Is the Cognitive Institutional Perspective affecting the Leadership Structure of Boards?

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Abstract

Our research purpose is to identify whether the cognitive institutional dimension affects the leadership structure of boards of directors due to their strategic and control roles. We analyze it in the context of firm performance of listed Ibero-American firms after the financial crisis (2009) and the creation of the Integrated Markets of Latin America (MILA, 2011).

Previous literature mainly considers the institutional theory and its potential effects over the corporate governance structures (Aguilera, Judge, & Terjesen, 2018; Aoki, 2010). We see an interesting possibility to link the institutional cognitive dimension of a firm with both the resource dependence theory and the agency theory to explain the possible changes in the strategic and control roles of the board of directors. The aim is to find support to how the firms' value creation and the external context (per year and per country) affects the structures of an internal mechanism of corporate governance as the board of directors (Dalton & Dalton, 2011b; Westphal & Zajac, 2013). Moreover, we classify the variables that will empirically affect firm performance, both accounting/financial and market performance, with Ibero-American examples, through the dimension of leadership structure of the boards of directors and the global financial crisis. After that, the hypotheses cover the most relevant variables in order to measure the post-crisis effects to present date (period 2009-2016).

The methodology develops a longitudinal quantitative research design to test our hypotheses. The sample considers those firms listed on stock exchanges belonging to MILA (Integrated Markets of Latin America), from Mexico City, Santiago de Chile, Lima and Bogotá, along with the firms listed on the stock exchanges market of Portugal and Spain. We also consider two stages: the period after the global financial crisis (from 2009) and the period after the creation of the Integrated Markets of Latin American (MILA, 2011). We use data panel to see the significant random and fixed effects, as well as the circumstances by which some institutional variables could, or could not, affect firm performance and the changes on the control and strategic roles of the board of directors.

The results show an initial descriptive analysis of the sample to identify the impact of the variables under the particular context of each country. We also use correlational analysis to see the relationships of the variables with appropriate levels of significance to show the possible causality and effects considering the strategic and control roles, as well as the relationship between both. In the case of data panels, tests are for several countries, and companies based on the most representative industries by years, post-crisis, to see both their fixed and random effects throughout the study period and considering the two stages previously mentioned.

We aim to contribute to widen the field of corporate governance from the point of view of the boards of director structures for firms listed in stock exchanges of developing countries, Ibero-American countries in particular, considering also a post-crisis period. We believe there are implications for both the practical-professional and scientific-applied research fields. In the same way, we aim to expand the current future research agendas to develop corporate governance concerns in these countries and the region.

Keywords: Institutional Theory, Agency Theory, Resource Dependence Theory, Boards of Directors, Firm Performance, Stock Exchange Integrated Markets of Latin America, Ibero-America.

Introduction

Since the owners delegate their management activities to third parties in the organizations, they develop a relationship that requires the institutionalization of a mechanism capable of establishing corporate governance (Daily, Dalton, & Cannella Jr., 2003). For this reason, one of the most important internal mechanisms of corporate governance is the board of directors (Shleifer & Vishny, 1997). Therefore, over the years, there are studies of the different attributes of the boards of directors, such as its composition, characteristics, structures and processes, as well as their effects on firm performance (Zahra & Pearce II, 1989). Moreover, as part of these studies, the theoretical perspectives have made it possible to show the roles played by these boards of directors (Johnson, Daily, & Ellstrand, 1996), being analyzed mainly under a micro vision, that is, within the firm and its organizational behavior (Dalton & Dalton, 2011b).

One of the main economic perspectives comes from the agency theory, where a contract establishes a principal-agent relationship in an organization (Eisenhardt, 1989; Jensen & Meckling, 1976). As a consequence diverse agency problems may appear, where under information asymmetry, problems of adverse selection and moral hazard appear between principal and agent, causing different effects and potential risks on the firm results (Fama, 1980). In this context, the board of directors, as an internal mechanism of corporate governance, may exercise its control role to mitigate the individual self-interest of the agents in favor of the principals.

Agency theory is not the only perspective deeply rooted in the literature. The provision of external resources and the idea that the board of directors may play a strategic role towards management (Pfeffer & Salancik, 1978) is also quite popular. This is the perspective of the resource dependence theory relevant, too (Hillman, Cannella Jr., & Paetzold, 2000; Hillman, Withers, & Collins, 2009; Hillman & Thomas, 2003). In particular, this strategic role works as a catalyst between the principal and the agent, providing a strategic responsibility to the agent to lead new external resources towards the achievement of higher benefits for the company (Hillman et al., 2009).

These two roles of the board of directors, control or monitoring and strategy providers, are relevant at the time of determining a leadership structure capable of promoting business growth

(Hillman & Thomas, 2003; Zona, Gomez-Mejia, & Withers, 2015). However, after the financial crisis, current discussions mention that not only should the roles assumed by the board of directors be studied in an integrated manner, other external factors should be included too. External factors, at the macro level, could affect the development of these governance structures (Aguilera et al., 2018; Aoki, 2010; Dalton & Dalton, 2011b; Westphal & Zajac, 2013).

Taking this into account, several studies have also focused, from a social perspective, on understanding how certain context factors affect organizational decisions that strengthen the change of those leadership structures that face the business dynamics (Selznick, 1948, 1996). In particular, the institutional theory began to take relevance in the field of corporate governance (DiMaggio & Powell, 1983; Tolbert & Zucker, 1996). Considering the institutional perspective, the normative, regulatory and cognitive dimensions gain value by establishing, socially, an environment capable of affecting the organizational culture, based on their routine and roles and, therefore, in the institutional leadership structure that the organization develops (Scott, 1995).

Recent studies have attempted to establish a vis-a-vis between macro and micro dimensions to see how, from an institutional perspective, macro dimensions could be aligned with micro dimensions in the area of corporate governance (Aguilera et al., 2018; Aoki, 2010). Furthermore, beyond the normative and regulatory dimensions that are more punctual and lasting, the institutional cognitive dimension represents a more systematic way of recognizing collective changes that may well exert pressure on the managerial behavior and, therefore, on their governance (Aoki, 2010). Thus, some macro variables associated with an institutional cognition that the society of a country adopts in time could exert an effect, along with the annual firm results, in the two roles of the board of directors, control and strategic, and this could involve a change in the leadership structures of the corporate governance. In order to carry out this type of studies we need to have longitudinal information that allows, on one hand, to describe the behavior over time and, on the other hand, variables at the macro level for some comparable countries (Dalton & Dalton, 2011b). Consequently, Latin America becomes a reasonable option to carry out a comparative study capable of supporting micro and macro level studies (Capaul, 2003; Chong & Lopez-de-Silanes, 2007; Sáenz González & García-Meca, 2014).

Taking into consideration the previous framework, launching a study in Latin America would need to contemplate comparatively homogeneous countries in their size of industries and their growth dynamics (Aguilera, Kabbach de Castro, Lee, & You, 2012). For these reasons, we focus on a part of Latin America that has been developing certain common aspects, such as the creation of an integrated stock market. Those countries are Mexico (Chong & López-de-Silanes, 2006), Chile (Agosin & Pastén H., 2003), Peru (McGee, 2010) and Colombia (Lagos Cortés, 2013). As a comparison and given the commercial closeness with Spain, we will also include this country in the analysis.

Iberoamerica has gone through several changes in recent decades. Notwithstanding the changes that have occurred in North America, several Latin American emerging countries have sought to follow part of good practices in corporate governance issues (Agosin & Pastén H., 2003; Chong & Lopez-de-Silanes, 2007; Chong & López-de-Silanes, 2006). Within the Latin countries, many changes have been of great importance at the end of the last millennium. Almost in general, all these countries have had to overcome in the nineties macroeconomic problems associated with fiscal and economic policies. One of the main problems that affected these economies was the presence of governments with poor practices of governance and management, where controls and governance structures based on international principles were vaguely assumed. In many cases, overcoming a situation of critical inflation, or severe social problems, were characteristic of these countries.

In such a context, one of the main problems that the countries began to face as part of their restructuring was the assumption of new leadership structures based on the privatization of public companies (Chong & Lopez-de-Silanes, 2004). This generated a great impetus from national policies and regulations to incorporate new corporate governance standards valid not only in the public sphere, but also to strengthen the relationship with the private sector.

Likewise, the context of new technologies in a knowledge society, improved the dynamics within the stock markets that began to reflect in the middle of the first decade of the new millennium. However, with the arrival of the global financial crisis, these changes were seen as almost mandatory in these markets, with the need of a much more complete and transparent information for the listed companies (Cueto, 2010; Galve-Górriz & Hernández-Trasobares, 2015). In addition, this increased information allowed more analyses, not only from a financial

perspective but also from an organizational perspective, thanks to the continuous public reports and the greater samples of the listed companies of local creation in emerging countries.

Finally, our work wants to connect also with new studies related to institutional comparisons that build up on different realities and face dynamics changes in their governance structures (Pelayo-Maciel & Sánchez-Gutierrez, 2013). One of the challenges currently facing academics is to approach other emerging contexts to understand comparatively how institutional aspects could affect the development of changes in corporate governance associated with internal mechanisms that could determine the leadership structures changes of the boards (Krause, Semadeni, & Cannella, 2014). Consequently, these accounting or market features can be seen as, not only antecedents of prior firm-performance, but also as causal effects on these changes of the boards.

Agency and Resource Dependence Theories on the Leadership Structure of Boards

CEO duality is a phenomenon widely discussed by academics as part of the leadership structure of the board of directors. Initially, the studies defined CEO duality as the presence, or not, of the CEO within the board of directors. In early studies, the priority has been to establish, in a dichotomous way, if the CEO was at the same time president of the board of directors or not. Until now, the results of this approach remain controversial. Initially, academics studied the direct relationship of CEO duality on firm performance, either accounting or market performance, even at the level of bankruptcy. The findings to date are very varied, even from the first meta-analysis that warned of the non-existence of significant effects in a general way. Subsequent studies, with greater refinement, have made it possible to understand the nature of significant effects due to turbulent contexts in organizations that are not as complex, in contrast to situations of calm with much larger and more complex companies.

The search for a refinement of the dependent variable allowed us to study whether the CEO duality is product of any internal or external member to the organization at the time of the change. Consequently, the academics undertook studies to see the antecedents of the CEO duality, including the CEO turnover as one of the variables that help to disintegrate the CEO duality and, in other cases, as an interacting part of the variables that cause the existence of duality. In addition, in the search to refine duality, other options were sought to present the

variable not in a dichotomous way. Under this premise, one of the considerations to be studied is that the CEO can be part of the board of directors without being the chairman, as an intermediate option to whether there is duality or not.

Beyond CEO duality, the different roles played by the board of directors become also relevant. So, considering attributes such as the board size or the board independence, as well as the levels of rotation or the experience may be affecting the leadership structures. This allowed us to open the threshold of the theories associated with the roles that the board could assume and the effects on the leadership structure. For the present study, it will be relevant to delve into the widely studied relationship coming from two perspectives, that of agency theory and that of resource dependence, focusing on the control and the strategic roles respectively.

Control Role and Leadership Structure of Boards

One of the theories widely studied in the field of corporate governance is the theory of agency. From a continuous search to understand how to reduce the agency problems due to information asymmetries, as well as the moral hazard and adverse selection generated by the hiring of agents to carry out the objectives of value creation for the principals (Shapiro, 2005; Hillman & Thomas, 2003; Fama, 1980). With these premises, several studies sought to understand the boards of directors or the ownership structure, as well as the internal mechanism designs to mitigate the problems of the principal-agent relationship.

For these reasons, from a control perspective, the academics studied the attributes of the boards of directors, using variables such as size, independence, as well as the rotation of members or experience, tenure, and many others (Daily, Dalton, & Cannella Jr., 2003; Daily, Dalton, & Rajagopalan, 2003; Johnson et al., 1996). These variables, as well as others, which were even grouped by composition, characteristics, structure and processes, to show how monitoring conditions, and other potential roles, could exert on firm performance (Zahra & Pearce II, 1989). Even, in the actions of management and even opening the threshold that leads us to this study, the leadership structure that must be assumed in the governance and the top management (Linck, Netter, & Yang, 2008; Dalton & Dalton, 2011; Dalton, Daily, Ellstrand, & Johnson, 1998; Brickley, Coles, & Jarrell, 1997; Daily & Dalton, 1993). The studies in this strategic field opened a threshold not yet conclusive, in which many questions have remained open, and that

in this recent decade have been mentioned as discussions or future agendas to be addressed in greater depth (Krause et al., 2014).

