CORPORATE GOVERNANCE, OWNERSHIP STRUCTURES AND IT INVESTMENTS AN INSTITUTIONAL APPROACH ON IBEROAMERICAN STOCK EXCHANGES

ABSTRACT

The research aims to highlight the relationships of traditional and new ownership structures, like corporate governance's changes, on information technology (IT) investments for firms listed on Iberoamerican stock markets after the global financial crisis. The study uses a neo-institutional economic framework to show changes in corporate governance through ownership structures (including new institutional investors of common ownership such as Fidelity Investments, The Vanguard Group, State Street and BlackRock) as well as IT investments growth in Iberoamerica. Besides, a literature review addresses the relationship between corporate governance and IT investment considering the relevance of the concentrated ownership, foreign ownership and institutional investors of common ownership in relation to IT investment levels to raise the hypotheses. The study has a longitudinal method design with 2009-2015 period, using firms listed in stock market of Chile, Colombia, Mexico, Peru (MILA) and Spain (IBEX). The findings demonstrate that IT investment growth is negatively affected by concentrated ownerships and top foreign ownership, this last as unexpected situation, while it is positively affected by the new institutional investors of common ownership.

JEL Classification: B52, C33, G34, G32, G23, M15

Keywords: *Institutional Theory, Corporate Governance, Ownership Structure, Institutional Investors, IT Investments.*

INTRODUCTION

Studying about the investments that companies make in technological capital, mainly in information technology (IT), remains an important strategic management issue (Sabherwal, Sabherwal, Havakhor, & Steelman, 2019). In practice, companies have invested extensively in information technology, and this trend continues today (Kappelman et al., 2019). For this reason, studies of IT investments have been a fruitful field. On the one hand, with an approach aimed at understanding how these IT investments affect firm performance (Brynjolfsson & Hitt, 1996; Dehning & Richardson, 2002; Dehning, Richardson, & Stratopoulos, 2005; Lim, Dehning, Richardson, & Smith, 2011). On the other hand, how these IT investments are governed from the structures, processes or relationships for strategic implementation (Peterson, 2004; Sambamurthy & Zmud, 1999; Weill, 1992; Wu, Straub, & Liang, 2015). Despite this, IT investment studies as consequence of internal mechanisms of corporate governance remain a topic of discussion. (Drnevich & Croson, 2013; Gurbaxani & Whang, 1991; Henderson & Venkatraman, 1992), where few empirical studies have been developed, mainly considering the ownership structure (Choi, Park, & Hong, 2012; Ho, Tian, Wu, & Xu, 2017; Ho, Wu, & Xu, 2011; Loh & Venkatraman, 1993; Ravichandran, Han, & Hasan, 2009; Zhang & Huang, 2012) and, without being oblivious to consider emerging economies (Choi et al., 2012; Ho et al., 2011).

Moreover, it is important to see the close relationship of IT with the agency problem as a reducer of information asymmetry (Eisenhardt, 1989; Gurbaxani & Whang, 1991; Jensen & Meckling, 1976). After each global crisis (such as dot.com or the global financial crisis), the academic discussion highlights the need to deepen the relationship between corporate governance and IT with the highest decision levels (Andriole, 2009; Nolan & Mcfarlan, 2005), as well as the causes of IT investment in other regions under other perspectives of institutional perspective (Rojko, Lesjak, & Vehovar, 2011).

For these reasons, the main motivation of this document is to investigate whether changes in corporate governance, through the ownership structure, affect the levels of IT investments in the Latin American context. We can mention three important reasons that underline this objective.

First, under a new institutional economy perspective (Coase, 1998; North, 1986; Williamson, 2000), the specific technological investments growth has allowed us to reflect on organizational changes due to the reduction of agency costs and the transaction costs of firms (Gurbaxani & Whang, 1991). In fact, as mentioned earlier, this quest to understand the nature of IT investments led to research its impact on firm performance (Lim et al., 2011), as well as the governance that enables its strategic implementation (Wu et al., 2015). But more specifically about the consequences of internal mechanisms of corporate governance such as boards of directors and ownership structures (Ho et al., 2011). From the latter, academics took the traditional approach to property structures such as concentrated ownership or family ownership (Ho et al., 2017; Loh & Venkatraman, 1993), foreign ownership (Ho et al., 2011) and institutional investors (Ravichandran et al., 2009).

Second, in relation to aforementioned perspective, the institutional comparative analysis (Aoki, 2001) broadens the scope to study other contexts with their own rules and beliefs such as developing economies over time, in addition to the growth of new institutional investors promoting the change of organizational structures with an impact on economic and firm performance. (Bushee, 2004; Bushee & Noe, 2000; Ferreira & Matos, 2008; Gillan & Starks, 2000; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998). In fact, academics studied, apart from traditional ownership structures, categories of institutional investors to understand their impact (Bushee, 1998; Johnson & Greening, 1999; Porter, 1992), differentiating dedicated institutional investors (long-term) from temporary institutional investors (short-term). However, these approaches left the window open to a type of institutional investor that emerged in developed economies as passive foreign investment management firms (Crane & Crotty, 2018) with active shareholders (Appel, Gormley, & Keim, 2016; McCahery, Sautner, & Starks, 2016; Strampelli, 2018). This institutional investors was called quasi-indexers (Bushee, Carter, & Gerakos, 2014; Chen, Huang, Li, & Shevlin, 2018) or common ownership (Posner, Scott Morton, & Weyl, 2017; Wang & Barrese, 2019). These firms, such as Fidelity Investments, The Vanguard Group, State Street and BlackRock, have been growing and reconfiguring the new ownership structures through asset management as traded funds (Wang & Barrese, 2019). The prior through a common control with high risk of possible concentration problems that could trigger a future economic crisis (Brancaccio, Giammetti, Lopreite, & Puliga, 2018), even expanding this growth to developing economy contexts.

