

Cost of Debt, Corporate Opacity, and Family Control: An fsQCA Analysis

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Abstract: The connection between family power, corporate opacity, and the cost of debt for a corporation is explored in this research article. Family control is linked to a reduced cost of debt, according to the research. This suggests that family involvement could be beneficial for financial stability and risk management. The study found that a lower cost of debt is associated with more corporate opacity, which is surprising. This surprising finding implies that being opaque can help companies avoid unwanted attention, which could lead to better loan terms. But there's no evidence that company opacity and family control combine to affect loan costs; the two variables seem to have independent effects. To further clarify the connection among debt costs, controlling families, and corporate opacity, the study also makes use of fuzzy-set qualitative comparative analysis (fsQCA). Lower levels of controlling families and higher degrees of corporate opacity are related with a higher cost of debt, according to the fsQCA data. Firms seeking to improve their financial strategy can benefit from this research's conclusions, which shed light on the intricate dynamics of corporate opacity, family control, and the cost of debt.

Keywords: Family Control; Corporate Opacity; Fuzzy-Set Qualitative Comparative Analysis (fsQCA); S&P500; Cost of Debt; Financial Stability; Risk Management; Business Direction; Valuation and Profitability.

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1. Introduction

Recent studies have shown that family firms constitute the most fundamental worldwide organization. In the US, they account for approximately 90% of incorporated businesses. According to Anderson & Reeb [1], one-third of the S&P 500 corporations were founded by families. Also, Claessens et al. [9] show that family firms are present in over two-thirds of incorporated businesses in East Asian countries. About 44% of Western European firms are family-owned [15]; [13]. The literature shows that most family firms have higher valuation and profitability than non-family firms [28].

In this context, family governance plays a significant role, as the family firm's success largely depends on the family, its structures, its processes, and how it copes with disruptions. Also, family governance has received a lot of attention in recent years. Recently, family governance has received a lot of attention. Precisely, family firms differ from non-family firms.

To make the best decisions on the direction of the business and guarantee of accountability and control, a family governance system is "a system of processes and structures put in place at the highest level of the enterprises, family, and ownership," according to Pajunen [21].

A modest but increasing body of research has recently looked at how family ownership affects the agency cost of debt [3,5,12, 19].

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Families that are in a position of dominance also have more resources at their disposal, which they might use for spying and stealing from others [6]; [29]. So, whether the entrenchment incentive of family ownership is stronger than the alignment incentive determines whether family control has a favourable or negative effect on a firm's cost of debt. That is why it is not possible to see the effects of controlling families' motivations.

Using data from 291 S&P 500 firms between 2010 and 2017, this study analyses the relationship between corporate opacity and the effect of family control on the cost of debt for the firm. To measure corporate opacity. In accordance with Anderson & Reeb's [2] methodology, we construct a thorough index with four parts depending on disclosure and analyst coverage. In order to get around linear regression's infamous shortcomings, this innovative study mixes fuzzy-set qualitative comparison analysis with it [33]. A lower cost of debt is connected with family control, according to this study. Next, we discover that the cost of debt for a company is inversely related to its corporate opacity. On the other hand, we don't see any evidence that corporate transparency influences the correlation between the control family and interest rates on loans. By utilising fsQCA, we discover proof that a greater amount of debt a company has means fewer families with power and more corporate opacity.

Corporate governance and family businesses are both aided by this piece. We begin by looking into the correlation between family control and a company's cost of debt in the United States, and how corporate opacity affects this relationship. The second step is to determine the overall cost of debt for the company. This is done by adding together several factors, such as the yield on government bonds, a debt adjustment, the ratio of short-term to total debt, and the effective tax rate for the stock.

2. Review of Literature

Reducing agency conflicts caused by the split between ownership and management is a key feature of family businesses, according to Jensen and Meckling [14]. Appointing a family member to the position of chief executive officer or closely supervising outside executives are two ways in which tightly controlling families can alleviate owner-manager conflicts [10].

Nevertheless, there is a lack of theoretical investigation into the ways in which corporate opacity modifies the effect of family control on the cost of debt for a corporation. In addition, we lay out our major points, review the pertinent literature, and formulate our hypothesis in this part.

2.1. Family control and agency cost of debt

There is a lack of clear theoretical evidence about how family control affects the agency cost of debt. One the one hand, agency issues and the expense of the firm's debt might be made worse by family control and concentrated ownership. Similarly, having dominating owners increases the likelihood of a company's strategy failing.