Studies of the antecedents of boards of directors, under the vision of agency, that affect the leadership structure are, on one hand, by poor performance, as well as by the combination of the presence of independent members in the board and the industrial concentration, affecting significantly the determination of CEO duality (Harrison, Torres, & Kukalis, 1988).

Moreover, in a later study with companies that did not involve the financial sector, the findings showed that there was no relation of previous firm performances on the determination of CEO duality (Iyengar & Zampelli, 2009). Even considering variables as board independence, which at present opens a threshold of discussion to see in other samples, or contexts, what is happening with this effect types.

Furthermore, many studies told about the direct effect together, and in the last decade, the scholars extended the studies to measure the interactions of the governance internal mechanisms as moderator effects (Balsam, Puthenpurackal, & Upadhyay, 2016). However, currently, few studies talk about the mediation (Bergh et al., 2016), and for these reasons, one of the opportunities to open a gap related to measure the indirect effects could be possible. Consequently, we present the following hypothesis:

H1a: There is mediation by board independence, as control role, in the relationship of prior firm performance on governance leadership structure.

Likewise, based on determinate industries, a study showed that members of watchdog boards, conditioned to their independence, had significant positive effects on the CEO duality determination. However, the past high performance of the organization and a high level of informal power of CEOs weakened the effects (Finkelstein & D'Aveni, 1994).

With this last, one of the fields developed widely was that of CEO turnover. If initially studies have gone directly to see their effects on the firm performance (Brickley, 2003; Intintoli, Zhang, & Davidson, 2014), at present, the studies of CEO turnover have sought to measure their antecedents (Wiersema & Moliterno, 2015), using the firm performance as common antecedent. For these reasons, we present the following hypothesis:

H1b: There is mediation by CEO turnover, as control role of boards of directors, in the relationship of prior firm performance on governance leadership structure.

On the other hand, other studies contemplated that the presence of CEO founders of small, fast-growing and listed companies had no significant effect on the determination of CEO duality (Daily & Dalton, 1992). Nevertheless, if the CEO founders of small listed companies with a certain level of employees and small sales amounts would have significant positive effects on the determination of CEO duality (Daily & Dalton, 1993). However, similar studies later showed that companies of initial public offering in the stock markets of the goods and services industry had significant negative effects on the CEO duality determination (Beatty & Zajac, 1994).

Appropriately, the previous studies were related to companies with properties of enterprises, many of them, relatives. So, one of the elements that can be considered, within a control role, is that having a family property structure, can exercise greater control over the government leadership structure that you want to keep based on the prior performance that it reviews. Therefore, we present the following hypothesis:

H1c: There is mediation by family shareholders, as control role from boards of directors, in the relationship of prior firm performance on governance leadership structure.

Strategic Role and Leadership Structure of Boards

On the other hand, another of the theories addressed in the field of corporate governance is that of resource dependence. Unlike the theory of agency, where the design of control mechanisms is a priority, this perspective sees the development of strategic and service mechanisms by the board of directors regarding the corporate governance leadership structure.

This perspective allows understanding the effects of dependency and obtaining resources (Pfeffer & Salancik, 1978). Likewise, previous studies based on literature reviews show that this perspective is more accepted than other complementary perspectives to demonstrate the roles of the board of directors (Hillman & Thomas, 2003; Hillman et al., 2009). Although it is used less frequently than agency theory, this perspective is also successful in understanding boards of directors.

Thus, the first studies based on the theory of resource dependence and oriented to the boards of directors sought to understand attributes such as size and composition in the determination of critical resources for the company (Hillman et al., 2000; Hillman & Thomas, 2003). Concluding that the size and composition of the councils are not random or independent attributes, but are a response to external conditions that allow us to determine the most optimal governance structures for their purposes, including significant effects on the performance of the company (Hillman et al., 2009).

However, after studies in which the direct relationship of size or composition directly affect the firm performance, with various discussions, subsequent research suggests a deeper understanding in which the size and composition should also depend on the previous firm performance (Hillman & Thomas, 2003).

For these reasons, from a vision of resource dependence, the attributes of the boards of directors were studied, seeing how the members by a sense of knowledge and belonging of the organization could have significant effects on the results. Employing variables such as dependence, the permanence of members, as well as incentives and ownership to see their effects on the performance of the organization, and in some cases as a background to the governance leadership structure. For these reasons, we present the following hypothesis:

H2a: There is mediation of board dependence, as service role, in the relationship of prior firm performance on governance leadership structure.

Complementarily another one of the antecedents put to test relates the previous permanence of the CEO, as well as his experience, identifying that in situations where the permanence and the experience are greater, it has a significant positive effect on CEO duality (Lynall, Golden, & Hillman, 2003).

Often, this experience is determined by the permanence of a senior management position within the organization, which will seek to share their knowledge within the organization. This is not new, in previous studies it is even mentioned that not changing CEO in times of turbulence or with companies that are not so complex allows an optimal development and creation of value of the organization (Finkelstein & D'Aveni, 1994). For these reasons, we mention the following hypothesis:

H2b: There is mediation of CEO no turnover, as service role of boards of directors, in the relationship of prior firm performance on governance leadership structure.

On the other hand, one of the aspects that is also relevant in this type of perspective is the need for dependence on resources (Hillman et al., 2009). This is seen more in circumstances in which the property is not so concentrated so that it facilitates that from several participants in the ownership structures, other options can be sought to facilitate the creation of value.

In the same way, we could say that this non-concentrated or majority structure will have an impact on the government leadership structures that the company could maintain as an indirect effect of the business performance obtained previously. For these reasons, we mention the following hypothesis:

H2c: There is mediation by top ownership without majority, as service role from boards of directors, in the relationship of prior firm performance on governance leadership structure

Institutional Perspective and Board Roles on Leadership Structure of Boards

The previous and extensive reference studies used up to now in the construction of our literature review and theoretical framework are mainly from a micro level. This is because the micro level studies of this field are more for companies and their strategic behavior as analysis unit (Dalton & Dalton, 2011a).

However, when we talk about studies with an institutional perspective, the academic world has primarily developed macro-level studies. Although the choice of micro-level studies in institutional character have had another type of development (DiMaggio & Powell, 1983), the options that have been opened in the last decade to address multilevel studies have become more relevant (Briano-Turrent & Rodríguez-Ariza, 2016; Tolbert & Zucker, 1996).

In addition, due to the nature of the unit of analysis and the dynamics in the collection and analysis of the data, the studies usually remained separate.

Thus, this perspective has a double approach. On the one hand, we tried to approach from a micro perspective in the process in which the leadership structures institutionalize a behavior culture, as psychological perspectives and field of organizational behavior (Luoma & Goodstein, 1999). On the other hand, from the sociological perspective, we have been considering the opportunity to understand that the institutionalization or development of organizational institutionalism is due to external factors of social groups that assume in their organizations (Galve-Górriz & Hernández-Trasobares, 2015; Selznick, 1996).

For instance, one of this institutional perspective that faced the multilevel vision (Aoki, 2010) refers to three types of organizational architecture, or system of associative cognition, that allow the development of governance structures, hierarchical decomposition, information assimilation and information encapsulation.

In the case of the organizational architecture that allows a governance structure based on hierarchical decomposition, one could put as an example that the board of directors is the one that is affected or interacts better with the forces of the environment and then exert an effect on the agents. In order to set up a governance leadership structure that allows responding to this environment.

In the case of the organizational architecture that allows a governance structure based on the assimilation of information, it could be set as an example that the board of directors with the

agents are affected and they interact together with the forces of the environment. In order to configure an appropriate governance leadership structure that allows responding to the environment.

In the case of the organizational architecture that allows a governance structure based on the information encapsulation, it could be put as an example that the board of directors and the agents are affected and interact with the forces of the environment in an independent isolated way. In order to configure a governance leadership structure that allows responding to the environment independently from both sides.

While these types of organizational architecture are due to the relationship that can develop between two groups in a governance leadership structure, such as the management boards and management, thus the first type resembles the control role, while the second to a strategic or service role.

Considering the above as institutional cognitive perspective, one of the global indicators that has increased its relevance in recent years for its continuity in its measurements and the source thereof is the Worldwide Governance Index (WGI). This set of global governance indicators has allowed understanding how macro institutional variables such as Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption influence on the organizations according to their countries. For these reason, we mention the following hypotheses:

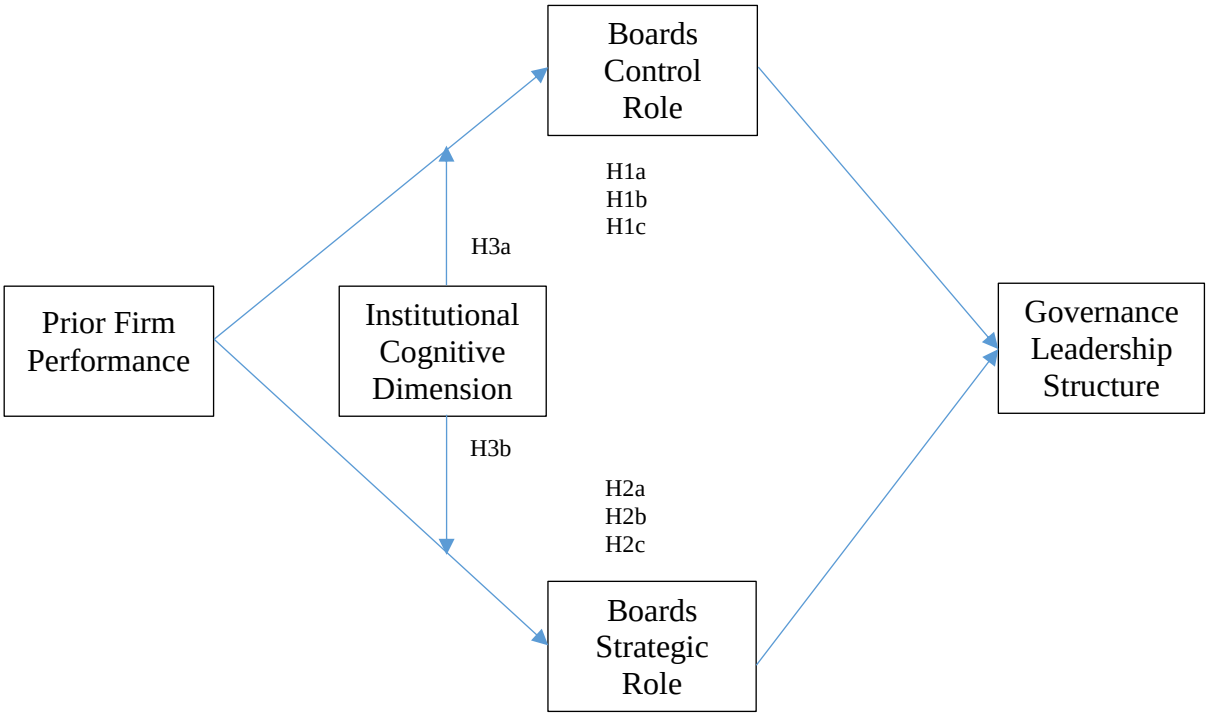
H3a: There exist moderation effects of institutional cognitive factor on the relationship between the prior firm performance and the board control role.

H3b: There exist moderation effects of the institutional cognitive factor on the relationship between the prior firm performance and the board strategic role.

Methodology

The research design is a causal longitudinal non-experimental study. The model describes initially two mediation studies between the prior firm performances on governance leadership structure. These two mediation studies are in order to the control and service roles described above. Moreover, the institutional cognitive perspective enter as moderation effect in the first stage of both mediation relations.

