




GOVERNANCE-LED INTELLECTUAL CAPITAL DISCLOSURE: EMPIRICAL EVIDENCE FROM PAKISTAN

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ABSTRACT

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The study objective is to empirically examine the relationship between intellectual capital disclosure (ICD) and corporate governance with a specific focus on the role of family ownership. Secondary data of 99 Pakistan Stock Exchange listed manufacturing firms pertaining to the 2008–2017 period were obtained from the annual statements of these companies. Owing to the non-linear role of family ownership in corporate governance, quadratic regression was employed to estimate the relationship between the degree of IC disclosure and various attributes of corporate governance. Study findings confirm that the relationship between ICD and family ownership follows the familiar inverted U-shaped curve, whereby the degree of IC disclosure tends to decrease once family ownership exceeds 22.64%. Moreover, analysis results depict a significantly positive impact of board independence, presence of an audit committee, and foreign ownership on ICD. Conversely, CEO duality was found to be negatively associated with the degree of ICD. In further analyses, IC disclosure was disaggregated into three major dimensions, namely internal capital, external capital, and human capital, yielding congruent findings. Thus, for effective IC disclosure, the study findings indicate that it is necessary to improve the governance mechanisms. It would also be beneficial for firms to restrict the family ownership to a certain level in order keep the information disclosure optimal. Since these recommendations are based on analyses of secondary data pertaining to a limited number of indicators of corporate governance pertaining to Pakistani manufacturing firms, any generalizations should be attempted with care.

Contribution/Originality: This study contributes to the existing literature by finding the threshold level of family ownership through a quadratic regression which provides unique insight for the relationship between corporate governance and ICD.

1. INTRODUCTION

Besides conventional forms of capital, i.e., *physical* and *financial*, intellectual capital (IC) has recently gained a vital position in the assessment of organizational performance (Cuozzo *et al.*, 2017). Majority of scholastic literature on this topic (e.g., (Keenan and Aggestam, 2001; Muttakin *et al.*, 2015; Mubarik *et al.*, 2016; Kamath, 2017; Duff, 2018)) ties the success of an organization with its ability to capitalize on the intellectual capital and efficiency of its corporate governance process. In the context of corporate governance, Keenan and Aggestam (2001) among others, identified and propounded the conceptual association between intellectual capital disclosure (ICD) and firms' governance. These authors maintain that stakeholders responsible for organization's corporate governance have primary responsibility to fully utilize the intellectual capital of an organization, such as physical and financial

capital, as well as disclose it to the relevant parties. However, the empirical literature on the linkage between intellectual capital and facets of corporate governance is limited, especially in South Asian context (Hidalgo *et al.*, 2011; Khalique *et al.*, 2015; Muttakin *et al.*, 2015; Manes *et al.*, 2018). Therefore, the overarching objective of this study is to examine the association between various facets of corporate governance and intellectual capital disclosure. In one of the pioneering studies on ICD, Cerbioni and Parbonetti (2007) found that corporate governance was positively related to ICD. The authors identified three dimensions of corporate governance—board structure, board independence, and dual role of chief executive officer (CEO)—indicating that each is positively associated with ICD. Likewise, Hidalgo *et al.* (2011) investigated the association between ICD and corporate governance in Mexico. The main study objective was to examine the relationship between family ownership and extent of ICD, which was not supported by statistical analyses. According to Muttakin *et al.* (2015) given that Hidalgo *et al.* (2011) study was the only work of this kind conducted in the developing country context, the ICD–corporate governance relationship needs to be explored further. Moreover, the authors pointed out that the failure to find a statistically significant relationship between family ownership and governance may be due to the nature of this relationship, which could be non-linear. As Hidalgo *et al.* (2011) did not consider this possibility in their work, Muttakin *et al.* (2015) further suggested use of quadratic regression in future studies on this relationship.

The aforementioned approach was adopted in the present study, which focused on Pakistani firms. The choice of Pakistan as a specific case is also important, as the studies conducted in Pakistan mostly yielded ambivalent findings, while failing to provide any conclusive empirical evidence on the ICD–corporate governance juxtaposition (Khalique *et al.*, 2015). For example, Mubarik *et al.* (2018) pointed out that most of the Pakistani companies had ignorant approach toward ICD. Moreover, as ICD is not an essential requirement, a few companies disclose it, and do so in any quantifiable form. Therefore, research conducted on ICD in Pakistan tends to be descriptive in nature, and most studies are conducted on a very small sample size, thus limiting the potential for reaching statistically significant conclusions (Khan and Ali, 2010; Khan and Khan, 2010). Studies conducted in other developing countries, such as Bangladesh (Abhayawansa and Azim, 2014; Muttakin *et al.*, 2015) indicate that companies rarely follow any standard reporting format to measure, manage, and disclose their intellectual capital.