Third, considering an institutional comparative historical analysis, the Ibero-American context becomes a promising field of study the evolution of corporate governance (Briano-Turrent & Rodríguez-Ariza, 2016; Kabbach de Castro, Crespí-Cladera, & Aguilera, 2013; Saona & San Martín, 2018) as well as IT investments (Hofman, Aravena, & Aliaga, 2016; Malaquias & Albertin, 2018). In fact, part of the institutional changes in developed economies have been adopted by developing economies such as those in Latin America with a strong Iberian connection to Spain. In addition, in the last years after the global financial crisis, an institutional economic consolidation emerges from that region, called the Pacific Alliance, which incorporates the first Stock Markets Integrated in Latin America (MILA), including Chile, Colombia, Mexico and Peru.

For these reasons, and considering that North America and Europe have direct influence in Latin America, the study raises the following question: What happens in Iberoamerica regarding the effects of traditional and new ownership structures on IT investment levels? Thus to answer this question we raise some points.

First, the study develops an institutional framework for the Iberoamerican case. Due to the importance of establishing a connection between the neo-institutional economic perspective and the Ibero-American reality, the study develops an institutional comparative historical analysis (Aoki, 2001). This analysis contemplates the evolution of corporate governance from a point of view of ownership policies, rules and structures, as well as IT investment in Iberomerica.

Second, the study addresses a review of corporate governance literature and IT investment to clearly focus on how IT investment studies begin their relationship with internal mechanisms of corporate governance (Loh & Venkatraman, 1993), until the last studies with ownership structures from an institutional perspective (Ho et al., 2017). This review allows the hypotheses to be raised between ownership structures based on concentrated ownership, top foreign ownership and institutional investors related to IT investment.

Third, the study proposes a longitudinal method design through panel data from 2009 to 2015 with firms listed in the stock markets of Chile, Colombia, Mexico, Peru and Spain. In addition, the main source of ownership structure types and IT investments come from Bloomberg Terminal, Thompson Reuters Eikon and manual collection of the annual reports on corporate governance of each Superintendency of Stock Market by country.

Fourth, the research contribution, at the academic level, lies in enriching, from institutional theory, the evidence left by studies in corporate governance and IT investment (Drnevich & Croson, 2013), considering other types of ownership structures not previously contemplated, as well as the breakdown of IT investment, together with an institutional view that dares to compare countries with growth common conditions. Likewise, at a practical level, the study hopes to contribute to IT and management professionals to consider the widely discussed IT investment importance is responsibility of the higher decision levels of organizations beyond the direction.

AN INSTITUTIONAL FRAMEWORK IN THE IBEROAMERICAN CASE

Hitherto, the world is changing and Iberoamerica has gone through several institutional changes in recent decades. In fact, several Latin American emerging economies followed part of the good practices in corporate governance due to their firms' financing tended to be internal, concentrated or by over-controlled banks (Shleifer & Vishny, 1997). For instance, many countries had to overcome in the nineties macroeconomic problems improving their public and private institutions, such as their capital markets, introducing better rules to welcome institutional investors such as pension funds or mutual funds (Lefort & Walker, 2000) and, to reduce the agency problem between controlling and minority shareholders (Cueto, 2013; Lefort, 2005).

Moreover, in this regional context, one of the main problems that these countries began to face was the assumption of new leadership structures based on the privatization of former state-owned enterprises, as part of their financial restructuring and capital need (Chong & Lopez-de-Silanes, 2004). These changes generated a great stimulus to new national policies and regulations that adopted new corporate governance standards in the public and private sector due to world changes (e.g. OECD, World Bank, Sarbanex-Oxley act, among others), creating even regional corporate governance networks (Bedicks & Arruda, 2005).

These changes allowed the growth from several countries, consolidating economic alliances such as Mercosur (1991) or Unasur (2004) or their relationships with countries from other regions. However, after

the global financial crisis of 2008, only some Latin American countries consolidated their economic institutional changes, creating the Pacific Alliance and within it the first Stock Markets Integration in Latin America (MILA). For these reasons, a representative scope to study the Iberoamerican case are the Pacific Alliance countries, because they represent almost 50% of the Latin American GDP plus Spain. Besides, the study considers Spain because of the economic-commercial relationships with these countries, as well as the socio-cultural features and constraints, being a relevant reference in the region, sharing investments, common knowledge and even some subsidiary firms created at MILA group.

Hence, this empirical study is based on the listed firms of Spain (IBEX) and the countries of Chile, Colombia, Mexico and Peru, as MILA group from the Pacific Alliance. Currently, these countries are among the most liberalized in this region. In fact, Chile has 26 free trade agreements linked to 64 countries. Moreover, Peru has 21 free trade agreements linked to 50 countries. Meanwhile, Mexico and Colombia have 20 free trade agreements each, linked to 46 and 34 countries, respectively. In addition, Chile and Mexico are part of the OECD and, Colombia and Peru have applied to be members. Moreover, MILA countries have maintained stable and positive sovereign ratings in the long term, much better than other countries from the region, according to the three main credit rating agencies (Standard & Poor's, Moody's, Fitch), thus justifying our interest in this Iberoamerican case.

For instance, recently, part of scholar empirical studies has focused on understanding from an institutional perspective the concentration of the ownership structures, for example, as family owners, in Latin America and Iberoamerica, including Spain (Briano-Turrent & Rodríguez-Ariza, 2016; Galve-Górriz & Hernández-Trasobares, 2015; Kabbach de Castro et al., 2013; Saona & San Martín, 2018). And only one study of those highlights the importance of foreign ownership and new different types of institutional investors (Kabbach de Castro et al., 2013). In that sense, these last decades have been times of financial innovation and economic cultural changes where Iberoamerica has not been oblivious. Notably the movement from defined-benefit pension schemes to defined-contribution retirement plans sponsored by employers. Such changes have fed the growth of a new institutional investment firms (Posner et al., 2017). Indeed, the firms Fidelity Investments Inc. and The Vanguard Group, have enjoyed strong recognition since their beginnings and together to BlackRock Inc. and State Street in these last years, reporting over $15.5 trillion characterized as assets under management (Wang & Barrese, 2019). These institutional investors when managing important assets begin to own a significant part of firm shares that are listed on stock markets, called common ownership, so that economists have begun to study the consequences of this reality (Pozen & Harnacher, 2011; Yadav, 2018).