Model



Sample

The sample is a panel data from 2009 to 2015. Initially, we considered the countries of Mexico, Peru and Chile. In order to the data collection, we obtained 1673 observations. Complementarily, it review the data of Colombia, which is smaller in its proportion, since the information related to its board of directors is public only from 2011, which would contemplate the Latin American Integrated Market - MILA group. Subsequently, we will included Spain to make the comparative study to extend the scope to Ibero-America.

The sample includes locally created listed companies on the stock exchanges of their own country. Additionally, it is considered that they have continuous years of quotation and complete information to see their behavior over time.

year	country			
	Peru	Chile	Mexico	Total
2009	99	78	62	239
2010	99	78	62	239
2011	99	78	62	239
2012	99	78	62	239
2013	99	78	62	239
2014	99	78	62	239
2015	99	78	62	239
Total	693	546	434	1,673

The data related to the information of boards of directors come from the annual reports that each company gives to the securities market superintendence and to the stock exchange of each country, having information of contrast. In the same way, the data related to the financial-accounting and market information come from the Bloomberg platform and from the audited financial statements and delivered both to the superintendence of the stock market and the stock exchange of each country.

Measurements

For the final model, we need to prepare previous models to measure in times the effects.

The dependent variable was the governance leadership structure represented by the CEO duality. In our case, the CEO duality had three dichotomy categories. The first category is the CEO with no duality and the others. The second and third were a separation of the CEO in the Boards of Directors, one category related to CEO as a member of the board but no chair, and finally the CEO and Chief of the Board.

For the independent variables, we use the prior firm performance as measurements, which included the variable most useful in prior studies, as return of assets (ROA), return of equity (ROE), and the earning before the interest and taxes (EBIT). For reasons of incomplete data, variables as Tobin’s Q did not use.

The ROA measures the ability of a company's assets to generate profitability. Any professional investor monitors this value very closely, since it allows making very useful comparisons of profitability between different firms.

The ROE measures the return that shareholders obtain from the funds invested in the company; that is, the ROE tries to measure the capacity of the company to remunerate its shareholders.

The EBIT is an indicator of the operating income of a company without taking into account the interest rates, nor the tax burden applied to the company, which generally depends on the tax rate of corporation tax in each economic sector and country.

For the mediation, we use the variables related to the governance internal mechanisms, used in previous studies, as the board independence, CEO turnover, and family ownership in order to agency perspective to demonstrate the control role. On the other hand, the board size, board dependence, CEO permanence, and top ownership without majority in order to resource dependence perspective to demonstrate the service-strategic role.

Finally, we used as moderation the macro level variables of the Worldwide Governance Index (WGI) to study the effects of the Institutional Perspective, as Voice and Accountability (va), Political Stability and Absence of Violence/Terrorism (pv), Government Effectiveness (ge), Regulatory Quality (rq), Rule of Law (rl), and Control of Corruption (cc). According to a correlation analysis between these variables, them was factorized in a integrate dimension called WGI.

Operationalization

The study separated the variables into dependent, mediators, independents, control and moderators for the operationalization.

The dependent variable is the leadership structure. The main dependent variable is CEO duality, defined by three categories. In addition, that variable has three dummy variables for separate analyses.

The mediator variables open the control and service roles as part of the governance internal mechanisms.

The independent variables are about firm performance. As mentioned above, these variables have three ratios, the ROA, the ROE and the EBIT.

The control variables are mainly those that determine the size and leverage of the company.

Finally, the moderator variables come from the Worldwide Governance Index. After a factor analysis of principal components, the six variables was reduced in an integral factor.

Dependent Variable	Code	Definition	Measure
CEO duality	ceo_duality	Three categories of Governance Leadership Structure: 1 = ceo non dual, 2 = ceo dual as board member, 3 = ceo dual as cbo.	categorical
CEO non Dual	ceo_nodual	Likelihood to have a CEO non duality	dummy
CEO Dual as Member	ceo_bodmem	Likelihood to have a CEO as Board member	dummy
CEO Dual as CBO	ceo_dual_cbo	Likelihood to have a CEO and CBO	dummy
Mediator Variables	**Code**	**Definition**	**Measure**
Board Size	bod_size ln_bod_size	Number of members on Board	ordinal ln ordinal
Board Independence	bod_numind bod_p_ind lnp_bod_ind	Number of independent members on Board	ordinal ratio ln ratio
Board Dependence	bod_numdep bod_p_dep ln_bod_dep	Number of dependent members on Board	ordinal ratio ln ordinal
CEO Turnover	ceo_turnover	Likelihood to have a CEO turnover	dummy
CEO Permanent	ceo_noturnover	Likelihood to have a CEO permanent (no turnover)	dummy
Family in the Shareholder	shld_fam	Likelihood to have family in the ownership structure	dummy
Top Owner <50% shares	top_owner_0_50	Likelihood to have the top owner with less than 50% of the shares	dummy
Independent Variables	**Code**	**Definition**	**Measure**
ROA t-1	roa_1	(Net Income / Total Assets) of prior year	ratio
ROE t-1	roe_1	(Net Income / Total Equity) of prior year	ratio
EBIT t-1	ebit_1 ln_ebit_1	Earning Before Interests and Taxes, of prior year	ratio ln ratio
Control Variables		**Definition**	**Measure**
Ln Assets	ln_assets	Firm size in order to log natural of the assets	ln ratio
Leverage	leverage	Total Debt / Total Equity ratio	ratio
Moderate Variables		**Definition**	**Measure**
WGI	WGI	Integral Factor of Worldwide Governance Index that reduce the following 6 variables	ratio
va t-1	va_1	Voice and Accountability	ratio
pv t-1	pv_1	Political Stability and Absence of Terrorism	ratio
ge t-1	ge_1	Government Effectiveness	ratio
rq t-1	rq_1	Regulatory Quality	ratio
rl t-1	rl_1	Rule of Law	ratio
cc t-1	cc_1	Control of Corruption	ratio

Procedure

The procedure begins with a data descriptive analysis. This analysis allows recognizing the data patterns and seeing what data are quantitative or continuous, categorical and dummies. In the same way, we verified the distribution of quantitative independent variables with histograms. This step allows standardizing some variables at the natural logarithm level.

The variables transformed to natural logarithms are the proportion of board independent members, the board dependent members, the board size, as well as the control variable of firm size represented by the total assets.

After describing the initial data, we proceeded to a correlation analysis. This analysis allows identifying the relationship between the variables, as well as identifying potential problems related to autocorrelation or homoscedasticity. The correlation analyzes are carried out to test all the variables related to the control role and the variables related to the service role.

Before of the logarithmic regressions of data panel, we performed a prior panel data analysis, with random effects, to test possible endogeneity problems with the variables of the boards of directors and of the leadership structure as independent variables on the three involved firm performance types. Thus, we developed six test models in two groups (for control role and service role), having three models for each group, with the dependent variables ROA, ROE and EBIT respectively.

$$[ROA \mid ROE \mid EBIT] = \alpha + \beta 1\ leverage + \beta 2\ ln\_assets + \beta 3\ lnp\_bod\_ind + \beta 4\ ceo\_turnover + \beta 5\ shld\_fam + \beta 6\ ceo\_duality + \beta 7\ (lnp\_bod\_ind\ x\ ceo\_duality)$$

$$[ROA \mid ROE \mid EBIT] = \alpha + \beta 1\ leverage + \beta 2\ ln\_assets + \beta 3\ ln\_bod\_dep + \beta 4\ ceo\_noturnover + \beta 5\ top\_owner\_0\_50 + \beta 6\ ceo\_duality + \beta 7\ (ln\_bod\_dep\ x\ ceo\_duality)$$

These initial models identified that both the ROA and the EBIT are the most stable variables of firm performance for our study, discarding the variable ROE. Furthermore, ROA presents a normalized distribution, while EBIT requires normalization, so it becomes a natural logarithm to continue with the models.

Then, we proceeded with the logit technic of panel data of the three types of CEO duality (CEO non-dual, CEO-board member, CEO-CBO) in order to the two types of prior firm performance (ROA t-1, EBIT t-1), according to the variables for control role and service role respectively.

These models use all the variables as independent variables to see the direct effects on firm performance. In addition, this allows reviewing compliance with the regression assumptions.

$$[ceo\_nondual \mid ceo\_bodmen \mid ceo\_cbo] = \alpha + \beta 1\ leverage + \beta 2\ ln\_assets + \beta 3 roa\_1 + \beta 4\ lnp\_bod\_ind + \beta 5\ ceo\_turnover + \beta 6\ shld\_fam$$

$$[ceo\_nondual \mid ceo\_bodmen \mid ceo\_cbo] = \alpha + \beta 1\ leverage + \beta 2\ ln\_assets + \beta 3 ln\_ebit\_1 + \beta 4\ lnp\_bod\_ind + \beta 5\ ceo\_turnover + \beta 6\ shld\_fam$$

$$[ceo\_nondual \mid ceo\_bodmen \mid ceo\_cbo] = \alpha + \beta 1\ leverage + \beta 2\ ln\_assets + \beta 3 roa\_1 + \beta 4\ ln\_bod\_size + \beta 5\ ln\_bod\_dep + \beta 6\ ceo\_noturnover + \beta 7\ top\_owner\_0\_50$$

$$[ceo\_nondual \mid ceo\_bodmen \mid ceo\_cbo] = \alpha + \beta 1\ leverage + \beta 2\ ln\_assets + \beta 3 ln\_ebit\_1 + \beta 4\ ln\_bod\_size + \beta 5\ ln\_bod\_dep + \beta 6\ ceo\_noturnover + \beta 7\ top\_owner\_0\_50$$

After these previous analyzes, we proceeded to the mediation analysis to demonstrate the hypotheses raised in our study regarding the control role and the service role on the governance leadership structure.

The mediation tests used the dependent variable of three categories "ceo_duality". In addition, the independent variables "roa_1" and "ln_ebit_1" worked together. Thus, we developed two models that grouped the mediation variables due to the roles of the boards of directors.

The mediation analyzes show, which are the significant mediator variables and determine each role foreseen in the study. With this identification, we proceed to do the moderation analysis of the macro-level variables factored into a single dimension of the Worldwide Governance Index.

Although the Worldwide Governance Index presents six variables associated with the context of governance by country, when performing a correlation analysis between them, all had high significance levels. Thus, they were taken to factorize the main components, reducing the six variables previously mentioned to a single dimension.

For develop the moderation on the initial mediation relationship, we use a platform complementary to SPSS, Process v3.0 by Andrew F. Hayes.

Results

According to the results, the CEO duality is still a feature that is not widely used by the countries studied. The priority remains to have the CEO separate from any superior governance structure.

However, the duality of the CEO is representative when the CEO is only a member of the board, than when he is the chair of the board of directors. This is mainly because countries such as Chile normatively consider the presence of a CEO as president of the board of directors incompatible. For this reason, it was necessary for our study to separate that category.

Moreover, after the financial crisis of 2008, the proportional variations of these categories, in general, have not been as strong, even considering that, they have remained almost stable over the last few years. Slightly the CEO non-duality increased and reduced the other two categories.

One of the aspects that has had a significant variation over time is the amount of CEO turnover. After the financial crisis, we would think that it was increasing, but in fact, the CEO turnover increased in subsequent years, having peaked in 2013. However, these changes with respect to the proportion of total number of companies observed were not they surpass 15% of the observations.

Although this study does not address the case of the diversity associated with gender, it is because the proportion found is much lower than what could be expected to show significant effects in the study. Although we speak about this in a general way, such as the proportion of women on the council, or proportion of women in the top management team, in the case of women as presidents of the council it is even more limited.

Another aspect of internal mechanism is related property structure. One of the variables used in the study was the presence of family as shareholders of the company. Although, it is very widespread in the context that most of the ownership of companies in Ibero-America are of a family nature, in many cases this is hidden. According to the records presented of which analyzes, it is reported that less than 45% of the observations are family property. However, this is a subject to consider. Due mainly to structuring situations on the part of companies that build companies outside the country through investment banks to include investment partners that are then placed through this investment bank or a new company as a main shareholder, hiding the presence of family as majority shareholder.