Present research was carried out in Pakistan, as this country provides an interesting context to study ICD. Pakistan's corporate sector is mainly dominated by family-owned firms of varying sizes. Owing to the government's drive toward internationalization, Pakistan follows the Western-oriented corporate governance model, requiring considerable board independence and a single role of the company CEO. Nevertheless, despite the stringent oversight of the Securities and Exchange Commission of Pakistan (SECP), due to the conventional societal structure and dominant family ownership in major businesses, the effectiveness of any measures imposed by the SECP could be compromised (Uddin and Choudhury, 2008). Recently, Azim *et al.* (2018) argued that family dominance in family-owned businesses rendered the corporate governance system a mere formality. Moreover, no official guidelines for intellectual disclosure presently exist in Pakistan, making it difficult to ascertain the influence of corporate governance on ICD.

In addressing the aforementioned issues, the present study differentiates itself from the extant research on this topic. Specifically, in the analyses, family ownership is examined as a corporate governance dimension that directly contributes to its relationship with ICD. This approach is rarely taken in studies pertaining to Pakistan, even though the findings yielded can have significant implications for Pakistani businesses. Moreover, as recommended by Muttakin *et al.* (2015) we tested existence of a non-linear (specifically quadratic) relationship between ICD and family ownership. As a further contribution to the extant body of knowledge, in the present study, the influence of family duality (a common trait of emerging economies) on intellectual capital disclosure (ICD) is also explored. In addition, to the best of our knowledge, the associations of ICD and corporate governance dimensions have been primarily investigated in the Western context and the findings yielded may not be applicable to developing

countries like Pakistan, characterized by weak institutional arrangements and dominant family ownership. Lastly, by extending the findings of previous (mostly descriptive) research on ICD in Pakistan, the present study is expected to enhance the understanding of corporate governance dimensions and ICD practices in Pakistan.

2. LITERATURE REVIEW

This section is designated for a review of extant literature on the relationship of IC disclosure and various attributes of corporate governance.

2.1. Family Ownership

Family ownership plays a pivotal role in the governance mechanism effectiveness of any organization. According to the agency theory postulates, family-owned businesses may face major issues (Anderson and Reeb, 2004). One of these issues stems from the conflict between the owner and the manager and can be denoted as Type A agency problem. The second issue pertains to the conflict between family ownership and minority shareholders (denoted as Type B agency problem). However, it should be noted that the former is not an issue in family-owned businesses because ownership concentration motivates each member to strive for value maximization that benefits all shareholders. Further, long-term investment horizon and reputational concerns are posited to stall family members' covetous conduct to act for personal gains. Therefore, family-owned firms should be more concerned with information transparency, which can result in a direct association between ICD and family ownership (Villalonga and Amit, 2006). Conversely, Type B agency problem may be highly prevalent in family-owned businesses. Available evidence indicates that, family ownership above a certain threshold level may be counterproductive for a firm (Abhayawansa and Azim, 2014). Muttakin *et al.* (2015) argued that increasing the family ownership may lead toward expropriation of minority shareholders. Furthermore, such ownership concentration puts families in a dominant position, where they can influence the firm's strategies and policies, including disclosure policies, such as ICD. In Pakistan, this type of agency problem is prevalent due to the weak institutional governance and legal enforcement system. Moreover, as family-owned businesses tend to attract less public interest and attention, minority shareholders have limited influence on the IC disclosure practices. Likewise, management of family-owned businesses is usually reluctant to invest in IC disclosure, as the associated costs are not believed to lead to commensurate gains. In this scenario, a combination of Type A and Type B agency problems creates a non-linear (possibly quadratic) relationship between IC disclosure and family ownership. Therefore, in the analyses conducted as a part of the present study, family ownership is presented in quadratic form. Consequently, an inverted U-shape relationship between family ownership and ICD is expected, whereby a rise in family ownership up to a certain percentage may increase ICD disclosure, while subsequent increases beyond this threshold would reverse this trend. At the apex, it is anticipated that family interests would be most optimally aligned with those of the general shareholders. As this link will gradually break down as the family ownership increases, Type B problem would emerge, having an adverse effect on IC disclosure. Based on these assertions, the following hypothesis was formulated:

H1: There exists an inverted U-shape relationship between family ownership and IC disclosure.

2.2. Foreign Ownership

The significant influence of the degree of foreign ownership on IC disclosure is supported by the findings yielded by a number of studies (e.g., (Haniffa and Cooke, 2002; Al-Akra *et al.*, 2010; Joshi *et al.*, 2018)). For example, Haniffa and Cooke (2002) explained that limited domestic contextual understanding, geographical dispersion, and language barriers limit the foreign investors' access to pertinent information. Owing to these barriers, and the resulting information asymmetry, foreign investors typically demand stringent corporate governance policies, including those pertaining to IC disclosure. In the Pakistani context, in particular, foreign investors may ask for

even greater degree of disclosure from business organizations due to high economic uncertainties, unfamiliarity with the local corporate and legislative environment, and prevalence of malpractice (Al-Akra *et al.*, 2010; Rashid *et al.*, 2018). Against this backdrop, it can be inferred that the foreign investors in Pakistan affect both the nature and extent of corporate disclosure policies and practices, including intellectual capital disclosure. Hence, we propose the following hypothesis:

H2: There exists a positive relationship between foreign ownership and the degree of IC disclosure.