Even this progress makes of the relationship between these internal mechanisms of corporate governance and IT investments a new field to study for the region.

In fact, regarding investment in information technologies in Iberomerica, recent studies speak of significant growth and contribution in the region (Hofman et al., 2016; Malaquias & Albertin, 2018). For instance, one

study compares developed economies with developing economies, and Latin American countries had similar IT investments growth ratios to Spain or Italy, as a percentage of total fixed capital formation, with upward trends since twenty years ago and positive contributions in all sectors of economy activity (Hofman et al., 2016). In addition, the findings of other study at the corporate level are that listed firms committed to IT investments have a larger participation of institutional investors compared to other listed firms (Malaquias & Albertin, 2018).

Thus, in this research, the main interest is to determine what ownership structures, as internal mechanisms of corporate governance, affects the returns on IT investments in firms listed on Iberoamerican stock exchanges, related to the Pacific Alliance (MILA) and Spain (IBEX), after the global financial crisis.

CORPORATE GOVERNANCE AND IT INVESTMENT

Studies on corporate governance and information technologies have their origin since the consolidation of the agency theory related to the theory of the firm (Jensen & Meckling, 1976), where information or search costs and, decision-making costs based on computational costs, reinforce the understanding of information asymmetry as part of the principal-agent problem (Fama, 1980). From an economic perspective, this threshold allowed scholars to propose how information technology investments grew creating value to firms, so these investments were no longer an exclusive competence of the technology departments, but also of the highest direction levels (Porter & Millar, 1985). Furthermore, these information technologies could be related to contracts based on behavior or objectives between principal-agent, reducing the information asymmetry (Eisenhardt, 1989); whereas, internal coordination costs or agency costs and, external coordination costs or transaction costs are significantly reduced with a strategic information technology investment (Gurbaxani & Whang, 1991).

Additionally, the studies in IT investments expanded its scope. On the one hand, scholars strengthened studies of IT investment effects on firm performance, breaking with the past productivity paradox (Brynjolfsson & Hitt, 1996; Dehning & Richardson, 2002; Dehning et al., 2005; Lim et al., 2011). On the other hand, the studies raised the relationship, by way of alignment, of the corporate strategy and the information technology strategy (Henderson & Venkatraman, 1992), becoming the approach of an information technology governance (Loh & Venkatraman, 1992) and, giving way to the empirical relationship between corporate governance and IT investment (Loh & Venkatraman, 1993).

However, regarding an information technology governance, scholars deepened their studies from an operational efficiency and project perspective (Drnevich & Croson, 2013), investigating a governance more oriented to contingencies, structures, processes and relationships to align corporate objectives with information technology management and firm performance (Peterson, 2004; Sambamurthy & Zmud, 1999; Weill, 2004).

Despite the above, the approach and discussions for the study of a corporate government related to IT investment grew. In fact, after the dot.com crisis, discussions began on the board role regarding IT investments (Huff, Maher, & Munro, 2006; Kambil & Lucas, 2002; Nolan & Mcfarlan, 2005). Also, after the global financial crisis, empirical studies resumed, from an institutional perspective, the effect of ownership structures on IT investments (Ravichandran et al., 2009) or considering under the agency theory the board of directors and the ownership structure as variables that moderate the return of IT investments in an emerging market (Ho et al., 2011). Moreover, another study considered the governance indexes (G-index) on the return of the specific IT investment as an ERP (Zhang & Huang, 2012). Or under agency theory and resource dependence theory, seeing the effects of ownership structures on IT investment performance (Choi et al., 2012). Even recently, under institutional theory highlighting the concentration of family ownership on IT overinvestment or IT underinvestment (Ho et al., 2017).

In addition, from the reflection of different theoretical perspectives, theories based on governance were considered, of important need to deepen the effects of corporate governance on information technology investments, integrating both the academy visions of the information systems with the business economics (Drnevich & Croson, 2013). Further, on an institutional basis of multi-business organizations, another study proposes how a corporate level and a strategic business unit could show differences regarding the types of IT investments (Reynolds & Yetton, 2015).

From recent studies, a neo-institutional economic framework is strengthened as an appropriate perspective to resume empirical research that has paid limited attention to what ownership structures determine IT investment levels in different contexts (Choi et al., 2012; Ho et al., 2017, 2011; Ravichandran et al., 2009; Zhang & Huang, 2012).

In fact, one of the studies showed that institutional pressures, defined in part by large institutional shareholders in the ownership structure, exert significant positive influence on IT investments (Ravichandran et al., 2009); arguing to include the board of directors as part of this effect from the ownership structure. Along these lines, another study using an emerging market showed that the ownership structure like foreign investors, as well as the board independence, generate a significant effect on the return on IT investment in small businesses within highly competitive industries (Ho et al., 2011); discussing considering in future studies other characteristics of the board of directors and the ownership structure. In addition, another study uses the good corporate governance index (G-index) by firms on the returns of their specific IT investments based on ERP (Zhang & Huang, 2012); evidencing which firms with the best corporate governance supervise the CEO or TMT more effectively reducing agency problems, ensuring that the first investment decisions and post-implementation processes are properly monitored.