Given this aspect, the presence of family as a shareholder has a role of control rather than service. Likewise, in almost all cases in which the family is a shareholder, almost all have a presence with more than 50% of the shareholding concentration.

On the other hand, there is a particular interest in determining the presence of principal shareholders with less than 50% of shares, since in a large proportion their presence is not familiar. This helps to understand another relevant aspect as a service role and resource search for the company.

Regarding the firm performance variables, the variations in the return on assets, as well as the return on equity, present a normal behavior over time. The minimum and maximum ratios do not present outliers, thus the average and standard deviation have a normal trend. In the case of the earnings before interest and taxes, its behavior was asymptotic, having a marked deviation, so it was necessary to convert it to natural logarithm. After the conversion, the ln ebit presented a normal trend distribution, significantly reducing the biases.

For the cases of the variables of administration councils, their standardization to natural logarithm allowed to distribute the roles used in the analysis. While for the control role the Board independence behavior has a negative trend, for the service role both the behavior of the Board size as well as the Board dependency takes a positive trend.

Finally, in the case of the moderation variables that represented an institutional cognitive perspective of governability based on external factors, each variable had standardized behavior from the same index. So that its nature allowed converting them into an single factor to be able to explain if it is that integrally this factor could have some moderating effect on the relationship between firm performance and the control or service roles.

Correlations Analysis

The correlation analysis shows the relationships that the CEO duality has with the other variables, as well as the relationships between the other variables. Of the results obtained, the main independent variable of firm performance that is related to the duality of the CEO is ROA t-1. Likewise, this independent variable is related to its mediators of size, dependence, independence, family as shareholder and top owner non-majority. In the case of the CEO turnover, this variable has no significance.

Correlation Analysis

	ceo_dual	roa_1	roe_1	ln_ebit_1	leverage	ln_asset	ln_bsize	ln_bdep	ln_bind	ceo_turn	shld_fam	top_own50
ceo_duality	1.0000											
roa_1	0.0410	1.0000										
	0.0953											
roe_1	0.0324	0.3978	1.0000									
	0.1868	0.0000										
ln_ebit_1	0.0069	0.2022	0.1103	1.0000								
	0.7890	0.0000	0.0000									
leverage	0.0501	0.0066	-0.1333	0.0949	1.0000							
	0.0418	0.7904	0.0000	0.0002								
ln_assets	0.0090	-0.0761	0.0277	0.8188	0.1637	1.0000						
	0.7124	0.0019	0.2602	0.0000	0.0000							
ln_bod_size	0.1753	-0.1115	-0.0489	0.3896	0.0891	0.4731	1.0000					
	0.0000	0.0000	0.0465	0.0000	0.0003	0.0000						
ln_bod_dep	-0.0389	0.0503	-0.0074	0.2686	0.0229	0.2524	0.5467	1.0000				
	0.1123	0.0408	0.7631	0.0000	0.3532	0.0000	0.0000					
lnp_bod_ind	0.3412	-0.0627	0.0169	0.0123	0.0514	0.0338	0.1695	-0.6015	1.0000			
	0.0000	0.0225	0.5382	0.6694	0.0619	0.2176	0.0000	0.0000				
ceo_turnover	-0.1044	-0.0304	-0.0067	-0.0163	0.0025	-0.0251	-0.0609	-0.0318	0.0180	1.0000		
	0.0000	0.2161	0.7843	0.5267	0.9185	0.3050	0.0127	0.1943	0.5115			
shld_fam	0.2911	-0.0807	-0.0596	0.1254	0.0617	0.1762	0.3412	0.1173	0.1851	-0.0873	1.0000	
	0.0000	0.0010	0.0151	0.0000	0.0121	0.0000	0.0000	0.0000	0.0000	0.0003		
top_owner~50	-0.0750	-0.1048	-0.0465	0.0510	0.0261	0.1079	0.1929	0.1225	-0.0753	-0.0590	0.0815	1.0000
	0.0021	0.0000	0.0584	0.0473	0.2895	0.0000	0.0000	0.0000	0.0059	0.0158	0.0009	

On the other hand, the independent variable EBIT t-1 has no direct relationship with the CEO duality. However, it has a direct relationship with the mediator variables of board size and board dependence, as well as with family as shareholder and top owner as non-majority. It has no relation with the independence of the board, nor with the CEO turnover.

In the case of the independent variable ROE t-1, it has no direct relationship with the dependent variable CEO duality, nor with the main mediator variables of control and service roles, the board independence and board dependence, as well as the CEO turnover.

In the case of control variables, only leverage is directly related to the CEO duality, while ln assets does not. Likewise, leverage is related to the size and independence of the board, as well as family as shareholder. On the side of ln assets, the significant relationship is with the board size and board dependence, as well as to family as shareholder and the top owner as non-majority.

Although the CEO turnover only relates to board size, the other mediator variables have significant relationship to each other. For purposes of not having multicollinearity problems, we passed prior VIF tests for each model that is constructed in order to see to what extent they are within acceptable ranges to be able to run the regressions.

Direct Effects as prior steps

One of the first direct effects analyzes is the regressions of panel data with random effects for each firm performance. This is done to verify that there is no endogeneity on the part of the variables to be used in subsequent models.

The results show that all control variables, leverage and ln assets, significantly absorb the effects on firm performance. From the results obtained, in none of the cases the CEO duality and CEO turnover (and CEO no turnover) have direct effects on the firm performance, as well as the variables associated with the control role. Only the CEO duality in the CEO-CBO category has a significant effect on the EBIT when it interacts with the independence of the board. In the three cases of control role, only with ROE the constant is not significant.

In the case of the variables associated with the service role, the board size has effects on ROE and EBIT, while the board dependence has effects on ROA and ROE. In addition, only the top owner as non-majority has significant effect on EBIT. Moreover, in the three cases of service role, only with ROE the constant is not significant.

Direct Effects on Firm Performance (ROA, ROE, EBIT) in order to Control Role (_C) or Service Role (_RD)

	(1) ROA_C	(2) ROE_C	(3) EBIT_C	(4) ROA_RD	(5) ROE_RD	(6) EBIT_RD
leverage	-0.00612***	-0.0709***	-15.05***	-0.00282***	0.0498***	-4.290**
	(-5.73)	(-10.95)	(-3.15)	(-4.93)	(12.99)	(-2.14)
ln_assets	-0.00480**	0.0282***	170.2***	-0.00932***	-0.00278	127.3***
	(-2.20)	(3.36)	(9.87)	(-4.01)	(-0.34)	(9.47)
lnp_bod_ind	-0.000462	-0.00359	10.73			
	(-0.09)	(-0.14)	(0.41)			
ceo_turnover	-0.00221	0.00597	-7.561			
	(-0.51)	(0.19)	(-0.41)			
shld_fam	-0.00595	-0.0161	-88.47			
	(-0.75)	(-0.53)	(-1.34)			
ceo_duality	0.00663	0.0144	-49.84	0.0182	0.0672	-66.85
	(0.86)	(0.35)	(-1.34)	(1.58)	(1.24)	(-1.44)
1.ceo_dualxind	0	0	0			
	(.)	(.)	(.)			
2.ceo_dualxind	-0.00160	-0.0265	-66.88*			
	(-0.22)	(-0.70)	(-1.82)			
3.ceo_dualxind	0.00841	-0.00122	-114.7			
	(0.55)	(-0.02)	(-1.56)			
ln_bod_size				-0.00622	-0.0988**	96.04**
				(-0.60)	(-2.28)	(2.03)
ln_bod_dep				0.0146*	0.0821**	1.926
				(1.87)	(2.29)	(0.06)
ceo_noturnov				0.00374	0.0203	3.686
				(0.84)	(0.64)	(0.24)
top_owner~50				-0.00133	-0.0384	-96.39***
				(-0.22)	(-1.56)	(-3.67)
1.ceo_dualxdep				0	0	0
				(.)	(.)	(.)
2.ceo_dualxdep				-0.00575	-0.0255	63.10**
				(-0.77)	(-0.74)	(2.10)
3.ceo_dualxdep				-0.0174	-0.0717	72.37
				(-1.33)	(-1.14)	(1.39)
_cons	0.0782***	-0.0693	-828.8***	0.0853***	0.0728	-724.7***
	(3.94)	(-0.78)	(-5.70)	(3.14)	(0.63)	(-5.06)
N	1319	1319	1314	1644	1644	1639
sigma_u	0.0518	0.129	754.9	0.0589	0.109	705.9
sigma_e	0.0469	0.344	193.1	0.0525	0.390	180.4
rho	0.550	0.124	0.939	0.557	0.0725	0.939

t statistics in parentheses | * p<0.1, ** p<0.05, *** p<0.01

The obtained results discarded the models associated to the ROE, because on the one hand they would not have an orientation defined by presenting non-significant constants. In addition, in the role of service role it presents both the size and the dependence of the board with significant values, being the model that would present greater endogeneity for our study.

Subsequently, the next models of direct effects on CEO duality, as dummies, allowed testing the direct effects of the independent and mediating variables of our study. For this modeling, we used the logit data panel to demonstrate how the probability of having a defined structure of leadership in relation to the other variables.

The first table includes six models in two groups, according to both board roles, for each category of CEO duality, taking the ROA t-1 as the main independent variable.

In all six cases, the ROA t-1 has no significant direct effects on the CEO duality. Likewise, the board independence and CEO turnover, as board control role, are not significant on CEO as board member. However, in the models of CEO non-dual and CEO-CBO, the variables board independence, CEO turnover and family as shareholder show significant direct effects.

On the other hand, in the models of service role, the board dependence has no significant direct effect on duality CEO, in any category. However, the board dependence has significant direct effects on CEO non-dual and CEO as board member. In the case of CEO no turnover, this presents significant direct effects on CEO non-dual and CEO-CBO. Finally, in the case of the top owner as non-majority, this variable has a significant direct effect on CEO as board member.

The second table includes the other six models in two groups, according to both board roles, for each category of CEO duality, taking the ln EBIT t-1 as the main independent variable.

For the models with the control role, mainly the family as shareholder presents significant direct effects on all categories of CEO duality. Moreover, the board independence has significant direct effects on the non-dual CEO and the CEO-CBO, and CEO turnover only has a significant direct effect on CEO-CBO.

For models with the service role, the Board size does not have significant direct effects on any category of CEO duality. However, the board dependence has significant direct effects on CEO non-dual and CEO as board member. Moreover, the CEO no turnover, has significant direct effects on CEO no dual and CEO-CBO. Finally, the top owner as non-majority has significant direct effect on CEO as board member.