2.3. Board Independence

Board independence is typically measured via the percentage of independent directors on the company board (Haniffa and Cooke, 2002). Their presence is required in order to ensure that other directors are not acting opportunistically. Thus, a greater number of independent directors, *inter alia*, would signify a more stringent corporate governance mechanism. According to Fama and Jensen (1983) the role of independent directors is crucial in corporate governance mechanisms, as such directors also encourage firm's management to disclose more information, which can reduce the potential for manager-owner conflict. Therefore, Cerbioni and Parbonetti (2007) and Li *et al.* (2008) among others, posited that board independence exerts a positive influence on IC disclosure. Nevertheless, the findings reported by Hidalgo *et al.* (2011) refuted this claim, as the authors failed to establish a statistically significant relationship between board independence and IC disclosure. Hidalgo *et al.* (2011) justified these results by claiming that, in practice, independent directors may not be truly independent. According to the available evidence, in Pakistan, directors declared as independent are often retired military officials, bureaucrats, and other stakeholders, whose interests are directly linked to those of the company for which they act as independent directors. These observations concur with the findings reported by Uddin and Choudhury (2008) who claimed that independent directors are usually identified and appointed through personal connections and thus may not meaningfully influence company's IC disclosure practices. However, assuming that this is not a prevalent issue, we hypothesize the following:

H3: There exists a positive and significant relationship between the number of independent directors on the company board and the degree of IC disclosure.

2.4. Dual Role of a CEO (Role duality)

CEO duality occurs if one individual acts both as the CEO and the board chairperson. Entrusting both positions to one person increases not only the managerial grip of that individual but also results in better alignment with management. Nevertheless, the dual role of a CEO can compromise board independence and may suppress the board's power to implement strategies aimed at strengthening governance, according to Finkelstein and D'aveni (1994). Furthermore, this dual role can provide the CEOs excessive power, allowing them to pursue their vested interests. Therefore, according to Gul and Leung (2004) CEO duality may reduce the propensity for voluntary disclosure of information, including IC disclosure. Interestingly, these assertions find limited empirical support, as the pertinent studies have yielded incongruent results. For example, Cerbioni and Parbonetti (2007) showed a significant positive relationship between CEO duality and IC disclosure, whereas Li *et al.* (2008) and Hidalgo *et al.* (2011) failed to find a significant association between dual role of CEO and IC disclosure. In the context of the present investigation, it is also noteworthy that, according to the guidelines provided by the Securities Exchange Commission of Pakistan, the board chairperson and the CEO roles cannot be held by the same individual. Consequently, the following hypothesis was postulated:

H4: There exists an inverse relationship between CEO duality and the degree of IC disclosure.

2.5. Family Duality

The concept of family duality is similar to that of CEO duality, as this situation arises when the chairperson and CEO positions are held by two close family members. This close relationship between the individuals holding such prominent positions in the company can have a significant impact, yet extant research on the effects of family duality on governance has yielded mixed results. For example, [Prencipe et al. \(2011\)](#) posited that family duality improves the alignment between general stakeholders' interests and those of the board members. Yet, [Muzumdar \(2006\)](#) and [Turley and Zaman \(2007\)](#) among others, opined that family duality can affect the distribution of income in the company, as it is possible that some specific groups would be given precedence over others. Further, family duality can also result in placing family interests above the interests of general shareholders. In Pakistan, family duality is a common trait, as given the prevalence of family-owned firms, close family members often hold the positions of CEO and board chairperson. In some cases, the son is the CEO and the father is the board chairperson. Indeed, with the exception of big multinationals, a wide majority of the Pakistan Stock Exchange (PSX) listed companies are affected by either family duality or CEO duality issue (SOURCE). This corporate management structure, coupled with weak and corrupt institutional framework, allows those in the top positions in the organization to pursue their own vested interests. Consequently, family duality may result in less voluntary disclosure of IC. Therefore, we can hypothesize:

H5: There exists an inverse relationship between family duality and the degree of IC disclosure.

2.6. Audit Committees

The role of an audit committee in establishing an efficient and active governance system is indispensable [Turley and Zaman \(2007\)](#). An effective audit committee would enhance internal controls, while reducing agency costs, and increasing IC disclosure ([Turley and Zaman, 2007](#); [Li et al., 2012](#)). According to the available evidence, the establishment of the audit committee is expected to increase reliability and quality of financial reporting, while enhancing information disclosure ([Ho and Wong, 2001](#); [Turley and Zaman, 2007](#); [Li et al., 2012](#)). In this regard, empirical research conducted by [Li et al. \(2012\)](#); [Li et al. \(2008\)](#) indicates a highly significant influence of the audit committee's characteristics (size, meeting frequency, etc.) on the degree of IC disclosure. This fact has been further endorsed by [Pomeroy and Thornton \(2008\)](#) who examined IC disclosure in the context of emerging economies. According to these authors, a direct and statistically significant relationship exists between audit committee effectiveness and quality and extent of financial reporting. Presently, according to the SECP guidelines, a company operating in Pakistan should have at least two independent directors that serve as audit committee members. It is also essential that the audit committee should be chaired by an experienced professional with thorough expertise in finance and accounting. However, available evidence [Khan et al. \(2013\)](#) indicates that most Pakistani firms do not have a formal audit committee. Further, [Khan et al. \(2013\)](#) noted that, even in companies that do have audit committees, these cannot work independently due to family dominance. Consequently, the impact of such audit committees on the extent of IC disclosure would be limited. This issue is mitigated to some extent by having two independent directors as audit committee members, as stipulated by the SECP. Based on these arguments, the following hypothesis was proposed:

H6: There exists a significant direct relationship between the presence of an audit committee and the degree of IC disclosure.