Pajunen [21] asserts that families in control have the power to influence the restructuring process following a default and even take a cut of the creditors' surplus. Members of the controlling family may be able to enrich themselves at the cost of the company's other stakeholders. Fraud is more likely to occur in family businesses because they are less transparent compared to enterprises with diffused shareholders, according to Anderson & Reeb [2].

Conversely, controlling families have the potential to reduce the cost of debt for the enterprise while also reducing shareholder-debt-holder friction. In addition, the firm's long-term commitment to the family business spans multiple generations and is characterised by extremely undiversified investment strategies. As a result, ruling families are more prone to prioritise the survival of the enterprise over the strict maximum of wealth, according to factors such as long-term commitment, reputation, and having highly undiversified investments. Family control and enterprise debt cost have been inconsistently explored empirically.

For companies in the S&P 500 index, Anderson et al. [3] found that those with family ownership had a lower cost of financing. The cost of debt is higher for family-owned businesses, according to Abbott and Ragin [24]. Therefore, compared to non-family enterprises, family firms appear to have a lower cost of debt in the previous analysis. Consequently, here is our first hypothesis:

H1: family control has a negative effect on the cost of debt.

2.2. Family firms and corporate opacity information

Companies that are publicly traded might show that they care about their investors' interests by providing them with relevant corporate information. Since owners in ownership blocs have more access to sensitive company information, agency theory predicts that these businesses will be less forthcoming with information. Certain empirical evidence does not seem to be adequately explained by agency-based economic explanations when ownership gets concentrated in the family.

Family businesses are more likely to provide accurate financial information and less likely to manipulate profits than non-family businesses. If investors want to be able to properly discriminate among borrowers, they need access to corporate information. Investors may alter earnings to reduce the possibility of outside interference, according to Leuz et al. [18]. Furthermore, experts are hesitant to follow family businesses or other entities with the ability to artificially inflate their profits [16].

What happens to company data when families have control is a hot topic in the literature. Wang [31], Abbott and Ragin [24] state that family firms in the S&P 500 index outperform non-family enterprises in terms of financial reporting quality, analyst following, and bid-ask spreads. But research by Anderson et al. [3] shows that, compared to non-family organisations, family businesses are less open about their finances. Also, S&P 1500 family businesses aren't as forthcoming with earnings predictions and conference calls when it comes to voluntary disclosures [8]. Our second working hypothesis is that families with a lot of power influence corporations to become very secretive, which allows them to reap private benefits and become very entrenched. That being said, here is our second hypothesis:

H2: controlling families possess strong incentives to foster and exploit corporate opacity.

2.3. Corporate opacity, family control, and firm's cost of debt

Agency issues among creditors, management, and shareholders can be lessened with the help of corporate information [7]; [32]. Consequently, there is less of a knowledge gap between owners and investors when corporations are open about their finances, and equity rather than debt is the funding mechanism of choice for more open businesses [20].

Because of differences in ownership and control rights, institutions have a significant impact on businesses, says institutional theory. Therefore, owners' expropriation behaviour is likely to be encouraged by an institutionally weak environment [11]; [15]. More so, Rey et al. [26] look at how higher equity analysts track debt ratios. Lower debt ratios are correlated with a larger following of equities analysts, according to their findings.

If creditors believe that family members in control of a family business are more likely to engage in expropriatory behaviour, they will demand more openness from the business and will use this knowledge to negotiate more favourable terms for their debt. Corporate information is seen as opaque when ruling families are more prone to stealing from outside investors, according to Leuz et al. [18]. Lenders may demand greater rates of return on loans as a result of the increased risk. Put simply, when dominant families and creditors are involved, there is a higher likelihood of corporate opacity difficulties. The following is a formal estimate of our third hypothesis:

H3: Corporate opacity information strengthens family control and debt cost effects.

3. Methodology

3.1. Sample and data source

Our initial study sample consists of firms listed on the S&P 500 index from 2010 to 2017. We first excluded companies in the finance and insurance sectors because the regulation of ownership structure and corporate opacity differs across companies. Then, we skipped firms not listed in the Anderson & Reeb [1] database. So, our final sample consists of 291 family and non-family firms. Therefore, we obtained our accounting, financial, and governance data from the Bloomberg database and collected family control data from Anderson & Reeb [1].