Direct Effects on CEO duality (as no Dual – as Board member – as CBO) with ROA t-1

	(1)	(2)	(3)	(4)	(5)	(6)
	CEOnoDual_C	CEOBoD_C	**CEOCBO_C**	**CEOnoDual_RD**	CEOBoD_RD	**CEOCBO_RD**
main						
roa_1	-1.177	0.504	0.896	-2.551	1.048	2.881
	(-0.42)	(0.17)	(0.32)	(-1.01)	(0.41)	(1.08)
leverage	-0.198	0.0844	0.0547	-0.216	0.0731	0.0844
	(-1.34)	(0.95)	(0.59)	(-1.35)	(0.85)	(0.90)
ln_assets	0.291	0.157	**-0.556****	**0.454***	0.180	**-0.750****
	(1.22)	(0.60)	**(-2.07)**	**(1.91)**	(0.78)	**(-2.46)**
lnp_bod_ind	**0.998***	-0.514	**1.185***			
	(1.94)	(-0.99)	**(1.88)**			
ceo_turnover	**1.155****	-0.292	**-1.840*****			
	(2.51)	(-0.69)	**(-2.66)**			
shld_fam	**-12.46*****	**2.649*****	**3.676*****			
	(-14.00)	**(2.83)**	**(4.01)**			
ln_bod_size				0.909	-0.394	1.143
				(0.86)	(-0.43)	(0.77)
ln_bod_dep				**-2.099*****	**0.968***	0.590
				(-3.23)	**(1.77)**	(0.56)
ceo_noturnov				**-1.471*****	0.190	**2.220*****
				(-3.39)	(0.49)	**(3.20)**
top_owner~50				-1.070	**1.343****	-0.860
				(-1.55)	**(2.16)**	(-1.04)
N	1311	1311	1311	1633	1633	1633
chi2	215.3	11.72	25.68	33.44	10.80	19.90
df_m	6	6	6	7	7	7
sigma_u	12.13	9.436	5.863	15.11	10.11	10.31
rho	0.978	0.964	0.913	0.986	0.969	0.970

Marginal effects; t statistics in parentheses
(d) for discrete change of dummy variable from 0 to 1
* p<0.1, ** p<0.05, *** p<0.01

Direct Effects on CEO duality (as no Dual – as Board member – as CBO) with ln EBIT t-1

	(1)	(2)	(3)	(4)	(5)	(6)
	CEOnoDual_C	CEOBoD_C	**CEOCBO_C**	**CEOnoDual_RD**	CEOBoD_RD	**CEOCBO_RD**
main						
ln_ebit_1	**-0.552***	0.377	0.0892	**-0.523***	0.398	0.148
	(-1.94)	(1.33)	(0.31)	**(-1.89)**	(1.62)	(0.49)
leverage	-0.272	0.0960	0.0579	**-0.636****	0.0903	0.102
	(-1.46)	(0.98)	(0.56)	**(-2.38)**	(0.92)	(1.00)
ln_assets	**0.840****	-0.296	**-0.657***	**1.102*****	-0.363	**-0.867****
	(2.37)	(-0.84)	**(-1.70)**	**(3.11)**	(-1.18)	**(-2.16)**
lnp_bod_ind	**1.034***	-0.435	**1.227***			
	(1.88)	(-0.80)	**(1.89)**			
ceo_turnover	0.777	-0.189	**-1.327***			
	(1.58)	(-0.41)	**(-1.93)**			
shld_fam	**-13.48*****	**2.716*****	**3.781*****			
	(-14.05)	**(2.90)**	**(3.98)**			
ln_bod_size				-0.373	0.698	0.396
				(-0.31)	(0.69)	(0.26)
ln_bod_dep				**-1.696****	0.846	0.534
				(-2.36)	(1.43)	(0.52)
ceo_noturnov				**-1.183****	0.0799	**1.759*****
				(-2.55)	(0.19)	**(2.63)**
top_owner~50				-1.000	**1.291****	-0.712
				(-1.35)	**(2.05)**	(-0.85)
N	1197	1197	1197	1489	1489	1489
chi2	215.4	12.46	22.18	28.03	12.63	15.23
df_m	6	6	6	7	7	7
sigma_u	13.15	9.826	5.754	14.32	10.11	10.66
rho	0.981	0.967	0.910	0.984	0.969	0.972

Marginal effects; t statistics in parentheses
(d) for discrete change of dummy variable from 0 to 1
* p<0.1, ** p<0.05, *** p<0.01

These both models of direct effects allow understanding the potential effects of the variables that represent the control and service roles for the study.

From the results obtained, all the variables of control role exert a significant direct effect on CEO-CBO. While in other models of CEO duality, the direct effects are mixed.

After these tests individually, the following models included the indirect effects to study the mediations using the dependent variable CEO duality in an integral way, as well as the independent variables ROA t-1 and ln EBIT t-1 together.

Indirect Effects of Control Role and Service Role

After the prior analyzes, we followed with the mediation models to test the indirect effect of the control and service roles between the firm performance and the CEO duality.

From the results, the model as control role shows that mediation is complete because there are no significant levels of direct effects between the firm performances on CEO duality.

The first mediator variable, board independence, exerts a significant indirect effect in the relationship of ROA t-1 on CEO duality, whereas in the ln EBIT t-1 on CEO duality there is no significant effects, therefore the H1a is partially supported.

This result shows that if the firm performance does not directly affect the leadership structure assumed by the organization, it does have an indirect effect through the independence of the board of directors. However, mediation has two stages, while the prior ROA has an inverse effect on the council's control role based on its proportionality of independence; this board independence has a positive effect on the CEO duality.

The interpretation is that the ROA improvement could reduce the need for board independence and as control role; therefore, this would allow the increase of CEO duality as governance leadership structure, as a board member or in the best case, board chair. The results are under a post-crisis context, so it could be an acceptable characteristic for a situation of apparent calm and consolidation of the countries analyzed.

In the case of CEO turnover, as mediator variable, there is no significant indirect effects, neither with the relationship ROA t-1 on the CEO duality nor with ln EBIT t-1 on the CEO duality. Therefore, the H1b is not supported.

This result shows that the CEO turnover has no influence as indirect effect between the prior firm performances on the CEO duality. However, directly the CEO turnover if it generates a

negative effect on the CEO duality, so it would be possible to contemplate the possibility of studying later if the CEO turnover significantly reduces the options of CEO duality in the countries studied with more details.

For the last mediator variable, family as shareholder, the finding shows significant indirect effects with both ROA t-1 and ln EBIT t-1 on CEO duality. So the H1c is fully supported.

This result shows that any of the two types of firm performance indirectly affect the CEO duality through the presence of family as shareholder. However, an important issue to highlight is that while on the one hand the increase in the previous ROA could encourage a reduction in the presence of family as shareholder, the increase in previous EBIT rather encourages the increase in the presence of family as shareholder.

This could be a contradiction if we interpret the firm performance as a single dimension, but if we understand the ROA as a ratio that explains the return on assets, it could be determined by an increasing of ownership structure, through new Investors involved. While in the case of EBIT, we talked more about the earnings obtained by the exercise carried out, which could be associated with the family involvement and therefore its increased presence. Possibly, this participation of the family as shareholder has a positive effect on the CEO duality, considering the family participation as CEO and board member or as CEO and chair of the board to have more control in the governance leadership structure.

On the other hand, the model as service role shows that mediation is partial because there are significant levels of direct effects between the firm performances on CEO duality.

The first mediator variable, board dependence, exerts a significant indirect effect in the relationship of ln EBIT t-1 on CEO duality, whereas in the ROA t-1 on CEO duality there is no significant effects, therefore the H2a is partially supported.

This result shows that the board dependence, as service role, allows an indirect effect between the prior firm performance and the CEO duality. However, as in the explanation of the previous model, it is necessary to review the stages. On the one hand, the previous EBIT exerts a positive effect on the increasing of board dependence, but then that increase in board dependence reduce the CEO duality, causing CEO to cease to be board chair or member thereof.

Indirect effects of the Firm Performance on CEO duality through Control Role

	Coef.	Robust S.E.	z	P>|z|	[95% Conf.	Interval]
ceo_duality <-						
ceo_turnover	**-0.179**	**0.049**	**-3.677**	**0.000**	**-0.275**	**-0.084**
shld_fam	**0.415**	**0.043**	**9.627**	**0.000**	**0.330**	**0.499**
lnp_bod_ind	**0.375**	**0.030**	**12.524**	**0.000**	**0.316**	**0.434**
roa_1	0.262	0.336	0.779	0.436	-0.396	0.920
ln_ebit_1	-0.014	0.011	-1.275	0.202	-0.035	0.007
_cons	1.882	0.072	26.078	0.000	1.741	2.024
H1a:lnp_bod_ind <-						
roa_1	**-0.740**	**0.292**	**-2.536**	**0.011**	**-1.312**	**-0.168**
ln_ebit_1	0.008	0.010	0.809	0.419	-0.011	0.028
_cons	-1.165	0.047	-24.791	0.000	-1.257	-1.073
H1b:ceo_turnover <-						
roa_1	-0.083	0.089	-0.933	0.351	-0.256	0.091
ln_ebit_1	-0.002	0.005	-0.468	0.640	-0.011	0.007
_cons	0.132	0.022	5.941	0.000	0.088	0.176
H1c:shld_fam <-						
roa_1	**-0.853**	**0.128**	**-6.648**	**0.000**	**-1.104**	**-0.601**
ln_ebit_1	**0.040**	**0.006**	**6.213**	**0.000**	**0.027**	**0.053**
_cons	0.185	0.028	6.631	0.000	0.131	0.240
var(e.ceo_duality)	0.403	0.016			0.373	0.436
var(e.ceo_turnover)	0.103	0.006			0.092	0.117
var(e.shld_fam)	0.204	0.005			0.195	0.213
var(e.lnp_bod_ind)	0.335	0.010			0.316	0.355

Indirect effects of the Firm Performance on CEO duality through Service Role

	Coef.	Robust S.E.	z	P>|z|	[95% Conf.	Interval]
ceo_duality <-						
ceo_noturnover	**0.198**	**0.048**	**4.153**	**0.000**	**0.104**	**0.291**
top_owner_0_50	**-0.161**	**0.036**	**-4.487**	**0.000**	**-0.231**	**-0.091**
ln_bod_size	**0.615**	**0.070**	**8.823**	**0.000**	**0.479**	**0.752**
ln_bod_dep	**-0.313**	**0.055**	**-5.736**	**0.000**	**-0.420**	**-0.206**
roa_1	**0.568**	**0.244**	**2.325**	**0.020**	**0.089**	**1.046**
ln_ebit_1	**-0.030**	**0.011**	**-2.655**	**0.008**	**-0.052**	**-0.008**
_cons	0.765	0.123	6.237	0.000	0.525	1.006
ln_bod_size <-						
roa_1	**-1.098**	**0.121**	**-9.044**	**0.000**	**-1.336**	**-0.860**
ln_ebit_1	**0.093**	**0.005**	**18.093**	**0.000**	**0.083**	**0.103**
_cons	1.746	0.024	72.178	0.000	1.698	1.793
H2a:ln_bod_dep <-						
roa_1	-0.069	0.130	-0.531	0.595	-0.325	0.186
ln_ebit_1	**0.070**	**0.007**	**9.527**	**0.000**	**0.056**	**0.085**
_cons	1.371	0.036	37.654	0.000	1.299	1.442
H2b:ceo_noturnover <-						
roa_1	0.083	0.089	0.933	0.351	-0.091	0.256
ln_ebit_1	0.002	0.005	0.468	0.640	-0.007	0.011
_cons	0.868	0.022	39.056	0.000	0.824	0.912
H2c:top_owner_0_50 <-						
roa_1	**-0.881**	**0.131**	**-6.732**	**0.000**	**-1.138**	**-0.625**
ln_ebit_1	**0.022**	**0.007**	**3.073**	**0.002**	**0.008**	**0.036**
_cons	0.391	0.033	11.908	0.000	0.326	0.455
var(e.ceo_duality)	0.485	0.017			0.453	0.519
var(e.ceo_noturnover)	0.103	0.006			0.092	0.117
var(e.top_owner_0_50)	0.240	0.002			0.235	0.244
var(e.ln_bod_size)	0.114	0.004			0.106	0.123
var(e.ln_bod_dep)	0.199	0.009			0.182	0.218

Possibly, this trend could be understood from a perspective in which the service and strategic role represented by greater dependence on the council is easy to interact with non-dual CEOs, since they have less power in a governance leadership structure, allowing more clarity in the role of service and strategic support.

In the case of CEO no turnover, as mediator variable, there is no significant indirect effects, neither with the relationship ROA t-1 on the CEO duality nor with ln EBIT t-1 on the CEO duality. Therefore, the H2b is not supported. As in the case of the CEO turnover, as a control role, in the case of the CEO permanence, it does not exercise any significant mediation between the prior firm performance and the CEO duality. However, the CEO non-turnover has a positive direct effect on the CEO duality. Which shows that the CEO permanence could potentially determine a trust effect reflected in the possibility to be a board member or board chair, if the country regulations allow it (since in the case of Chile this last case would not be allowed).

For the last mediator variable, top owner as non-majority, the finding shows significant indirect effects with both ROA t-1 and ln EBIT t-1 on CEO duality. So the H2c is fully supported.

This last result shows that both prior firm performances indirectly affect the CEO duality through the presence of top owner non-majority. However, in the case of ROA t-1, its effect is negative towards the top owner non-majority. Which could be expressed that when the returns on assets increase, thus there is trend to reduce the top owner non-majority. Potentially mean that the top owner would seek to increase its participation and thereby positively affect the CEO duality, giving greater openness to having a CEO as board member or as board chair. In the case of the ln EBIT t-1, its increasing affect positively the presence of top owner non-majority. This would imply a major extension of ownership structures in participation with a vision of dependence on resources, involving more principals that could support in the development of new strategies or services in coordination with the agents of the organization.