3. METHODOLOGY

3.1. Sample and Data

The study sample comprised of 99 companies operating in the Pakistani manufacturing sector that are listed at Pakistan Stock Exchange (PSX). These firms belong to various industries, including textile, cement, pharmaceuticals, engineering, etc., as indicated in [Table 1](#). The analysis period spanned from 2008 to 2017 and the pertinent data was sourced from the studied companies' annual reports. These reports were obtained from the

official PSX website, Securities & Exchange Commission of Pakistan (SECP), and company websites. The data sampling period commenced in 2008 because trading on the Pakistan Stock Exchange was halted on 28 August due to the stock market crash. Trading activity resumed on 15 December 2008, with a strong emphasis by the SECP on the role of corporate governance.

Table-1. Sample distribution by industry.

S	Industry	Number
1	Textile	23
2	Cement	17
3	Pharmaceuticals	11
4	Engineering	12
5	Food	11
6	Leather	15
7	Paper and Printing	10
	Total	99

3.2. Model Specification

Based on an extensive literature review and the hypotheses guiding the present study, we have developed following model for estimation:

$$\begin{aligned} \Delta ICD_{it} = & \alpha + \beta_1 FO_{it} + \beta_2 FORO_{it} + \beta_3 IND_{it} + \beta_4 DUCEO_{it} + \beta_5 FDU_{it} + \\ & \beta_6 AUC_{it} + \beta_7 SIZE_{it} + \beta_8 AGE_{it} + \beta_9 LVR_{it} + \beta_{10} RoA_{it} + \beta_{11} Industrydummy + \\ & \beta_{12} Yeardummy + \omega_{it} \end{aligned} \quad (1)$$

Where:

ICDI is an acronym of intellectual capital disclosure index/score.

FO denotes the proportion of shares under family member ownership.

FORO denotes the proportion of shares under the ownership of foreign investors.

BIND refers to the percentage of independent directors on the board of directors.

DUCEO is a dummy variable representing CEO's duality, and is assigned the value of 1 if the same person holds the positions of the chairperson and the company CEO, and is set to 0 otherwise.

FDU represents a dummy variable signifying family duality, and is assigned 1 if the CEO and chairperson positions are held by two family members, and is set to 0 otherwise.

AUC a dummy variable repressing existence of an audit committee, and thus has a value of 1 if there is an audit committee in the firm, and is otherwise set to 0.

SIZE a control variable representing firm size, measured as natural logarithm of total assets.

AGE another control variable denoting firm age, taken as the number of years since establishment.

LEV a control variable representing leverage, measured as the ratio of book value of total debt and total assets.

ROA another control variable denoting returns on assets, measured as the ratio of earnings before interest and taxes and total assets is an error term.

3.3. Measuring Intellectual Capital Disclosure Index (ICDI) — Dependent Variable

Two major approaches are typically employed when measuring intellectual capital disclosure, the disclosure occurrence and the volumetric method (Joseph and Taplin, 2011). The former measures the breadth of disclosure, whereas the latter focuses on its depth. While there is no consensus on which method is preferable, a significant number of researchers (e.g., (Abeysekera and Guthrie, 2005; Abeysekera, 2008a; 2008b; Joseph and Taplin, 2011)) advocate for the use of breadth of disclosure, in particular in countries where voluntary disclosure appears to be low.

As this is the case in Pakistan, in the present study, intellectual capital disclosure was measured using IC disclosure index (ICDI) developed in line with the disclosure occurrence approach. When applying this technique, various indicators of IC disclosure are taken into account to create an index signifying the extent of disclosure. In extant studies, the number of indicators considered when assessing IC disclosure ranges from 10 to 30. In the present study, 30 indicators were adopted to provide a comprehensive assessment of ICD. These 30 indicators (and their coding rules) were adopted from the work of Muttakin *et al.* (2015) and were modified to reflect the Pakistani context, as advised by Abeysekera (2008a). We adopted a dichotomous procedure to measure these indicators, whereby the value of 1 is assigned if a company discloses the required information and 0 otherwise. Intellectual capital disclosure index (ICDI) score of that company is derived by dividing the scores on individual indicators obtained by the maximum score achieved by any company in that sector (i.e., 30). This approach has been previously adopted by Haniffa and Cooke (2005) and Li *et al.* (2008).

3.4. Hypothesized and Control Variables

To measure corporate governance, family ownership (FO), foreign ownership (FORO), board independence (BIND), CEO duality (DUCEO), family duality (FDU), and audit committee (AUC) were incorporated into the proposed model, along with several control variables, as indicated by Equation 1 namely firms size (SIZE), firm age (AGE), degree of leverage (LEV), and return on assets (ROA). In the present study, a quadratic specification of FOWN variable was adopted, since a non-linear relationship between family ownership and the extent of ICD is hypothesized. The rationale behind using firm size as the control variable is that, unlike small or medium-sized firms, large-sized firms can disclose more voluntary information in order to mitigate the conflict between the managers and shareholders. Likewise, long-established firms have developed reputation over time and would thus be more likely to voluntarily disclose information to support their standing in the market. Further, firms with high leverage have a higher external pressure from creditors and other stakeholders, and will thus typically disclose more voluntarily information (Arvidsson, 2003). Lastly, highly profitable companies tend to disclose more information as this enhances their market reputation (Ousama *et al.*, 2012).