3.2. Measurement variables

Cost of debt: A security's after-tax weighted average cost of debt is determined by a number of factors, including interest rates on government bonds, a debt adjustment factor, the ratio of short-term to long-term debt, and the effective tax rate of the stock. For each rating class, the adjustment factor shows the typical yield above government bonds. When a corporation lacks a fair market curve, the debt adjustment factor is employed (FMC). The assumed rate for a corporation without a credit rating is 1.38, which is the same as the long-term currency issuer rating of a BBB+ from Standard & Poor's. Bloomberg uses its proprietary formula to get the precise cost of debt adjustment factor.

Cost of debt= $[(SD/TD) * (CS*AF)] + [(SD/TD) * (CL*AF)] * (1-TR)$ Where:

SD: short-term debt;

TD: total debt;

CS: pre-tax cost of short-term debt;

AF: debt adjustment factor;
 LD: long-term debt;
 CL: pre-tax cost of long-term debt;
 TR: effective tax rate;

3.3. Independent variables

Data on corporate opacity: We followed Anderson et al. [3] and built the corporate opacity index using four variables: trade volume, analyst coverage, percentage of trading days with zero return, and stock return volatility.

We characterised family firms as businesses in which members of the founding family or direct descendants of the founders own at least 5% of the shares [29]; [30]. In our study, we employ a binary variable to classify a firm as a family firm. This variable is set to one when a family member has 5% or more ownership, and zero otherwise.

We accounted for 10 control variables that can influence a company's cost of debt: company size, return on assets, Tobin's Q, free cash flow, fixed-to-total-assets ratio, debt-to-total-assets ratio, current ratio, board size, board duality, and board independence. The impact of these factors on the cost of debt for a company is a well-known topic in theory and practise [22]; [23]. Table 1 has comprehensive explanations of all control variables.

Table 1: Variables description

Variables	Descriptions
Cost of debt (COD)	WACC cost of debt (after tax): after-tax weighted average cost of debt for the security, calculated using government bond rates, a debt adjustment factor, the proportions of short and long-term debt to total debt, and the stock's effective tax rate.
Corporate opacity (OPACITY)	The corporate opacity index ranks four components: trading volume, analyst coverage, bid-ask spread, and stock volatility.
Family control (FC)	A binary variable that equals one when a family member holds a 5 % or greater ownership and zero otherwise.
Trading Volume (VOL)	The natural logarithm of average daily shares traded/outstanding.
Tot analyst (ANAL)	The number of equities analysts tracking each firm.
bid-ask spread (SPREAD)	The ask price minus the bid price is divided by the bid and ask price average.
Stock volatility (RISK)	The standard deviation of daily stock returns during the year.
Board independent (BI)	The number of independent directors is divided by the total board of directors.
Board size (BS)	The total number of directors on the board.
Return on assets (ROA)	Earnings before interest and taxes divided by total assets.
Free cash flow (FCF)	The natural logarithm of free cash flow.
firm size (FS)	The natural logarithm of total assets.
Current Ratio (CR)	Current assets/current liabilities.
Tobin's Q Ratio(T'Q)	The market value of total assets divided by the book value of total assets.
Net property, plant, and equipment (PPE)	Net property, plant, and equipment divided by total assets.

3.4. Descriptive statistics

Table 2 provides four panels of summary statistics for our sample of firms. Panel A illustrates the frequency of family firms and non-family firms. Panel B presents our sample's means, standard deviation, and minimum and maximum values.

Table 2: Frequency family

FC	Freq.	Percent	Cum.
0	1,856	79.73	79.73
1	472	20.27	100.00

Panel B also shows family and non-family firms' means, standard deviation, minimum, and maximum values. Panel C provides a correlation matrix for key variables for our sample. Finally, panel D presents the means for comparison tests between family and non-family firms (Tables 3 to 7).