In the same way, other research, conducted in an emerging market, expanded the studies of ownership structure on technology performance. On the one hand, the agency theory is used to separate levels of ownership concentration and types of internal ownership or institutional investors, and on the other hand,

the resource dependence theory to separate the types of state or foreign ownership (Choi et al., 2012). The results showed that mainly institutional investors, as well as foreign ownership, have a significant positive effect on technology performance, while the other types of ownership are not significant for this context. However, the discussions suggest testing in future research the concentration or not of ownership in other emerging markets and the theory based on economic transaction costs along with comparative institutional analyzes as a stronger study perspective.

Recently, a last study based on institutional theory, proves that the impacts on the return of information technology investments are conditioned on the concentration of property (Ho et al., 2017). Regarding the latter, the study shows that the lower the ownership concentration, tends to grow an IT overinvestment, while the greater the ownership concentration, related to family shareholders, an IT subinvestment tends to grow. These results support the idea that while the principal is more risk lover, it will invest more, compared to a principal more risk adverse, where it will reduce its investments.

For all these reasons, the study considers that the institutional perspective offers a comprehensive alternative to study what type of ownership structures determine changes in IT investment levels under different contexts over time.

Concentrated Ownership

Beyond the principle of separation between ownership-control (Berle & Means, 1932), one of the most discussed characteristics in ownership structure is the concentration (Aguilera & Crespi-Cladera, 2016; Edmans, 2014; Shleifer & Vishny, 1997). In fact, in ownership concentration large shareholders or blockholders not only have outright firm control with 51% or more ownership. In different contexts , in different contexts, it represents the institutional presence of family structures, state institutions or institutional investors (Thomsen & Pedersen, 2000). Further, blockholders on corporate governance give rise to a diverse literature, related to several topics in financial economics and management, denominated in some cases a principal-principal problem (Kabbach de Castro et al., 2013; Young, Peng, Ahlstrom, Bruton, & Jiang, 2008).

On one hand, theoretical models examine topics such as the free-rider problem, informed trading and market microstructure, strategic information transmission, the trade-off between the ex post costs and ex ante benefits of monitoring, and the role of incentives (Edmans, 2014; Shleifer & Vishny, 1986, 1997; Young et al., 2008). On the other hand, empirical studies have linked blockholdings to both corporate finance outcomes (such as firm value, profitability, leverage, investment, among others) and financial market variables (such as liquidity and price informativeness), analyzing the market reaction to block trades, and the private benefits of control (Lins, 2003).

As large shareholders controlling corporate operations, these powerful and dominant shareholders have stronger incentives to monitor and advice properly the manager investment decisions in the firm interest

(Aguilera & Crespi-Cladera, 2016). Even more, its interest tends to be higher over the short-term than the long-term. Thus, in the case of IT investments, which generally have long-term results, the performance could be different by such presence. For these reason, we present the following hypothesis:

H1: The IT investment changes for listed Iberoamerican firms are negatively affected by concentrated ownership.

Top Foreign Ownership

Firms with foreign ownership search superior technological, organizational, and financial resources (Douma, George, & Kabir, 2006). These institutions can have different investment horizons and are oriented towards stock market-based measures of performance. Indeed, foreign ownerships come from portfolios with large number of investments in different industries to obtain the benefits associated with a diversified investment portfolio (Douma et al., 2006). In addition, foreign institutional investors tend to have longer investment horizons than individual investors, which decreases stock turnover (Huang & Shiu, 2009). Thus, the presence of foreign owners in the firm is highly valued.

Despite that, there are claims that domestic investors in developing economies establish overseas companies, registered as foreign investment firms, and then used them to invest in their local stock markets. This problem is more severe for small firms, because are more illiquid and attract less public scrutiny. If the seemingly genuine foreign investment affect small firms, then they will not should show a positive relationship between foreign ownership and firm performance, since the locals firms lack the foreigners' know how and resources. For instance, to examine the foreign ownership-performance relation, studies divide the samples into big and small firms (Huang & Shiu, 2009).

On the other hand, the advantages will be sustainable as long as linked to the institutional context. As consequence of imperfections in capital, labor, and technological markets, foreign shareholders are, relative to domestic shareholders, in a better position to exploit their advantages (Chhibber & Majumdar, 2005). Furthermore, countries with stronger shareholder rights and judicial systems, government incentives and higher levels of economic development attract higher levels of foreign capital (Aggarwal, Klapper, & Wysocki, 2005).

Consequently, the direct relation between foreign ownership and firm performance is consistent with a prior research in developing economies (Tan, 2002), in addition, a last study contributes to the literature by showing a significant and positive interaction between foreign ownership and IT investment for listed small firms in a developing economy (Ho et al., 2011). According to that, foreign investors may inject IT expertise that is likely to be applicable across industrialized and developing economies. Hence, foreign ownership may help small firms to deploy IT more effectively.

H2: *The IT investment changes for listed Iberoamerican firms are positively affected by top foreign ownership.*

Institutional Investors with Common Ownership

Literature on institutional owners is rapidly evolving. Existing studies note that institutional owners affect the corporate policies of those firms in which they invest in research and development (Aghion, Van Reenen, & Zingales, 2013; Bushee, 1998), in corporate governance and payout policy (Aggarwal, Erel, Ferreira, & Matos, 2011; Appel et al., 2016; Crane, Michenaud, & Weston, 2016), among others.

Just recently, studies have also begun to consider the effects that institutional investors may have on the interaction among those firms where institutional investors hold equity stakes at the same time. Topics already approached include the effect of common ownership on mergers and acquisitions (Harford, Jenter, & Li, 2011; Matvos & Ostrovsky, 2008) and on industry competition (Azar, Schmalz, & Tecu, 2018; He & Huang, 2017). In this common ownership literature, researchers have also identified BlackRock, and a few legal journals have extended the linkage to groupings of institutional investors, specifically, Fidelity Investments Inc., The Vanguard Group, BlackRock Inc. and State Street (Yadav, 2018).