3.5. Estimation Technique

Following Zhu and Pollin (2005) and Quartey (2010) in this work, quadratic regression was applied to estimate the association between ICD and corporate governance. As the present study focuses on Pakistani firms, a non-linear (quadratic) relationship between family ownership and IC disclosure is expected. Thus, this technique is appropriate, as it allows us to estimate the threshold level or the turning point (if any) above which family ownership exerts a negative effect on intellectual capital disclosure in Pakistan. Moreover, in adopting this approach, it is possible not only to test the existence of any non-linear relationship, but also show the point at which the trend in the relationship is reversed. Identifying such a point can reveal the optimal percentage of family ownership for IC disclosure. Extant empirical research in the area of management, finance and economics (e.g., (Hermes and Lensink, 2001; Clements *et al.*, 2005)) suggests that the quadratic regression technique can be successfully adopted to model non-linear relationships. For example, Muttakin *et al.* (2015) applied the quadratic function to identify the inverted U-shape relationship between corporate governance and intellectual capital in the case of Bangladesh. Similarly, Hermes and Lensink (2001) used the same approach to identify the optimum government size for maximizing the economic growth. In line with these studies, in this work, we used the following quadratic function to test the non-linear relationship between family ownership and ICD:

$$\begin{aligned} \Delta ICD_{it} = & \alpha + \beta_1 FO_{it} + \beta_2 FO_{it}^2 + \beta_3 FORO_{it} + \beta_4 IND_{it} + \beta_5 DUCEO_{it} + \beta_6 FDU_{it} + \\ & \beta_7 AUC_{it} + \beta_8 SIZE_{it} + \beta_9 AGE_{it} + \beta_{10} LVR_{it} + \beta_{11} RoA_{it} + \beta_{12} Industrydummy + \\ & \beta_{13} Yeardummy + \omega_t \end{aligned} \quad (2)$$

In Equation 2 all variables, except the squared family ownership, i.e. FO^2 , are as defined in Equation 1. As discussed in pertinent literature, intellectual capital disclosure can be divided into three categories, namely internal, external, and human capital. In order to establish which dimension of IC disclosure is affected the most by corporate governance, we have also estimated the following three models:

$$\begin{aligned} \Delta IntICD_{it} = & \alpha + \beta_1 FO_{it} + \beta_2 FO_{it}^2 + \beta_3 FORO_{it} + \beta_4 IND_{it} + \beta_5 DUCEO_{it} + \beta_6 FDU_{it} + \\ & \beta_7 AUC_{it} + \beta_8 SIZE_{it} + \beta_9 AGE_{it} + \beta_{10} LVR_{it} + \beta_{11} RoA_{it} + \beta_{12} Industrydummy + \\ & \beta_{13} Yeardummy + \omega_t \end{aligned} \quad (3)$$

$$\begin{aligned} \Delta ExtICD_{it} = & \alpha + \beta_1 FO_{it} + \beta_2 FO_{it}^2 + \beta_3 FORO_{it} + \beta_4 IND_{it} + \beta_5 DUCEO_{it} + \beta_6 FDU_{it} + \\ & \beta_7 AUC_{it} + \beta_8 SIZE_{it} + \beta_9 AGE_{it} + \beta_{10} LVR_{it} + \beta_{11} RoA_{it} + \beta_{12} Industrydummy + \\ & \beta_{13} Yeardummy + \omega_t \end{aligned} \quad (4)$$

$$\begin{aligned} \Delta HCICD_{it} = & \alpha + \beta_1 FO_{it} + \beta_2 FO_{it}^2 + \beta_3 FORO_{it} + \beta_4 IND_{it} + \beta_5 DUCEO_{it} + \beta_6 FDU_{it} + \\ & \beta_7 AUC_{it} + \beta_8 SIZE_{it} + \beta_9 AGE_{it} + \beta_{10} LVR_{it} + \beta_{11} RoA_{it} + \beta_{12} Industrydummy + \\ & \beta_{13} Yeardummy + \omega_t \end{aligned} \quad (5)$$

In Model 2, 3, 4, and 5, we expect to be positive, reflecting the positive effect of low family ownership (FO) on IC disclosure (ICD). Conversely, is expected to have negative sign, indicating an adverse effect of family ownership after the turning point on the inverted U-shape curve. Since a squared variable increases in value faster than a linear variable, any negative effects of family ownership will eventually overshadow the positive ones. Moreover, the combination of a positive and significant linear term with a negative and significant squared term suggests that the impact of family ownership on the company output can be described as an inverted U-shaped curve. Moreover, it supports the view that the family ownership effects shift from positive to negative when ownership surpasses some threshold level. The peak of the quadratic function identifies the family ownership threshold level above which the marginal effect of family ownership becomes negative.