Table 3: Summary statistics Non-family firms

Variable	Obs	Mean	Std. Dev.	Min	Max
COD	1,838	2.175779	.860599	0	5.9597
RISK	1,812	.2417201	.2435039	.0118	2.886
Volume	1,812	3.30e+08	5.89e+08	1081666	1.23e+10
SPREAD	1,546	.0553346	.0646054	.0077	1.6501
Shares Outstanding	1,839	623.1005	1073.466	25.5414	10615.38
VOL	1,802	13.25267	.5119048	7.037144	14.82602
ANAL	1,823	21.75151	7.866491	1	61
BI	1,832	85.41375	8.51551	0	100
BS	1,832	10.81223	1.930158	5	18
ROA	1,835	7.204395	7.200521	-61.8205	42.2794
FCF	1,840	1849.308	4293.395	-10048	70019
Total Assets	1,843	29466.71	56050.05	0	747793
CR	1,819	1.873518	1.167461	.1685	9.5921
T'Q	1,831	2.291083	1.461637	.6896	20.9228
PPE	1,839	.267239	.2426892	.0053717	.9474287
OPACITY 1	1,524	.4981773	.1565946	.0833333	.9444444
OPACITY 2	1,524	.0416024	1.08807	-4.137633	18.51553

Notes: COD= cost of debt, RISK= Stock volatility, SPREAD= bid-ask spread, Shares Outstanding VOL= Trading Volume, ANAL= Tot analyst, BD= CEO Duality, BI= Board independent, BS= Board size, ROA= Return on assets, FCF= Free cash flow, FS= firm size, Total Assets, CR= Current Ratio, T'Q= Tobin's Q Ratio, PPE= Net property, plant, and equipment, OPACITY 1 et OPACITY 2= Corporate opacity firms.

Table 4: Summary statistics Family firms

	Count	means	p50	Sd	min	Max
COD	2308	2.140	2.08	0.87	0.00	5.96
RISK	2261	0.249	0.17	0.30	0.01	4.91
Volume	2261	3.37e+08	1.88e+08	5.91e+08	1.08e+06	1.23e+10
SPREAD	1924	0.055	0.04	0.06	0.01	1.65
Shares Outstanding	2306	668.757	317.98	1175.09	25.54	10615.38
VOL	2251	13.228	13.23	0.52	7.04	14.83
ANAL	2274	22.005	21.00	8.09	1.00	61.00
BI	2298	83.523	87.50	10.17	0.00	100.00
BS	2302	10.872	11.00	2.00	5.00	18.00
ROA	2302	7.433	7.11	7.09	-61.82	44.08
FCF	2311	1914.423	743.95	4307.94	-10048.00	70019.00
Total Assets	2314	29674.422	13385.11	54359.62	0.00	747793.00
CR	2280	1.938	1.56	1.41	0.17	19.07
T'Q	2291	2.322	1.92	1.46	0.68	20.92
PPE	2308	0.261	0.17	0.23	0.00	0.95
OPACITY 1	1900	0.496	0.50	0.16	0.06	0.94
OPACITY 2	1900	0.000	0.02	1.10	-4.14	18.52

Notes: COD= cost of debt, RISK= Stock volatility, SPREAD= bid-ask spread, Shares Outstanding VOL= Trading Volume, ANAL= Tot analyst, BD= CEO Duality, BI= Board independent, BS= Board size, ROA= Return on assets, FCF= Free cash flow, FS= firm size, Total Assets, CR= Current Ratio, T'Q= Tobin's Q Ratio, PPE= Net property, plant, and equipment, OPACITY 1 et OPACITY 2= Corporate opacity firms.

Table 5: Correlation Matrix

Variables	COD	OPACITY 1	BD	BI	BS	ROA	FCF	FS	CR	T'Q	PPE
COD	1.0000										
OPACITY 1	-0.0210	1.0000									
BD	-0.0293	-0.0840	1.0000								
BI	0.0445	-0.0646	0.2311	1.0000							
BS	-0.0448	-0.2200	0.0433	0.0547	1.0000						
ROA	-0.2061	0.0367	0.0539	-0.0979	-0.1071	1.0000					
FCF	-0.0880	-0.2434	0.0837	0.1357	0.3265	0.1044	1.0000				
FS	0.0422	-0.2816	0.1114	0.1718	0.4274	-0.2553	0.7791	1.0000			
CR	-0.0083	0.1575	-0.0693	-0.0778	-0.2564	0.2132	-0.1296	-0.2642	1.0000		
T'Q	-0.1630	0.1471	0.0138	-0.1478	-0.1921	0.5415	-0.0749	-0.4016	0.1928	1.0000	
PPE	0.0580	0.0136	0.0803	-0.0149	0.0904	-0.0247	-0.0438	-0.2365	-0.2365	-0.0904	1.0000

Notes: COD= cost of debt, RISK= Stock volatility, SPREAD= bid-ask spread, Shares Outstanding VOL= Trading Volume, ANAL= Tot analyst, BD= CEO Duality, BI= Board independent, BS= Board size, ROA= Return on assets, FCF= Free cash flow, FS= firm size, Total Assets, CR= Current Ratio, T'Q= Tobin's Q Ratio, PPE= Net property, plant, and equipment, OPACITY 1 et OPACITY 2= Corporate opacity firms.