Moderation of the Institutional Cognitive Perspective

After the mediation tests, the next test is related to the moderation effects of the institutional cognitive perspective represented by the integral factor of Worldwide Governance Index.

For the moderation test, we use the results with significance levels in the mediation tests. In order to this, we probe the moderation in the model of board independence between ROA t-1 and CEO duality and in the model of board dependence between ln EBIT t-1 and CEO duality.

Moderation effects of Institutional Cognitive Perspective on Control Role Model

```
Sample Size:  1325
**************************************************************************
OUTCOME VARIABLE: lnp_bod_ind

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5107      .2608      .2497   155.3266     3.0000  1321.0000      .0000
Model
              coeff         se          t          p       LLCI       ULCI
constant    -1.1347      .0166   -68.4096      .0000    -1.1673    -1.1022
roa_1        -.6692      .2011    -3.3275      .0009    -1.0638     -.2747
WGI          -.2949      .0160   -18.3943      .0000     -.3264     -.2635
Int_1         .0480      .1864      .2576      .7968     -.3177      .4138

Product terms key: Int_1   :  roa_1   x  WGI

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0000      .0664     1.0000  1321.0000      .7968

**************************************************************************
OUTCOME VARIABLE: ceo_duality

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .3441      .1184      .4450    88.7935     2.0000  1322.0000      .0000
Model
              coeff         se          t          p       LLCI       ULCI
constant     1.9824      .0425    46.6895      .0000     1.8991     2.0657
roa_1         .2454      .2629      .9334      .3508     -.2703      .7611
lnp_bod_ind   .4216      .0316    13.3258      .0000      .3596      .4837

Conditional indirect effects of X on Y:

INDIRECT EFFECT: roa_1       ->    lnp_bod_ind    ->    ceo_duality

        WGI     Effect     BootSE   BootLLCI   BootULCI
     -.7298     -.2969      .1117     -.5186     -.0774
     -.6163     -.2947      .1060     -.5072     -.0856
     1.4354     -.2531      .1048     -.4525     -.0432

      Index of moderated mediation:
         Index     BootSE   BootLLCI   BootULCI
WGI      .0202      .0705     -.1171      .1607
```

According to the results obtained, in the case of the moderation of the cognitive institutional factor towards the mediation of the control role, represented by the independence of the directory, the evidence shows that there are no significant levels of moderating effect in said relationship, so that H3a is not supported.

On the other hand, in the case of the moderation of the cognitive institutional factor on the mediation of the service role, represented by the dependency of the directory, the evidence shows that if there are significant levels of negative moderating effect in that relation, so that the H3b is supported.

Moderation effects of Institutional Cognitive Perspective on Service Role Model

```
Sample Size:  1506
**************************************************************************
OUTCOME VARIABLE: ln_bod_dep

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .3358      .1128      .1910    63.6443     3.0000  1502.0000      .0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     1.4519      .0313    46.3544      .0000     1.3904     1.5133
ln_ebit_1     .0540      .0066     8.2104      .0000      .0411      .0669
WGI           .2298      .0346     6.6442      .0000      .1619      .2976
Int_1        -.0321      .0070    -4.5702      .0000     -.0458     -.0183

Product terms key: Int_1    :        ln_ebit_ x        WGI

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0123    20.8865     1.0000  1502.0000      .0000

----------
    Focal predict: ln_ebit_ (X)
          Mod var: WGI      (W)

Conditional effects of the focal predictor at values of the moderator(s):

        WGI     Effect         se          t          p       LLCI       ULCI
     -.7428      .0778      .0076    10.2488      .0000      .0629      .0927
     -.6397      .0745      .0072    10.2927      .0000      .0603      .0887
     1.4354      .0080      .0130      .6128      .5401     -.0176      .0335

**************************************************************************
OUTCOME VARIABLE: ceo_duality

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .2323      .0540      .4995    28.5646     3.0000  1502.0000      .0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     1.0046      .1024     9.8111      .0000      .8037     1.2054
ln_ebit_1    -.0212      .0111    -1.9159      .0556     -.0430      .0005
ln_bod_size   .5422      .0604     8.9826      .0000      .4238      .6606
ln_bod_dep   -.3039      .0472    -6.4379      .0000     -.3964     -.2113

Conditional indirect effects of X on Y:

INDIRECT EFFECT:
 ln_ebit_    ->    ln_bod_dep    ->    ceo_dual

        WGI     Effect     BootSE   BootLLCI   BootULCI
     -.7428     -.0236      .0048     -.0337     -.0148
     -.6397     -.0226      .0046     -.0322     -.0141
     1.4354     -.0024      .0026     -.0079      .0024

      Index of moderated mediation:
         Index     BootSE   BootLLCI   BootULCI
WGI      .0097      .0023      .0056      .0146
```

This last result shows that the cognitive institutional factor interacting with the ln EBIT t-1 reduces the impact of the service role represented by the dependence of the council. This would mean that the context plays a relevant role to the prior firm performance obtained to maintain the board dependence without critical increases therof. This would allow to maintain a certain CEO duality without resorting critically to the separation of positions in the governance leadership structure.

Discussion

The results are based on the 1673 observations compiled from 2009 to 2015 regarding the companies that list in the stock markets of the countries of Mexico, Peru and Chile. The next stage would consider observations from Colombia and Spain.

For the previous tests carried out, other control variables were not considered, such as the industry, the years of the company, as well as its commercial condition. Likewise, in the case of independent variables, Tobin's Q was not used because of the lack of data in several observations for its construction. In the same way, this influenced the use of other control variables such as the market-to-book or the book-to-market or the share return.

Regarding the procedures performed, although the full categories were used for the direct effects tests, tests with the aforementioned control variables could be performed, controlling the robustness and multicollinearity of the models.

In the case of mediation models, the variables used as part of the control and service roles could be expanded if the previous argument is considered. Which would allow a better overview of the variables that each role could represent to be evaluated.

On the side of moderation one of the limitations was the use of the complementary platform to the SPSS, since it only accepted continuous mediating variables, so that only the variables of independence, size and dependence of the directory could be effective. Because the other variables regarding the ownership structure, they were defined as dichotomous variables.

Due to the high degree of significant correlation of the macro level variables that defined the cognitive institutional perspective, these had to be reduced to a single dimension by factorization. For other studies, the variables could be identified that do not correlate with each other but with the other mediating or dependent variables of the model to perform tests in greater detail.

This research allows to see a new threshold in the study of the background of the CEO duality, using the combination of roles and the moderation of macro-level factors, allowing future multilevel studies.

Conclusions

The study gives a new gate of how the prior firm performance affects, as antecedent, the CEO duality, but indirectly through variables of governance internal mechanism that may be related to the control role or the service role.

From these studies, together with the previous tests, mediation is possible. Mediations as strategic and control roles are supported in this study.

The first results of direct effects discard significant levels of the prior firm performance on the CEO duality.

However, for the mediation model based on the control role, board independence as well as the presence of family as shareholder have significant levels of full mediation effects of the prior firm performance on the CEO duality.

In the same way, for the model based on the service role, the board size with the board dependence, as well as the presence of top owner non-majority, present significant levels of partial mediation effects between the prior firm performance on the CEO duality.

Likewise, in the case of moderation only in the model based on the service role, the presence of moderation on the part of the cognitive institutional factor is evidenced.

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Appendix 1: Descriptive Analysis by year

year	country 1	2	3	Total
2009	99	78	62	239
2010	99	78	62	239
2011	99	78	62	239
2012	99	78	62	239
2013	99	78	62	239
2014	99	78	62	239
2015	99	78	62	239
Total	693	546	434	1,673

year	ceo_duality 1	2	3	Total
2009	144	59	36	239
2010	142	61	36	239
2011	150	57	32	239
2012	148	61	30	239
2013	149	60	30	239
2014	150	56	33	239
2015	154	55	30	239
Total	1,037	409	227	1,673

year	ceo_nondual 0	1	Total
2009	95	144	239
2010	97	142	239
2011	89	150	239
2012	91	148	239
2013	90	149	239
2014	89	150	239
2015	85	154	239
Total	636	1,037	1,673

.

year	ceo_bodmem 0	1	Total
2009	180	59	239
2010	178	61	239
2011	182	57	239
2012	178	61	239
2013	179	60	239
2014	183	56	239
2015	184	55	239
Total	1,264	409	1,673

.

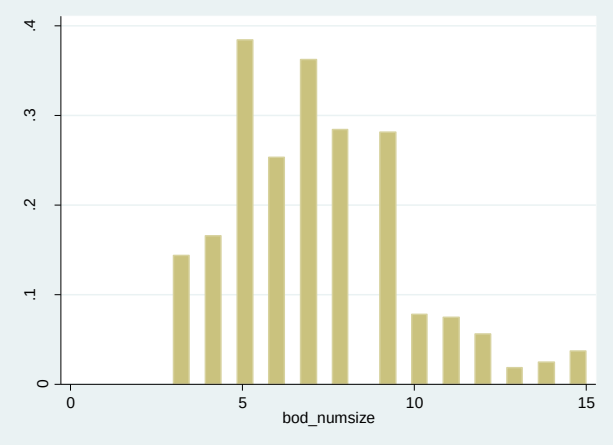
year	ceo_dual_cbo 0	1	Total
2009	203	36	239
2010	203	36	239
2011	207	32	239
2012	209	30	239
2013	209	30	239
2014	206	33	239
2015	209	30	239
Total	1,446	227	1,673

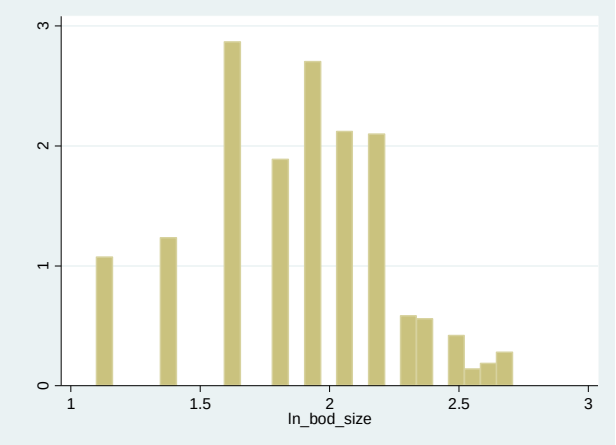
.