In order to ascertain whether the hypothesis of non-linear effect of family ownership (FO) on IC disclosure (ICD) is supported, Equation 2 is estimated and the significance of the coefficients of the linear and squared terms is assessed. If both coefficients are significantly different from zero, the peak of the quadratic function can be determined, thus revealing the critical point above which the marginal impact of family ownership on ICD is negative. To calculate the critical point corresponding to the FO threshold level, the partial derivative of Equation 2 is computed with respect to FO. The derivative yields Equation 6 below, which is set equal to zero:

$$\frac{\partial \Delta ICD_{it}}{\partial FO_{it}} = \beta_1 + 2\beta_2 FO_{it} = 0 \quad (6)$$

Solving the above equation for FO reveals the critical point in family ownership beyond which its marginal impact becomes negative, as indicated by the expression below:

$$FO_{it} = -\beta_1 / 2\beta_2 \quad (7)$$

The same process was repeated for Model 3, 4, and 5, whereby the aim was to ascertain the level of threshold in individual dimensions of ICD.

4. RESULTS

Table 2 provides a summary of the descriptive statistics pertaining to the study sample. It is evident from the results that the average family ownership (FO) among the sampled firms is 41%, whereby the average foreign ownership is 9.2%. Further, the average board independence (BIND) is 3.3%. Another important aspect is CEO duality (DUCEO), as the data show that CEOs of 29.0% of the sampled firms also hold the position of board chairperson (CEODU), while 52.0% of the firms are affected by family duality (FDU).

Table-2. Descriptive Statistics.

Variables	Mean	Median	Std. Dev	First Qtl	Third Qtl
FO	0.410	0.295	0.191	0.053	0.514
FORO	0.092	0.000	0.165	0.000	0.001
IND	0.033	0.000	0.074	0.000	0.111
DUCEO	0.290	0.000	0.392	0.000	0.000
FDU	0.520	0.000	0.412	0.000	1.000
AUC	0.610	1.000	0.431	0.000	1.000
SIZE	7.570	7.480	0.590	7.940	8.850
AGE	22.500	23.150	9.510	12.820	27.750
LVR	681.000	0.591	0.742	0.391	0.721
ROA	0.092	0.087	0.084	0.028	0.097
ICD	0.172	0.134	0.079	0.075	0.189
SCDI	0.182	0.142	0.127	0.000	0.115
RCDI	0.095	0.087	0.131	0.000	0.187
HCDI	0.235	0.213	0.094	0.118	0.244

In order to examine if there are significant differences between the mean values of ICD attributes of firms lower than median and greater than median, we conducted t-test. The results are reported in Table 3. It is interesting to note that firms with ICD higher than median have higher level of foreign ownership and greater board independence, and have an established audit committee. Likewise, firms with low level of IC disclosure have comparatively higher level of family ownership, as well as greater CEO duality. The t-test results show that significant differences in age (AGE), leverage (LEV), firm size (SIZE), and profitability (ROA) exist between the two groups.

Table-3. Mean Difference Test.

Variables	Mean ICD > Median	Mean ICD < Median	p-value
FO	0.250	0.307	0.172
FORO	0.11	0.041	0.000
IND	0.098	0.051	0.001
DUCEO	0.221	0.332	0.000
FDU	0.399	0.448	0.001
AUC	0.771	0.284	0.000
SIZE	9.46	8.86	0.000
AGE	29.650	27.28	0.011
LVR	0.592	0.775	0.000
ROA	0.084	0.045	0.000

Before shifting the analysis focus to the panel threshold, correlations among the variables were assessed. The results reported in Table 4 show a moderate correlation among IC attributes. Likewise, the value of variance inflation factors (VIF) less than 2 rules out the existence of multi-collinearity among variables (Neter et al., 1996).

Table-4. Correlations among Model Variables.

	FO	FORO	IND	DUCEO	FDU	AUC	SIZE	AGE	LVR	ROA	VIF
FO	1										1.25
FORO	-0.293***	1									1.57
IND	-0.123	0.201***	1								1.79
DUCEO	0.192***	-0.132**	-0.164**	1							1.24
FDU	0.452***	-0.321**	0.125*	-0.512*	1						1.81
AUC	0.010	0.25***	0.585***	-0.215**	0.154***	1					1.63
SIZE	-0.298***	0.298**	0.212***	-0.08	-0.185*	0.197***	1				1.19
AGE	-0.221***	0.118*	0.058**	-0.068	-0.154**	-0.018*	-0.125**	1			1.27
LVR	-0.152**	-0.098**	-0.098**	-0.011	-0.195*	-0.21**	-0.092	0.25***	1		1.32
ROA	0.092**	0.334***	0.223***	0.024*	0.112*	0.192*	0.088	0.084*	-0.29**	1	1.28

Note: * and ** show statistical significance at the 5% and 1% level of probability respectively.

Table-5. Relationship between Corporate Governance Attributes and ICD.