Table 6: Correlation Matrix

Variable	Obs	Mean	Std. Dev.	Min	Max
COD	470	2.001984	.9121434	0	5.3323
RISK	449	.2801886	.4754675	.0215	4.911
SPREAD	378	.0550079	.0516259	.0121	.575
Shares Outstanding	467	848.5487	1498.164	31.0398	8668
VOL	449	13.12748	.5597847	9.623059	14.35568
ANAL	451	23.03104	8.874879	2	54
BI	466	76.08798	12.47344	33.333	100
BS	470	11.10638	2.217723	5	17
ROA	467	8.333281	6.589334	-19.5355	44.0807
FCF	471	2168.802	4359.583	-2340	31378
Total Assets	471	30487.17	47211.82	1089.432	257808
CR	461	2.189964	2.106927	.1749	19.0688
T'Q	460	2.444104	1.443796	.6784	11.2854
PPE	469	.2349529	.1943739	0	.8443278
OPACITY 1	376	.4850768	.1743741	.0555556	.9444444
OPACITY 2	376	-.1686225	1.117933	-4.017502	6.853088

Notes: COD= Cost of debt, BD= CEO Duality, BI= Board independent, BS= Board size, ROA= Return on assets, FCF= Free cash flow, FS= firm size, Total Assets, CR= Current Ratio, T'Q= Tobin's Q Ratio, PPE= Net property, plant, and equipment, OPACITY 1 et OPACITY 2= Corporate opacity firms.

Table 7: Means differences

Variables	Means differences	
	Z Wilcoxon	Prob
COD	3.276	0.0011

BI	15.433	0.0000
BS	-2.177	0.0295
ROA	-3.734	0.0002
FCF	-1.756	0.0790
CR	-2.497	0.0125
T'Q	-2.171	0.0299
FS	-0.027	0.9786
PPE	0.0000	0.6171
BD	7.041	0.0000
OPACITY 1	1.885	0.0594
OPACITY 2	2.888	0.0039

Notes: COD= Cost of debt, BD= CEO Duality, BI= Board independent, BS= Board size, ROA= Return on assets, FCF= Free cash flow, FS= firm size, Total Assets, CR= Current Ratio, T'Q= Tobin's Q Ratio, PPE= Net property, plant, and equipment, OPACITY 1 et OPACITY 2= Corporate opacity firms.

Panel A contains S&P 500 family and non-family firm descriptive statistics. Overall, family enterprises pay a much lower loan cost (2.001) than non-family firms (2.175) (p-value=0.001). Corporate opacity index is 0.485 for family enterprises and 0.498 for non-family firms. Difference is substantial (p=0.0594).

In comparison to non-family enterprises, family firms tend to be larger. The PPE ratio is lower for family enterprises as compared to non-family firms (0.234 versus 0.267). The cost of debt is typically cheaper for family businesses. While non-family enterprises have a lower current ratio (1.873), family firms have a higher ratio (2.189), suggesting that family firms may prefer a capital structure with less risk. Distinct from family businesses, non-profits operate autonomously (85.41 versus 76.08). Additionally, we discover that family businesses perform better than non-family businesses in terms of free cash flow (2168 versus 1849), return on assets (8.33 compared 7.20), and Tobin's Q. (2.44 versus 2.29).

Table 2 presents the correlation matrix. The firm's cost of debt is negatively correlated with the corporate opacity index, CEO duality, board size, firm performance (return on assets, free cash flow, and Tobin's q), and current ratio. However, it positively correlates with firm independence, size, and PPE ratio.

To summarize, family firms differ from non-family firms in their cost of debt, corporate opacity, firm size, performance, and internal corporate governance.