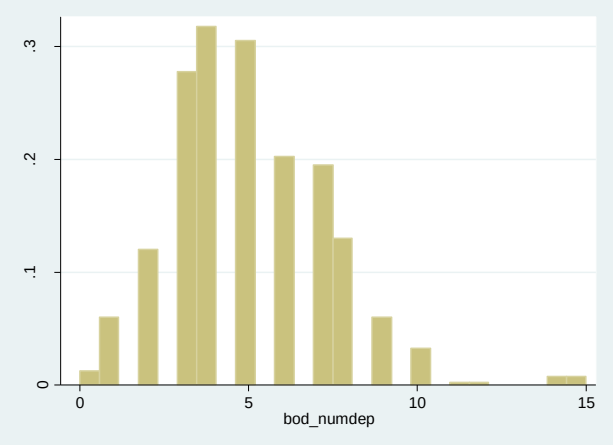
```
           |     ceo_turnover
      year |         0          1 |     Total
-----------+----------------------+----------
      2009 |       224         15 |       239
      2010 |       215         24 |       239
      2011 |       216         23 |       239
      2012 |       208         31 |       239
      2013 |       201         38 |       239
      2014 |       205         34 |       239
      2015 |       207         32 |       239
-----------+----------------------+----------
     Total |     1,476        197 |     1,673
.
           |       shld_fam
      year |         0          1 |     Total
-----------+----------------------+----------
      2009 |       165         74 |       239
      2010 |       167         72 |       239
      2011 |       168         71 |       239
      2012 |       169         70 |       239
      2013 |       168         71 |       239
      2014 |       168         71 |       239
      2015 |       171         68 |       239
-----------+----------------------+----------
     Total |     1,176        497 |     1,673

           |    top_owner_0_50
      year |         0          1 |     Total
-----------+----------------------+----------
      2009 |       139        100 |       239
      2010 |       137        102 |       239
      2011 |       135        104 |       239
      2012 |       140         99 |       239
      2013 |       137        102 |       239
      2014 |       137        102 |       239
      2015 |       137        102 |       239
-----------+----------------------+----------
     Total |       962        711 |     1,673
```

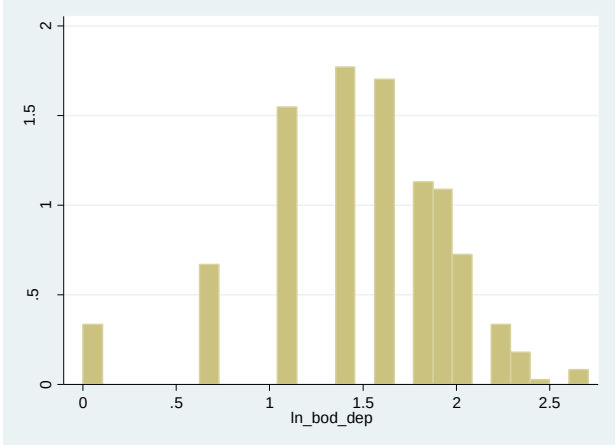
Appendix 2: Summaries and histograms

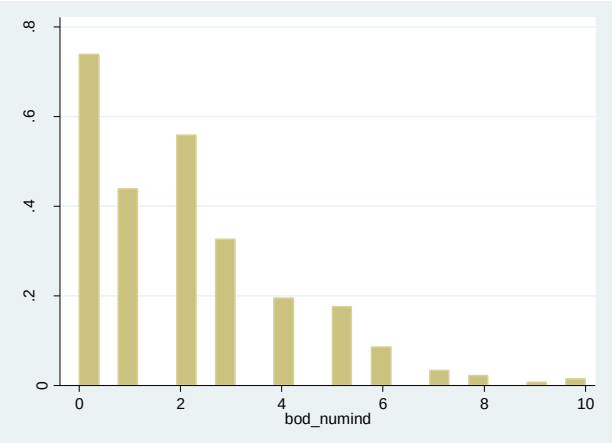
```
. sum roa_1 roe_1 ln_ebit_1 leverage ln_assets ln_bod_size ln_bod_dep lnp_bod_ind
WGI vae_1 pve_1 gee_1 rqe_1 rle_1 cce_1


    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
       roa_1 |      1,659    .0549103    .0884958   -.520183   .9077365
       roe_1 |      1,659    .1135221    .4246469  -9.240684    2.93159
   ln_ebit_1 |      1,512    4.329462    1.788322   -2.78125   9.432837
    leverage |      1,652    .8636231    2.743798  -87.01832   27.98304
   ln_assets |      1,671    7.060267    1.655061   1.837347   11.37001
-------------+---------------------------------------------------------
 ln_bod_size |      1,673    2.071492     .373148   1.098612   3.044523
  ln_bod_dep |      1,667    1.667767    .4617795          0   2.944439
 lnp_bod_ind |      1,336   -1.173931    .5798655  -2.639057   .1335314
-------------+---------------------------------------------------------
         WGI |      1,673   -1.96e-09           1  -.9063441   1.493196
       vae_1 |      1,673    .4300304    .4425558   .0003161   1.106285
       pve_1 |      1,673   -.3958319    .6232261  -1.179883   .6796045
       gee_1 |      1,673    .3682919     .636865  -.4166843    1.27253
       rqe_1 |      1,673    .7609688    .5103072   .2248415   1.538509
       rle_1 |      1,673    .0574573    .9070848  -.7044131    1.43314
       cce_1 |      1,673    .2378299    .8775491  -.7617088   1.582224
```

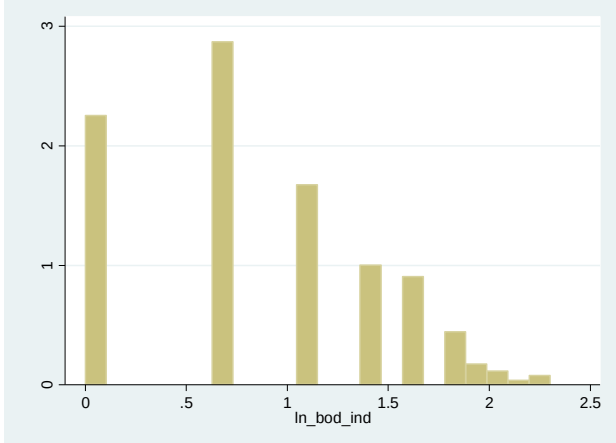

0
.1
.2
.3
.4
0
5
10
15
bod_numsize

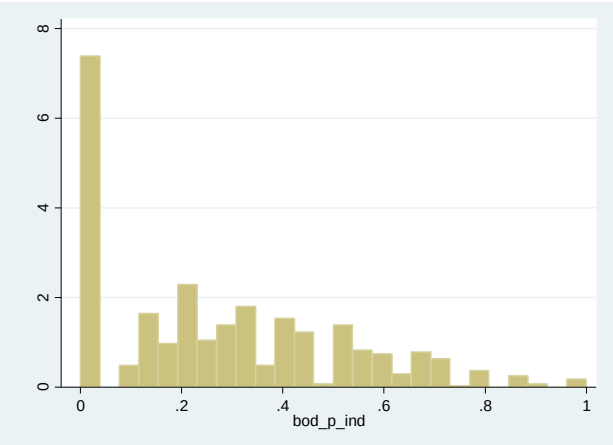

0
1
2
3
1
1.5
2
2.5
3
ln_bod_size

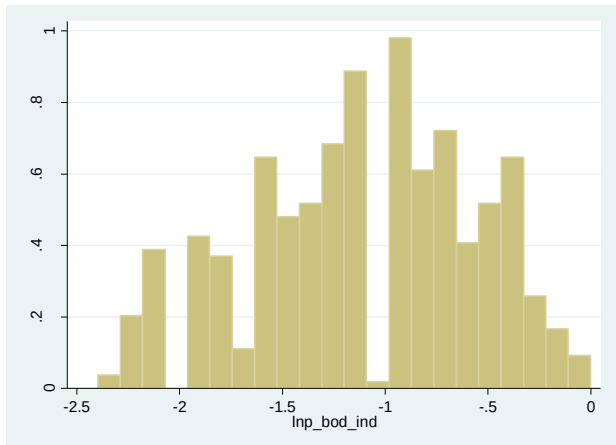

0
.1
.2
.3
0
5
10
15
bod_numdep

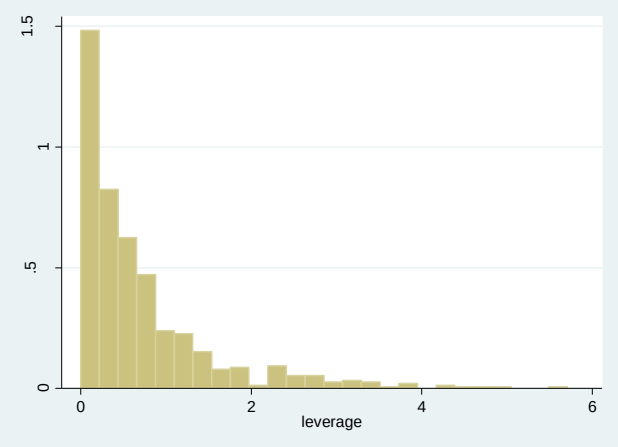

0
.5
1
1.5
2
0
.5
1
1.5
2
2.5
ln_bod_dep


0
.2
.4
.6
.8
0
2
4
6
8
10
bod_numind


0
1
2
3
0
.5
1
1.5
2
2.5
ln_bod_ind


0
2
4
6
8
0
.2
.4
.6
.8
1
bod_p_ind


0
.2
.4
.6
.8
1
-2.5
-2
-1.5
-1
-.5
0
lnp_bod_ind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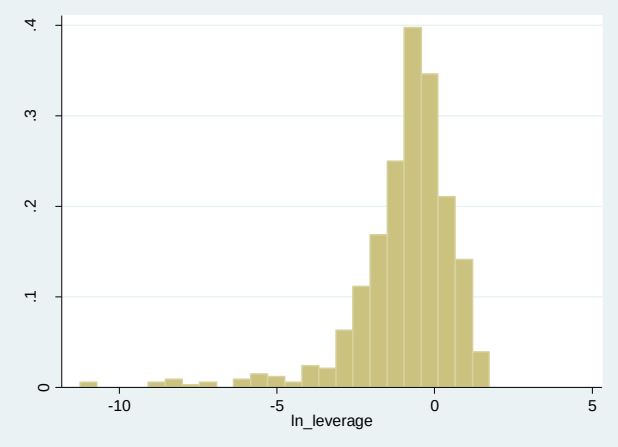
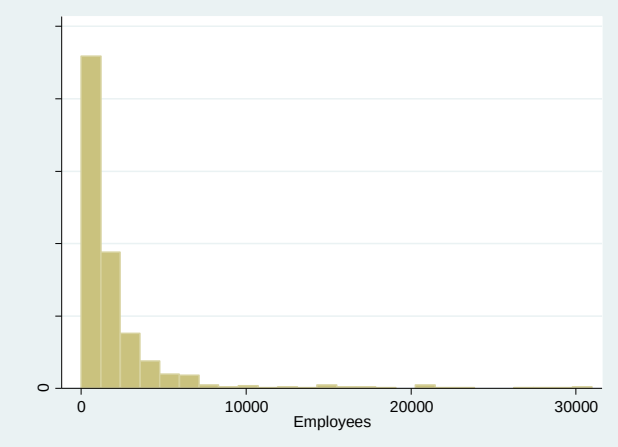
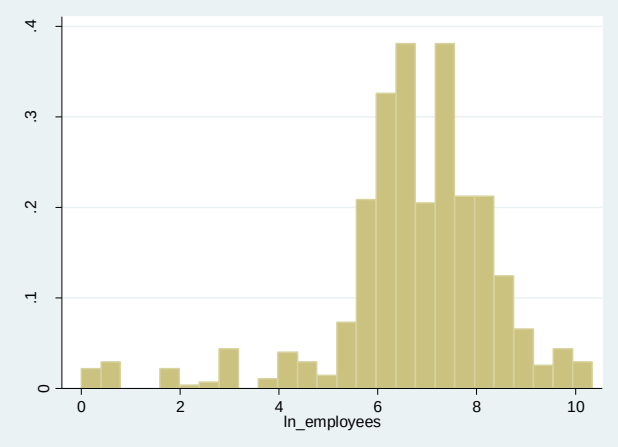
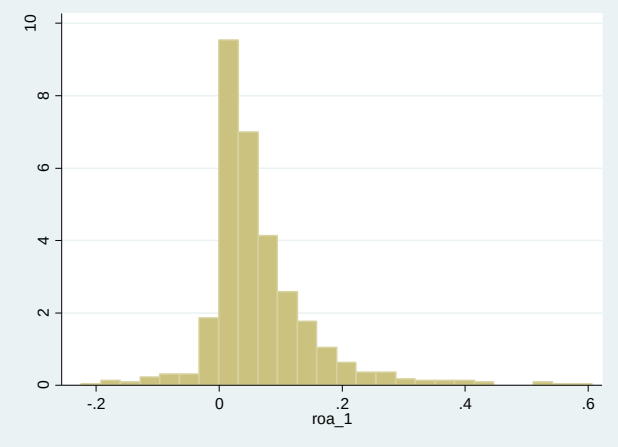
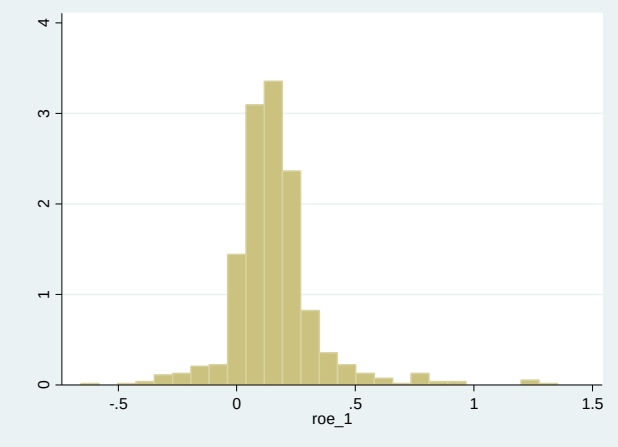
.5
1
1.5
0
2
4
6
leverage