Corporate Governance variables	Overall	By IC dimensions		
	Model 1	Model 2 (HC)	Model 3 (RC)	Model 4 (SC)
FO	0.124**	0.092*	0.211***	0.351***
	-0.187***	-0.271***	0.312**	-0.542**
FORO	0.194**	0.12**	0.187**	0.114**
IND	0.331***	0.285***	0.152***	0.271***
DUCEO	-0.074	-0.101	-0.002	-0.008
FDU	-0.097***	-0.087**	-0.051**	-0.081***
AUC	0.117***	0.092***	0.029***	0.254**
SIZE	0.058**	0.142***	0.072***	0.091***
AGE	0.012***	0.022**	0.008***	0.009***
LVR	-0.042	-0.028***	-0.005***	-0.092***
ROA	0.219**	0.187***	0.181***	0.198***
Dummy				
Industry	Significant	Significant	Significant	Significant
Year	Significant	Significant	Significant	Significant
R Square	0.421	0.387	0.442	0.408
F-Statistics	21.81	18.43	17.75	15.12
Sargan test of over-identifying restrictions	3.14 (0.64)	2.87 (0.51)	5.12 (0.44)	4.81(0.48)
Arellano-Bond tests for AR(2)	0.17 (0.79)	0.11 (0.84)	0.15 (0.74)	0.12 (0.79)
Family ownership threshold	3.12 (22.64%)	3.32 (27.66%)	3.19 (24.28%)	3.01 (20.82%)
Marginal Effect				
Mean	0.23***	0.25***	0.34	0.37***
Max	1.28***	1.58***	1.42***	1.46***
Min	1.32***	1.43***	1.35**	1.38**

Note: * and ** show statistical significance at the 5% and 1% level of probability respectively.

Panel threshold estimation results related to Equation 2 reported in Table 5 confirm the existence of threshold analysis. Model 1 tests the relationship between IC disclosure and various corporate governance attributes. As discussed in the preceding sections, to test whether family ownership is in a non-linear relationship with ICD, a square of family ownership (FOWN) variable was incorporated into Equation 2. The results show that the coefficient of the linear term of FOWN, i.e., is positive and significant (0.24, $p < 0.05$), while the coefficient of the squared FOWN, i.e., is negative and significant (-0.187, $p < 0.01$). These results support H1, as they indicate the existence of an inverted U-shape relationship between family ownership and IC disclosure. In other words, these findings confirm the hypothesis that there exists a turning point or a threshold level of family ownership above which family ownership is detrimental to IC disclosure in the manufacturing sector of Pakistan. These results further imply that a low level of family ownership increases the degree of IC disclosure, whereas higher family ownership reduces the company's propensity for voluntary ICD. Further, the results obtained by investigating the

turning/threshold point show that, below 22.64%, family ownership improves IC disclosure, whereas beyond this point, it reduces the level of IC disclosure. The negative relationship between ICD and a high percentage of family ownership is explained by the fact that, when family ownership is significant, it can override company interests, limiting the influence of minority shareholders, further decreasing IC disclosure. These results are in line with those reported by [Muttakin et al. \(2015\)](#) in the case of Bangladesh. However, [Hidalgo et al. \(2011\)](#) have found a reverse link in case of Mexico. Further, the positive and significant coefficient of FORO (0.194, $p < 0.05$) supports H2, as it implies that a higher level of foreign ownership results in a higher degree of IC disclosure. Indeed, empirical evidence indicates that, due to information asymmetry, foreign investors demand higher level of corporate information disclosure, including ICD. These findings concur with the results reported by [Li et al. \(2008\)](#); [Khan et al. \(2013\)](#) and [Muttakin et al. \(2015\)](#) indicating a significant and direct influence of foreign ownership on voluntary information disclosure. The coefficients related to the third component of corporate governance, board independence (IND), are also positive and statistically significant (0.331, $p < 0.01$). These results support H3, implying that greater board independence ensures higher level of IC disclosure. [Li et al. \(2008\)](#) reached similar conclusions, highlighting an effective role of independent directors in reducing agency conflict by encouraging information disclosure, including IC. Interestingly, H4 hypothesizing a significant impact of CEO duality (DUCEO) on IC disclosure is not supported by our results (0.074, $p > 0.10$). This finding suggests that dual CEO role is not an influential factor in the IC disclosure of Pakistani firms. However, the relationship between family duality and the degree of IC disclosure is significant and negative (0.097, $p < 0.05$), supporting H5 and indicating that, when two persons from the same family hold the positions of CEO and board chairperson, the IC disclosure level tends to decline. According to [Muttakin et al. \(2015\)](#) having two family members in the positions of CEO and chairperson reduces the influence of general shareholders, resulting in less voluntarily IC disclosure. Finally, the results related to the last component of corporate governance—presence of an audit committee (AUC)—are significant and positive (0.117, $p < 0.01$). These findings suggest that having an audit committee prompts the Pakistani firms to disclose more IC information relative to those that do not have an established audit committee. The influential role of the audit committee in disclosing the information that was postulated by other authors, such [Hidalgo et al. \(2011\)](#) is thus supported by our findings.