Thus, the institutional investors' behavior gives rise to another ownership pattern recently studied. Individuals who invest with mutual funds or institutional investors are less interested in the performance of a specific firm than in the aggregate performance of a grouping of firms represented in the fund portfolio. The large concentration of wealth held in these funds gives opportunities for the funds to concentrate on any one firm (Wang & Barrese, 2019).

The role of institutional investors in corporate governance is changing. A review of the 20-year period prior to 2000 claims, "despite the substantial growth of institutional ownership of corporations ... there is little evidence that institutional investors have acquired the kind of concentrated ownership positions required to be able to play a dominant role in the corporate governance process" (Edwards & Hubbard, 2000). For these reasons, its present the following:

H3: *The IT investment changes for listed Iberoamerican firms are positively affected by common ownership.*

METHODOLOGY

Design and Sample

The study is a non-experimental longitudinal design based on panel data with firms listed on stock exchange markets from 2009 to 2015. The stock exchange markets used are the MILA group (Chile, Colombia, Mexico and Peru) and the IBEX (Spain). The MILA group exists after the global financial crisis as part of the Pacific Alliance creation. In addition, the study includes Spain because it is the most influential country in the Latin American region with his firms present through branches and local firms in the MILA's countries.

The selection criteria for the observations was the following: companies founded in their own country where they started their initial public offering, with complete information since the global financial crisis and with common industries in the five countries. More specifically, these observations included seven common industries in the studied countries.

Regarding the data collection, we reviewed the firms listed on each stock exchange market. Likewise, the study reviewed each superintendence of stock exchange market to download the audited annual reports by firm for the selected years. Further, the study collected information on corporate governance, financial statements and balance sheets with Bloomberg Terminal, Thomson Reuters Eikon and Economatica platforms to contrast the data.

Measurements

Regarding the measurements, the dependent variable is the IT investment. The measurement is related to the growth rate. Considering the seminal empirical paper of corporate governance on IT investment (Loh & Venkatraman, 1993), The study takes as an IT investment the spending in hardware, software, personnel, projects, consulting and service contracts .

The independent variables are related to the property structure. The first independent variable is the concentrated ownership. This variable is widely discussed in various empirical studies, where its orientation tends to be related to risk aversion or more control by the principal on the agent's decisions, for instance, to invest on IT. The second variable is the top foreign ownership. Although the variable that is discussed in this field is usually the total foreign ownership of the firm that contributing positively to the agent's decisions as IT investment, the study considers only from the top shareholders in order to reflect if there is any variation in this field towards IT investments. Finally, the third variable is the institutional investors of common property. Here the study considers the participation of Fidelity Investments Inc., The Vanguard Group, BlackRock Inc. and State Street.

In relation to the control variables, they are divided into three types. The first type corresponds to the corporate governance variables represented by the top shareholders, family shareholders, and the board independence. The second type corresponds to the variables related to the investment represented by the

growth in research and development, the growth based on sales, the return on sales, the debt ratio (leverage) and the firm size. Finally, the third type corresponds to the variables related to the context represented by the industry, the country and the years. According to the study, the main measurements are the following.

Variable	Definition	Data Source
IT investment	a) Annual IT spending growth rate, % change of annual IT spending amount by firm. b) Annual IT spending amount, measured as proportion of net sales due to annual IT investment index (Kapelmann et al., 2019, 2018, 2017, 2016, 2014, 2013)	Thomson Reuters Eikon / Bloomberg Terminal
Concentrated Ownership	Dummy that capture the percentage of common stock outstanding held by the top shareholders with more than 50% of firm participation.	Audited Annual Reports
Top Foreign Ownership	Dummy that capture the percentage of common stock outstanding held by the top shareholders with foreign participation.	Audited Annual Reports
Common Ownership (Institutional Investor)	Percentage of common stock outstanding held by institutional investor with common ownership members (Fidelity Investments, The Vanguard Group, State Street, BlackRock)	Thomson Reuters Eikon
Top Shareholders	Percentage of common stock outstanding held by the top ownership members.	Thomson Reuters Eikon / Audited Annual Reports
Family Shareholders	Dummy that capture the percentage of common stock outstanding held by family members.	Audited Annual Reports
Board Independence	Proportion measured as the number of independent directors serving on the board divided by the board size.	Thomson Reuters Eikon / Audited Annual Reports
Δ R+D	Annual R+D spending growth rate based on percentage change of annual R+D spending amount by firm.	Thomson Reuters Eikon / Bloomberg Terminal
Δ Net Sales	Annual growth rate of net sales	Thomson Reuters Eikon / Bloomberg Terminal
Return on Sales (ROS)	Annual ratio of operating profit to net sales	Thomson Reuters Eikon / Bloomberg Terminal
Leverage	Financial leverage, measured as long-term debt divided by total assets	Thomson Reuters Eikon / Bloomberg Terminal
Firm Size	Firm size, measured as the natural logarithm of total assets	Thomson Reuters Eikon / Bloomberg Terminal
Industry	Industries according to Standard Industrial Classification (SIC) code. 1=Agriculture, Forestry and Fishing (0100-0999); 2=Mining (1000-1499); 3=Construction (1500-1799); 4=Manufacturing (2000-3999); 5=Transportation, Communications, Electric, Gas and Sanitary service (4000-4999); 6=Retail Trade (5200-5999); 7=Finance, Insurance and Real Estate (6000-6799)	Standard Industrial Classification
Country	Countries analized. Peru=1, Chile=2, Mexico=3, Colombia=4, Spain=5	MILA and IBEX
Years	Study years (from 2009 to 2015)	

Descriptive Analysis: General

For research purposes, the study proceeds with a descriptive analysis by year, country and industry.