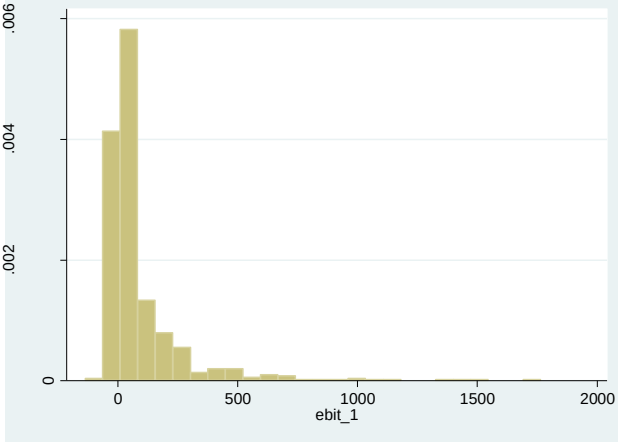

0
.1
.2
.3
.4
-10
-5
0
5
ln_leverage

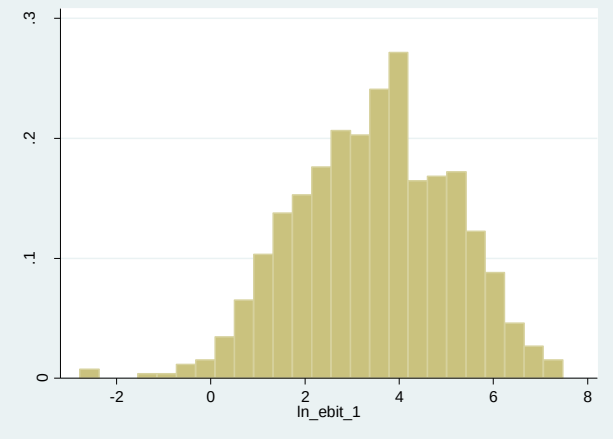

0
0
10000
20000
30000
Employees


0
.1
.2
.3
.4
0
2
4
6
8
10
ln_employees


0
2
4
6
8
10
-.2
0
.2
.4
.6
roa_1


0
1
2
3
4
-.5
0
.5
1
1.5
roe_1


0
.002
.004
.006
0
500
1000
1500
2000
ebit_1


0
.1
.2
.3
-2
0
2
4
6
8
ln_ebit_1

Appendix 3: VIF Test of the Models

Variable	VIF	1/VIF
ln_bod_ind	1.15	0.867379
shld_fam	1.14	0.874351
ln_assets	1.12	0.893058
leverage	1.08	0.925103
roa_1	1.01	0.985408
ceo_turnover	1.01	0.990617
Mean VIF	1.09	

Variable	VIF	1/VIF
ln_bod_ind	1.15	0.867616
shld_fam	1.15	0.872588
ln_assets	1.12	0.889648
leverage	1.07	0.932453
ceo_turnover	1.01	0.990738
roe_1	1.01	0.992678
Mean VIF	1.09	

Variable	VIF	1/VIF
ln_assets	3.55	0.281874
ln_ebit_1	3.34	0.299168
ln_bod_ind	1.16	0.860197
shld_fam	1.14	0.876242
leverage	1.11	0.897441
ceo_turnover	1.01	0.987190
Mean VIF	1.89	

Variable	VIF	1/VIF
ln_bod_size	1.80	0.556160
ln_bod_dep	1.46	0.683739
ln_assets	1.32	0.758180
top_owner~50	1.05	0.951418
roa_1	1.04	0.959210
leverage	1.03	0.971958
ceo_noturn~r	1.01	0.992164
Mean VIF	1.24	

Variable	VIF	1/VIF
ln_bod_size	1.77	0.563728
ln_bod_dep	1.44	0.696650
ln_assets	1.33	0.753868
leverage	1.05	0.953913
top_owner~50	1.04	0.957483
roe_1	1.03	0.972832
ceo_noturn~r	1.01	0.994421
Mean VIF	1.24	

Variable	VIF	1/VIF
ln_assets	3.76	0.265830
ln_ebit_1	3.30	0.303187
ln_bod_size	1.79	0.559043
ln_bod_dep	1.46	0.683044
leverage	1.12	0.894398
top_owner~50	1.05	0.949621
ceo_noturn~r	1.00	0.995697
Mean VIF	1.93	

Appendix 4: Moderation Test of the Models

```
**************** PROCESS Procedure for SPSS Version 3.00 *****************
          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3
**************************************************************************
Model  : 7
Y  : ceo_duality, X  : roa_1, M  : lnp_bod_ind, W  : WGI

Sample Size:  1325
**************************************************************************
OUTCOME VARIABLE: lnp_bod_ind

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5107      .2608      .2497   155.3266     3.0000  1321.0000      .0000

Model
             coeff         se          t          p       LLCI       ULCI
constant    -1.1347      .0166   -68.4096      .0000    -1.1673    -1.1022
roa_1        -.6692      .2011    -3.3275      .0009    -1.0638     -.2747
WGI          -.2949      .0160   -18.3943      .0000     -.3264     -.2635
Int_1         .0480      .1864      .2576      .7968     -.3177      .4138

Product terms key: Int_1  :  roa_1  x  WGI

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0000      .0664     1.0000  1321.0000      .7968

**************************************************************************
OUTCOME VARIABLE: ceo_duality

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .3441      .1184      .4450    88.7935     2.0000  1322.0000      .0000

Model
             coeff         se          t          p       LLCI       ULCI
constant     1.9824      .0425    46.6895      .0000     1.8991     2.0657
roa_1         .2454      .2629      .9334      .3508     -.2703      .7611
lnp_bod_ind   .4216      .0316    13.3258      .0000      .3596      .4837

***************** DIRECT AND INDIRECT EFFECTS OF X ON Y *****************

Direct effect of X on Y
     Effect         se          t          p       LLCI       ULCI
      .2454      .2629      .9334      .3508     -.2703      .7611

Conditional indirect effects of X on Y:

INDIRECT EFFECT: roa_1       ->    lnp_bod_ind    ->    ceo_duality

        WGI     Effect     BootSE   BootLLCI   BootULCI
     -.7298     -.2969      .1117     -.5186     -.0774
     -.6163     -.2947      .1060     -.5072     -.0856
     1.4354     -.2531      .1048     -.4525     -.0432

      Index of moderated mediation:
         Index     BootSE   BootLLCI   BootULCI
WGI      .0202      .0705     -.1171      .1607
********************** ANALYSIS NOTES AND ERRORS ************************
Level of confidence for all confidence intervals in output: 95.0000
Number of bootstrap samples for percentile bootstrap confidence intervals: 5000
W values in conditional tables are the 16th, 50th, and 84th percentiles.
NOTE: Variables names longer than eight characters can produce incorrect output.
      Shorter variable names are recommended.
------ END MATRIX -----
```

```
**************** PROCESS Procedure for SPSS Version 3.00 *****************
          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3
**************************************************************************
Model  : 7
Y  : ceo_dual, X  : ln_ebit_1, M1  : ln_bod_size, M2  : ln_bod_dep, W  : WGI

Sample Size:  1506

**************************************************************************
OUTCOME VARIABLE: ln_bod_size

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .4460      .1989      .1154   124.3019     3.0000  1502.0000      .0000

Model
             coeff         se          t          p       LLCI       ULCI
constant    1.7410      .0243    71.5203      .0000     1.6932     1.7887
ln_ebit_1    .0812      .0051    15.8866      .0000      .0712      .0912
WGI          .1476      .0269     5.4908      .0000      .0949      .2003
Int_1       -.0422      .0055    -7.7409      .0000     -.0529     -.0315

Product terms key: Int_1  :  ln_ebit_1  x  WGI

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0320    59.9216     1.0000  1502.0000      .0000

----------
    Focal predict: ln_ebit_ (X)
          Mod var: WGI      (W)

Conditional effects of the focal predictor at values of the moderator(s):

        WGI     Effect         se          t          p       LLCI       ULCI
     -.7428      .1126      .0059    19.0743      .0000      .1010      .1241
     -.6397      .1082      .0056    19.2324      .0000      .0972      .1192
     1.4354      .0206      .0101     2.0386      .0417      .0008      .0405

**************************************************************************
OUTCOME VARIABLE: ln_bod_dep

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .3358      .1128      .1910    63.6443     3.0000  1502.0000      .0000

Model
             coeff         se          t          p       LLCI       ULCI
constant    1.4519      .0313    46.3544      .0000     1.3904     1.5133
ln_ebit_1    .0540      .0066     8.2104      .0000      .0411      .0669
WGI          .2298      .0346     6.6442      .0000      .1619      .2976
Int_1       -.0321      .0070    -4.5702      .0000     -.0458     -.0183

Product terms key: Int_1    :        ln_ebit_ x        WGI

Test(s) of highest order unconditional interaction(s):
       R2-chng          F        df1        df2          p
X*W      .0123    20.8865     1.0000  1502.0000      .0000

----------
    Focal predict: ln_ebit_ (X)
          Mod var: WGI      (W)

Conditional effects of the focal predictor at values of the moderator(s):

        WGI     Effect         se          t          p       LLCI       ULCI
     -.7428      .0778      .0076    10.2488      .0000      .0629      .0927
     -.6397      .0745      .0072    10.2927      .0000      .0603      .0887
     1.4354      .0080      .0130      .6128      .5401     -.0176      .0335
```

```
**************************************************************************
OUTCOME VARIABLE: ceo_duality

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .2323      .0540      .4995    28.5646     3.0000  1502.0000      .0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     1.0046      .1024     9.8111      .0000      .8037     1.2054
ln_ebit_1    -.0212      .0111    -1.9159      .0556     -.0430      .0005
ln_bod_size   .5422      .0604     8.9826      .0000      .4238      .6606
ln_bod_dep   -.3039      .0472    -6.4379      .0000     -.3964     -.2113

***************** DIRECT AND INDIRECT EFFECTS OF X ON Y ****************

Direct effect of X on Y
     Effect         se          t          p       LLCI       ULCI
     -.0212      .0111    -1.9159      .0556     -.0430      .0005

Conditional indirect effects of X on Y:

INDIRECT EFFECT: ln_ebit_1    ->    ln_bod_size    ->    ceo_duality

        WGI     Effect     BootSE   BootLLCI   BootULCI
     -.7428      .0610      .0087      .0445      .0782
     -.6397      .0587      .0083      .0427      .0750
     1.4354      .0112      .0029      .0056      .0171

      Index of moderated mediation:
         Index     BootSE   BootLLCI   BootULCI
WGI     -.0229      .0037     -.0305     -.0161
---

INDIRECT EFFECT:
 ln_ebit_    ->    ln_bod_dep    ->    ceo_dual

        WGI     Effect     BootSE   BootLLCI   BootULCI
     -.7428     -.0236      .0048     -.0337     -.0148
     -.6397     -.0226      .0046     -.0322     -.0141
     1.4354     -.0024      .0026     -.0079      .0024

      Index of moderated mediation:
         Index     BootSE   BootLLCI   BootULCI
WGI      .0097      .0023      .0056      .0146
---

********************** ANALYSIS NOTES AND ERRORS ************************
Level of confidence for all confidence intervals in output: 95.0000
Number of bootstrap samples for percentile bootstrap confidence intervals: 5000
W values in conditional tables are the 16th, 50th, and 84th percentiles.
NOTE: Variables names longer than eight characters can produce incorrect output.
      Shorter variable names are recommended.
------ END MATRIX -----
```