The results pertaining to the control variables included in the models suggest that better performing, larger (SIZE), and older (AGE) firms tend to disclose higher levels of IC. However, the effect of leverage on IC disclosure appears to be insignificant. These findings are aligned with those yielded by other empirical studies (e.g., [Cerbioni and Parbonetti, 2007](#); [Muttakin et al., 2015](#)). For in-depth analysis, we also tested the relationship of three major dimensions of IC disclosure (structural capital, relational capital, and human capital) with the individual attributes of corporate governance. These relationships were modeled using [Equation 3 – 5](#).

[Equation 3](#) results indicate presence of an inverted U-shape relationship between internal capital disclosure and family ownership, confirming the results of [Equation 2](#). The findings also demonstrate a significant positive influence of foreign ownership (FORO), board independence (IND), and presence of audit committee (AUC) on internal capital disclosure, while revealing a significantly negative effect of family duality (FDU) on the level of internal capital disclosure. Conversely, the analyses indicate that CEO duality (DUCEO) does not have any effect on ICD. Among the control variables included in the models, firm size (SIZE), firm age (AGE), and profitability (ROA) showed a significantly positive association with ICD, whereas the effect of leverage (LEV) was not statistically significant. The results of [Equation 4](#) and [5](#) revealed similar trends, confirming the existence of a non-linear relationship between FOWN and the other two dimensions (i.e., external capital and human capital) of IC disclosure. To evaluate the robustness of these findings, Model 1 to 4 were re-estimated by excluding the control variables. The results were broadly consistent with those reported in [Table 4](#).

5. CONCLUSION AND RECOMMENDATION

The aim of the present study was to test the association between ICD (overall and by individual dimensions) and various attributes of corporate governance, with a particular focus on the role of family ownership. When interpreting the study findings, it is noteworthy that a most of manufacturing firms in Pakistan are family-owned. Consequently, many companies have family members in prominent positions, resulting in CEO and/or family duality, which tends to compromise governance controls (Al Farooque *et al.*, 2007). Even though a strong and rational model of corporate governance is in place in Pakistan, the conventional corporate structure creates a great hindrance to the adoption of strong governance mechanisms. Consequently, the impact of corporate governance on IC disclosure may be different to that observed in other countries, as the role of family ownership is often overemphasized. The results yielded by the present study confirm the existence of an inverted U-shape relationship between corporate governance and IC disclosure (overall, as well as when its individual dimensions are examined). These results counter those reported in extant literature (e.g., (Haniffa and Cooke, 2002; Anderson and Reeb, 2004; Hidalgo *et al.*, 2011; Massaro *et al.*, 2018)). This incongruence in findings can be attributed to the focus on family ownership in the present investigation, in addition to modeling its relationship with ICD in quadratic form. Additionally, these results revealed a significant positive impact of foreign ownership on IC disclosure in Pakistan. The fact that foreign investors require more information disclosure than do local investors is recognized in extant studies (Seng *et al.*, 2018). Likewise, a significant positive impact of board independence and audit committee presence was revealed, implying that, despite conventional organizational structure, corporate governance checks (including presence of outsiders on the board of directors and having an established independent audit committee) have a significant impact on the degree of IC disclosure in the Pakistani manufacturing sector.

Moreover, a significantly negative relationship between family duality and the level of IC disclosure strongly suggests that firms should aim to diversify their board composition to ensure a more effective IC disclosure. The specific focus of this study on family duality was relevant, as this is a common issue in Pakistan. It is also one of the contributions of the study to the pertinent literature, as there is a limited body of knowledge on this important aspect of corporate governance in the context of Pakistan. Interestingly, the relationship between CEO duality and IC disclosure was not supported by our findings, concurring with the results reported by other authors, such as Li *et al.* (2008) and Hidalgo *et al.* (2011). Based on the overall findings of the study, it can be concluded that corporate governance plays a significant role in the disclosure of intellectual capital in Pakistan. Further, the non-linear role of family ownership in the extent of ICD was confirmed, suggesting that family ownership beyond certain level is counterproductive for IC disclosure. This is a significant contribution to extant body of knowledge, as this aspect has not been previously investigated in the context of Pakistan. The study results clearly pertain to a limited body of manufacturing firms in Pakistan and thus cannot be generalized to other settings. Nonetheless, they can be used as guidelines for countries having similar corporate and legislative structure to that of Pakistan.

Based on the findings yielded by the present study, some pertinent policy implications can be drawn. Specifically, it should be noted that the degree of voluntarily information disclosure (especially IC) can be enhanced by improving firm's corporate governance, thus reducing information asymmetry that is often the main barrier to foreign investment. This can be an important consideration for the Securities and Exchange Commission of Pakistan (SECP) and the Stock Exchange authorities. Further, improving IC disclosure can lead to better management of resources. Finally, firms aiming to improve corporate governance should limit family ownership (this study suggests that the threshold is 22.4%), as above a certain level, family ownership exerts negative influence on corporate governance and may jeopardize the interests of common shareholders.

The study has certain limitations that must be considered when interpreting the findings reported here. Primarily, the data used in the analyses were obtained from financial statements of a limited number of Pakistani manufacturing companies. As other sources of information, such as websites and independent reports, were not considered, there is a potential for bias. Moreover, due to the limited data availability, not all dimensions of

corporate governance affecting IC disclosure could be examined. Finally, due to the lack information, we could not measure the influence of independent directors on ICD in Pakistan.

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