Panel A: Firms distribution by country over time

Year	Chile	Colombia	Mexico	Peru	Spain	Total
2009	78	21	62	99	48	**308**
2010	78	21	62	99	48	**308**
2011	78	21	62	99	48	**308**
2012	78	21	62	99	48	**308**
2013	78	21	62	99	48	**308**
2014	78	21	62	99	48	**308**
2015	78	21	62	99	48	**308**
Total	546	147	434	693	336	**2,156**

Panel B: Industry distribution by country

	Chile		Colombia		Mexico		Peru		Spain		Total	
Industry	N	%	N	%	N	%	N	%	N	%	N	%
Agriculture, Forestry and Fishing (SIC 0100-0999)	49	0.09	0	0.00	28	0.06	35	0.05	7	0.02	**119**	0.06
Mining (SIC 1000-1499)	28	0.05	7	0.05	14	0.03	112	0.16	14	0.04	**175**	0.08
Construction (SIC 1500-1799)	56	0.10	28	0.19	21	0.05	56	0.08	56	0.17	**217**	0.10
Manufacturing (SIC 2000-3999)	126	0.23	7	0.05	126	0.29	168	0.24	56	0.17	**483**	0.22
Transportation, Communications, Electric, Gas and Sanitary service (SIC 4000-4999)	126	0.23	49	0.33	28	0.06	77	0.11	119	0.35	**399**	0.19
Retail Trade (SIC 5200-5999)	98	0.18	7	0.05	91	0.21	35	0.05	21	0.06	**252**	0.12
Finance, Insurance and Real Estate (SIC 6000-6799)	63	0.12	49	0.33	126	0.29	210	0.30	63	0.19	**511**	0.24
Total	546	1.00	147	1.00	434	1.00	693	1.00	336	1.00	**2,156**	1.00

Panel C: IT investment growth rate by country over time

	Chile			Colombia			Mexico			Peru			Spain			Total		
Year*	N	mean	s.d.	N	mean	s.d.	N	mean	s.d.	N	mean	s.d.	N	mean	s.d.	N	mean	s.d.
2010	77	0.38	1.20	19	0.36	0.61	60	0.23	0.23	98	0.29	0.29	43	0.01	0.16	297	0.27	0.67
2011	77	0.13	0.30	21	0.28	0.80	62	0.10	0.20	99	0.12	0.22	44	0.08	0.30	303	0.12	0.32
2012	77	0.55	0.47	21	0.53	0.43	62	0.47	0.31	99	0.67	1.02	48	0.36	0.22	307	0.54	0.66
2013	77	0.45	2.57	21	0.17	0.58	62	0.08	0.14	99	0.04	0.21	48	0.00	0.13	307	0.15	1.31
2014	77	0.01	0.29	21	0.11	0.16	62	0.07	0.13	99	0.08	0.33	48	0.14	0.52	307	0.07	0.32
2015	77	-0.10	0.17	21	0.01	0.53	62	-0.06	0.12	99	-0.04	0.22	48	0.00	0.43	307	-0.05	0.27
Total	462	0.24	1.20	124	0.24	0.57	370	0.15	0.26	593	0.19	0.53	279	0.10	0.35	1828	0.18	0.72

*Year 2009 was not used for the models due to calculate the growth rate, because it is necessary to extract the IT spending from

According to the results, the trend of IT investment growth is clear after the global financial crisis. However, after three years, this trend decreases, contracting even in some countries. In addition, these specific investments show differences according to the ownership structures identified.

Descriptive Analysis: Concentrated Ownership

Differences in means based on independent variables describe whether the dependent and control variables are likely to show significant differences between two groups. For the study, and following the institutional framework, these groups represent institutional characteristics that define a firm. From the first test based on concentrated ownership (and dispersed as opposition) are the IT investment, the top shareholders, the board independence, and the firm size the variables that show significant differences. The negative differences indicate that the average towards the concentrated ownership is lower than when it is with dispersed ownership.

	Dispersed Ownership (N=972)		Concentred Ownership (N=1174)		Differences in Means	
Variable	mean	s.d.	mean	s.d.	t-test	s.d.
IT investment (spending)	217.292	539.95	149.658	408.97	**-67.634*****	[20.518]
Δ IT investment	0.183	0.52	0.186	0.85	0.003	[0.034]
Top Shareholders	0.304	0.13	0.747	0.17	**0.443*****	[0.007]
Family Shareholders	0.298	0.46	0.267	0.44	-0.032	[0.019]
Board Independence	0.343	0.22	0.301	0.23	**-0.042*****	[0.010]
Δ R+D	0.069	2.06	0.153	0.87	0.084	[0.072]
Δ Net Sales	0.071	2.12	1.001	25.79	0.930	[0.841]
Return on Sales (ROS)	0.403	6.08	-0.099	8.53	-0.502	[0.327]
Firm Size (ln Total Assets)	7.759	2.03	7.358	1.88	**-0.401*****	[0.085]
Leverage	1.161	5.69	1.035	4.78	-0.127	[0.227]

Significance levels are boldfaced at * p<0.05, ** p<0.01, *** p<0.001.
Standard errors of t-test in brackets.

Descriptive Analysis: Top Foreign Ownership

In the case of the test based on the top foreign ownership (and top local ownership as opposite), the IT investment as spending, the top shareholders, the family shareholders, the board independence and the firm size show significant differences. In this case, IT investment, top shareholders and board independence have positive differences towards top foreign ownership. Contrary situation regarding family ownership and the firm size.

	Top Local Ownership (N=1605)		Top Foreign Ownership (N=541)		Differences in Means	
Variable	mean	s.d.	mean	s.d.	t-test	s.d.
IT investment (spending)	161.254	411.21	236.714	620.73	**75.460*****	[23.515]
Δ IT investment	0.190	0.80	0.169	0.39	-0.021	[0.038]
Top Shareholders	0.526	0.26	0.609	0.29	**0.084*****	[0.013]
Family Shareholders	0.349	0.48	0.079	0.27	**-0.269*****	[0.022]
Board Independence	0.309	0.22	0.355	0.24	**0.046*****	[0.011]
Δ R+D	0.104	1.75	0.146	0.48	0.041	[0.082]
Δ Net Sales	0.733	22.15	0.129	0.38	-0.604	[0.964]
Return on Sales (ROS)	0.197	8.63	-0.072	1.91	-0.269	[0.374]
Firm Size (ln Total Assets)	7.643	1.84	7.234	2.27	**-0.409*****	[0.097]
Leverage	1.124	4.84	0.998	6.19	-0.126	[0.260]

Significance levels are boldfaced at * p<0.05, ** p<0.01, *** p<0.001.
Standard errors of t-test in brackets.

