outlier countries.

5. Discussion and implications

This study is motivated by the public reaction to large CEO pay packages, especially in times of economic crisis and mediocre firm performance. This makes CEO pay incentives a global public policy issue (Ertimur, Ferri, and Muslu 2011). Therefore, this paper analyzes the relation between the prevalence of CEO long-term equity-based incentive pay and its impact on national economic prosperity (GDP growth), and the moderating effect of individualist/collectivist culture on this relationship. We contribute to the

understanding of CEO compensation through the development of a new theory, a merger between agency theory and social learning theory: vicarious agency.

After longitudinal data analysis for 22 countries we find support for the hypothesis that the long-term equity-based incentive reward given to a CEO in one company may actually become an incentive to a host of CEOs in other networked firms (typically within the same country). These CEOs are motivated to model their behavior after that of the rewarded CEO. Although the CEO may well deserve the incentive reward, if this is carefully overseen by the board, their behaviors may not have led to economic success for the focal firm because success depends on good fortune as well as wealth-creating decision-making by the CEO. Nevertheless, the board may be correct with regard to rewarding the CEO, because as other CEOs mimic the behaviors of successful CEOs, greater hustle spreads throughout the CEO and/or potential CEO community.

Daniel, Cieslewics, and Pourjalali (2012) indicate that national cultural practices influence the institutional environment of firms and this, in turn, influences numerous corporate governance practices such as financial disclosure, board accountability, and executive compensation practices. More specifically, recent research in international business highlights how incentive systems are instrumental in bringing about economic change (Yang and Stening 2013). Using China as a case, Yang and Stening write that "cultural values evolve at the slowest pace while business-related values and political ideologies are more dynamic and change at a considerable faster pace" (p. 438) and that "particular changes to ownership and reward systems have triggered business related value changes in China" (p. 438). Consistent with their statement, we argue that long-term equity-based executive compensation incentives are particularly powerful mechanisms of change and are of particular importance in collectivist countries such as China (Adithipyangkul, Alon, and Zhang 2011, makes such arguments for China). These arguments for changes through reward systems in collectivist countries are key motivating factors behind our Hypothesis 2.

In Hypothesis 2, culture may influence executive compensation practices. Our findings demonstrate the importance of comparative international research that addresses the dynamic impact of organizational behavior (CEO incentives) on country-level outcomes (economic growth). We find that the vicarious agency dynamic appears more robust in collectivist than individualist national societies. Furthermore, this may help us to more fully understand the dynamic between CEO long-term equity-based incentive compensation and firm performance. For example, it may be that CEO long-term equity-based incentive compensation is more effective in enhancing firm performance in societies where institutional practices push for parsimonious use of such incentives. In cases where 85 percent or more of CEOs expect incentive-based compensation, as is the case in most

individualist national societies, it may be that they are less of a motivator to CEO wealth-creating pursuits as much as they are viewed as normal and their absence may be de-motivating. National societal values in collectivist nations allow for greater hubris among CEOs creating cultural environments where CEO incentives are a status reward and are as important as the monetary reward, and this holds more so than in individualist cultures where the manifestation of hubris is less condoned.

Our international comparative findings suggest that the dynamics between CEO long-term equity-based compensation incentives and firm performance may lead to a revisiting of earlier studies of these dynamics in nations with values and norms differing from those of highly individualist nations. It may be that in societies where CEO incentives are less ubiquitous, these equity-based incentives may act more robustly to enhance both firm and national performance.

Although we argue there is a positive relation between the prevalence of CEO long-term equity-based pay incentives and GDP growth, it is important to stress that our study is not about levels of such incentives and does not imply a linear relation between the level of CEO pay and GDP growth. Our CEO pay data is a frequency count of the relative number of CEOs receiving long-term equity-based incentive pay in 22 nations, and therefore does not reflect the magnitude of incentive pay. We highlight this because excessive CEO pay has become a major media issue, and there are numerous efforts by diverse groups to dampen executive pay—for example, by putting a total ban on pay for performance or limiting the size of such rewards. Our findings support a view that, in general, CEO long-term compensation performance incentives are a good thing that enhances economic growth. Therefore, from a policy point of view, incentives are recommended, but their specific design is outside the scope of this paper. Incentives considered excessive may be as costly to economic growth as a total ban on performance-based incentives.

6. Conclusions and future research

We hypothesize there is a link between CEO long-term equity-based compensation incentives and national economic performance. That link may, indeed, be nonlinear, however. Our results support this view in that we find that national economic performance is enhanced by CEO long-term equity-based compensation incentives in collectivist national cultures where, as a consequence of cultural values, the awarding of such incentives is not as pervasive as in individualist national cultures. We note that cultural values in collectivist societies push to limit universal awards of incentives, with 50.8 percent of CEOs in collectivist societies receiving such incentives. In contrast, in most individualist national cultures in our data, over 85 percent of CEOs receive incentives (Sweden, Germany, and Italy are the exceptions). We argue from these findings that CEO long-term equity-based

incentives, when used judiciously and with parsimony, contribute to national economic performance. Our notion is that CEO incentives lose their power to motivate when just about everyone receives them, and, in fact, when CEO performance incentives become an expectation rather than an award for exceptional performance, they may be more de-motivating in their absence than a motivator in their presence.

We raise the question: Is it possible that CEO long-term equity-based performance incentives enhance firm performance through both agency and vicarious agency dynamics when 50.8 percent of CEOs in collectivist nations compared to individualist nations with 86.7 percent are given such incentives? We argue that CEO long-term equity-based incentives are more motivating when they appropriately recognize the CEO as exceptional, so that with the incentives come admiration and social esteem from colleagues, peers, and society at large.

Our results have implications for both corporate decision makers (particularly remuneration committees) and public policymakers. For incentives to be effective there is a need for CEOs to believe they will be rewarded in line with industry or country peers in the long term. From a public policy view, our study suggests that national economic growth may be linked to the propensity of firms offering CEO long-term equity-based incentive pay, but not necessarily to the size of such incentives. Therefore, public policy should welcome such systems motivating wealth-creating actions, but impediments to such incentive systems may be appropriate in cases where CEO incentives are overly ubiquitous.

As discussed by Gneezy, Meier, and Rey-Biel (2011), extrinsic incentives are complex and may result in unanticipated consequences. This latter argument would then be consistent with recent research on the economic psychology of incentives (Pepper and Gore 2014) that there is not a linear relation between CEO incentive size and subsequent firm performance. The key issue may not be the scale or quantity of CEO incentive compensation, but rather in the design of the incentive program—or its mere existence. We argue that this is an important issue for future research to address.

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