Descriptive Analysis: Institutional Investor with Common Ownership

Finally, in the test based on institutional investors with common ownership (as opposed to firms without this institutional investor), the variables IT investment such as spending and growth, the top shareholders, family shareholders, board independence, firm size and leverage show significant differences. For this test, IT investment as spending, family ownership, board independence, firm size and leverage have positive differences related to common-owned institutional investors. Contrary situation regarding top shareholders and IT investment growth.

	Without Common Ownership (N=1220)		With Common Ownership (N=926)		Differences in Means	
Variable	mean	s.d.	mean	s.d.	t-test	s.d.
IT investment (spending)	34.539	69.98	371.875	670.05	**337.336*** **	[19.343]
Δ IT investment	0.216	0.88	0.145	0.43	**-0.071** **	[0.034]
Top Shareholders	0.595	0.28	0.483	0.24	**-0.111*** **	[0.012]
Family Shareholders	0.241	0.43	0.334	0.47	**0.093*** **	[0.019]
Board Independence	0.280	0.24	0.373	0.20	**0.093*** **	[0.010]
Δ R+D	0.130	2.01	0.096	0.45	-0.034	[0.072]
Δ Net Sales	0.215	2.92	1.045	28.67	0.831	[0.844]
Return on Sales (ROS)	-0.047	8.46	0.360	6.08	0.408	[0.328]
Firm Size (ln Total Assets)	6.465	1.45	8.954	1.62	**2.489*** **	[0.067]
Leverage	0.909	5.09	1.331	5.36	**0.422***	[0.228]

Significance levels are boldfaced at * p<0.05, ** p<0.01, *** p<0.001.
Standard errors of t-test in brackets.

These descriptions show that institutional characteristics of firms based on their ownership structures determine significant differences in aspects of corporate governance and IT investments principally. With these descriptions, the results below attempt to define the control variables use that will accompany the models on each ownership structure raised as hypothesis.

RESULTS

In previous tests on significant differences based on ownership structures, mainly IT investment and corporate governance variables show significant differences, while those related to sales and research and development do not. Despite this, in the correlation analysis, the control variables of R&D growth, net sales growth and return of sales have significant relations with the IT investment.

In fact, the results show that R+D growth and the net sales growth have a significant positive relationship with the IT investment growth. In contrast, the return on sales has a negatively significant relationship with the IT investments growth.

On the other hand, regarding the independent variables of ownership structure, although they do not have significant levels on IT investment growth, their relationships are positive. However, in the rest of the control variables, the relations on IT investment are negative, except the board independence.

Correlation Analysis

	mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12
1. Δ IT investment	0.185	0.72	1											
2. Concentrated Ownership	0.547	0.50	0.004	1										
3. Top Foreign Ownership	0.256	0.44	0.018	-0.048	1									
4. Common Ownership (Institutional Investor)	0.038	0.06	0.005	**-0.180*** **	0.041	1								
5. Top Shareholders	0.547	0.27	-0.021	**0.837*** **	-0.039	**-0.196*** **	1							
6. Family Shareholders	0.281	0.45	-0.031	**0.110** **	**-0.143*** **	0.046	0.041	1						
7. Board Independence	0.320	0.23	0.009	**-0.094** **	**0.132*** **	**0.148*** **	**-0.092** **	0.069	1					
8. Δ R+D	0.115	1.53	**0.865*** **	-0.001	0.001	-0.003	-0.025	-0.046	0.019	1				
9. Δ Net Sales	0.581	19.15	**0.109** **	0.016	0.000	0.008	-0.007	-0.035	0.006	**0.121*** **	1			
10. Return on Sales (ROS)	0.129	7.52	**-0.080***	-0.036	-0.033	-0.029	-0.010	-0.017	-0.018	**-0.071***	0.037	1		
11. Firm Size (ln Assets)	7.539	1.96	-0.050	0.053	0.064	0.013	**0.141*** **	**-0.090***	**0.126*** **	**-0.073***	-0.045	-0.049	1	
12. Leverage	1.092	5.21	-0.063	0.015	-0.019	-0.019	0.042	-0.030	0.002	-0.062	-0.043	-0.011	**0.104** **	1

Correlation figures are boldfaced if significan at * p<0.05, ** p<0.01, *** p<0.001

Ownership Structures on IT Investment Growth

After the correlation analysis, the regression models of the data panels show results that open the discussion on the subject.

First, the first model offers the control variables proof on IT investments. The results show that the variables of top shareholders, R+D growth, net sales growth, return on sales and firm size have significant effects on IT investment. Of these, only R+D growth has positive effect.

	Dependent Variable: Δ IT Investment			
	(1)	(2)	(3)	(4)
	Control	H1	H2	H3
Independent Variable:				
Top Shareholders *Concentrated Ownership (d)		**-0.193**** **(-2.42)**		
Top Shareholders *Foreign Ownership (d)			**-0.170*** **(-1.75)**	
Institutional Common Ownership				**0.288**** **(1.98)**
Control Variable:				
Top Shareholders	-0.191*** (-2.65)	-0.198* (-1.68)	-0.198* (-1.68)	-0.030 (-0.34)
Family Shareholders (d)	0.070 (1.13)	0.070 (1.13)	0.070 (1.14)	-0.027 (-0.74)
Board Independence	-0.073 (-1.12)	-0.073 (-1.11)	-0.075 (-1.16)	-0.009 (-0.18)
Δ R+D	0.906*** (27.46)	0.906*** (27.44)	0.906*** (27.45)	0.875*** (26.25)
Δ Net Sales	-0.010** (-2.13)	-0.010** (-2.13)	-0.010** (-2.12)	-0.010 (-1.56)
Return on Sales (ROS)	-0.004*** (-4.23)	-0.004*** (-4.24)	-0.004*** (-4.26)	-0.003*** (-10.97)
Firm Size (ln Total Assets)	-0.102*** (-2.74)	-0.102*** (-2.74)	-0.103*** (-2.75)	-0.020 (-0.68)
Leverage	0.000 (0.47)	0.000 (0.47)	0.000 (0.48)	-0.001*** (-2.90)
Fixed Effect:				
Industry (SIC)	YES	YES	YES	YES
Country	YES	YES	YES	YES
Year	YES	YES	YES	YES
N	1795	1795	1795	800
df_m	12	13	13	13
df_r	307	307	307	153
F	194.188	180.247	180.672	510.49
p	0.000	0.000	0.000	0.000
r2_w	0.882	0.882	0.882	0.914
r2_b	0.559	0.559	0.554	0.916
r2_o	0.815	0.815	0.814	0.913

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

Regarding the second model, it retains the same control variables with significant levels on IT investment growth. On the concentrated ownership side, it shows effects with negatively significant levels on IT investments. This confirms the institutional implications of concentrated ownership structures, in which, under their power and control, the principals can demonstrate their risk aversion by conditioning the agent's decision to low IT investment. In that sense, the hypothesis ***H1 is supported***.

Similarly, the third model shows that the control variables of the first and second models maintain significant levels in IT investments. Likewise, the main foreign ownership structure, as an institutional feature, has an important negative effect on the growth of IT investment. This result demonstrates that foreign ownership does not necessarily positively affect investments. Possibly, because these foreign owners, being the main ones, could show some risk aversion face to the Ibero-American context, discouraging the agent's decisions. Therefore, its effect ends up being negatively significant on the growth of IT investment. For these reasons, the hypothesis ***H2 is rejected***.

Finally, the fourth model varies in terms of the control variables that support it. While the R+D growth and the return on sales are preserved, the top shareholders, the net sales growth and the firm size no longer significantly influence. Despite this, leverage shows effects negatively significant on IT investment growth. Similarly, institutional investors with common ownership show effects positively significant on IT investment growth. Unlike the top foreign ownership, the institutional investors with common ownership are in a continuous growth of the Iberoamerican countries assuming the challenge of better integrating the information, information asymmetry reduction, of the agents with the principals. In fact, these institutional investors are already part of practically all the firms listed on IBEX in Spain. In that sense, the hypothesis ***H3 is supported***.

DISCUSSION

The study contextualizes its research objectives in Iberoamerica using a framework of institutional comparative analysis. Likewise, under the institutional perspective, it takes ownership structures as institutions capable of affecting the investments over which it has participation and power. Further, under that perspective, this internal mechanism of corporate governance shows its significant importance in face to IT investment.

The study findings have several implications of theoretical and practitioner approach.

Theoretical Implications

At a theoretical level, the study contributes to knowledge by expanding the studies that relate corporate governance to IT investments. In fact, the study focus on the institutional perspective to take ownership structures as institutions and compare them, within Iberoamerican stock markets, in different industrial markets and iberoamerican countries after the global financial crisis. This denotes a control by both time, countries, industries and even the firm size under study. Scholars could deepen multilevel studies of how

institutional constraints have an important role in defining agents' decisions related to IT investment. Another important point is to consider the full participation of foreign property, or family participation. Even a recent study addresses the initiative to see the impact of the concentrated ownership structure with family participation on IT overinvestment or subinvestment (Ho et al., 2017). Future studies could consider the other possible ownership structures, including new institutional investors of common participation if they condition the IT overinvestment or subinvestment.

Practitioner Implications

At the practitioner level, the study provides a critical look at the reality of corporate governments on IT investments in Iberoamerica. Discussions in other contexts are clear, high levels of control and participation of companies must take action on IT investment decisions. Mainly, this allows us to understand that owners and shareholders cannot be oblivious to the information technology decisions that the firm makes. Above all, because these IT investments would support part of the internal mechanisms to reduce the information asymmetry between principal and agent.

CONCLUSIONS

The study has hypothesized and tested how the ownership structures called concentrated ownership (H1), top foreign ownership (H2), or common ownership of institutional investors (H3) affect IT investment in firms listed in Iberoamerican stock markets. The study demonstrates through difference in means that IT investment, seen as spending, can be significantly different depending on the ownership structure groups studied. Likewise, in the regression of data panel with robustness and several models for each ownership structure it is demonstrated that there are significant effects of these internal corporate governance mechanisms on the IT investment growth.

Respect to concentrated ownership, the result is negatively significant on IT investment growth. This confirms that in Iberoamerica the theory related to ownership and control is also fulfilled, as well as risk aversion due to concentration and consequently reluctance to the agent's decisions on IT investment.

In the case of the top foreign ownership, the study shows a particular effect negatively significant on IT investment. Although prior studies regarding total foreign ownership consider positive effects on investments, in the case of the top foreign property, the case goes to a level similar to that of concentrated property, being the foreign owner responsibility to control the agent decisions related to IT investment.

Finally, in relation to the institutional investors with common ownership, the results show a effect positively significant on IT investment. This result is relevant to reaffirm that a future study may consider total foreign ownership and compare it with the result of the second model mentioned above. Likewise, the result shows that these types of institutional investors gain relevance on IT investment. In fact, several recent studies highlight the importance of monitoring the behavior of these institutional investors, as they could trigger profound changes in ownership structures and consequently on the agent decisions in the firms.

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