4. Empirical evidence

4.1. Impact of family control on the cost of debt

We construct the regression model to test our first hypothesis that family control enterprises have lower loan costs than non-family firms:

$$\text{Cost of debt}_i = \alpha + \beta_1 \text{family firm} + \beta_2 \text{opacity} + \beta_j \text{control variables} + \epsilon_i \quad \text{eq. (1)}$$

Government bond rates, a debt adjustment factor, the ratio of total debt to short-term and long-term debt, and the stock's effective tax rate are all factors that go into calculating the cost of debt (after taxes). Trading volume, analyst coverage, stock volatility, and the bid-ask spread make up corporate opacity, an index. The binary variable "family control" takes on the value 1 when a family member owns 5% or more of the business, and 0 otherwise (Table 8).

Table 8: Empirical results

Variables	(1) COD	(2) COD	(3) COD
fam	-0.177** (0.0849)	-	-
Fam* opacityindex	0.0970 (0.0885)	-	-

BI	0.00174 (0.00310)	0.00476 (0.00390)	-0.00400 (0.00573)
BS	-0.0445*** (0.0111)	-0.0335*** (0.0124)	-0.0864*** (0.0272)
FCF	-3.93e-05*** (8.29e-06)	-4.08e-05*** (1.08e-05)	-3.52e-05*** (1.09e-05)
CR	0.0407* (0.0219)	0.0469 (0.0329)	0.0257 (0.0334)
TQ	-0.00617 (0.0241)	0.00492 (0.0259)	-0.0594 (0.0421)
FS	0.237*** (0.0408)	0.218*** (0.0441)	0.245** (0.119)
CEO	-0.0637 (0.0498)	-0.0795 (0.0567)	-0.0284 (0.102)
PPE	-5.68e-06*** (1.24e-06)	-6.15e-06*** (1.54e-06)	1.47e-06 (7.28e-06)
opacityindex	0.0127 (0.0284)	0.0175 (0.0320)	0.0260 (0.0577)
Constant	0.188 (0.471)	-0.0384 (0.539)	1.004 (1.330)
Observations	1,869	1,500	369
Number of id	286	229	57

Notes: COD= Cost of debt, BD= CEO Duality, BI= Board independent, BS= Board size, ROA= Return on assets, FCF= Free cash flow, FS= firm size, Total Assets, CR= Current Ratio, T'Q= Tobin's Q Ratio, PPE= Net property, plant, and equipment, OPACITY 1 et OPACITY 2= Corporate opacity firms

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3 shows three outcomes. Regression findings for the entire sample are in Column 1. Non-family firm regression findings are in Column 2. Family firm regression findings are in Column 3. The family control coefficient is -0.151*. We discover that family control lowers a firm's debt cost. Anderson et al. [3] found the same. Despite disparities in investor protection and other institutions, family enterprises in China and the US may have cheaper financing costs.

However, Rey et al. [26] imply that family enterprises have greater debt costs than non-family firms. This mismatch prompts us to study other elements that may affect family control and a firm's debt cost.

4.2. Corporate opacity affects debt cost

To examine our second hypothesis that controlling families possess higher incentives to foster and exploit corporate opacity, we estimate the regression model as follows:

$$\text{Cost of debt} = \alpha + \beta_1 \text{ opacity} + \beta_j \text{ control variables} + \varepsilon_i \quad \text{eq. (2)}$$

We find a negatively significant association between a firm's cost of debt and corporate opacity index (-0.532***). This finding indicates that when firms are opaquer, they pay less of the firm's debt cost.

4.3. Company opacity and family control's impact on debt costs

Research has shown that long-standing majority shareholders tend to be less forthcoming with information when it comes to communicating with outside investors [16]; [18]. If business opacity is reasonably high, then family control should have a smaller negative impact on debt costs, we claim.

The regression model is estimated as follows to assess corporate opacity's moderating role:

$$\text{Cost of debt} = \alpha + \beta_1 \text{ family firm} + \beta_2 \text{ opacity} + \beta_3 \text{ family firm} * \text{opacity} + \beta_j \text{ control variables} + \epsilon_i \quad \text{eq. (3)}$$

We conclude that creditors can consider the names of family businesses a guaranteeing symbol. This implies that the opacity and the degree of concentration of family companies do not affect the level of the cost of debt.

4.4. Qualitative comparative analysis (QCA)

A novel method that compares situations using Boolean algebra is qualitative comparative analysis (QCA) [25]. One major benefit of the QCA over competing methods is its focus on causal setups.

As a bridge between qualitative and quantitative analysis, QCA aids in the identification of many cause combinations. The investigation of causal complexity is made possible by the sophisticated tools provided by QCA. Particularly in the fields of economics and trade, it works well for research designs with small to medium-sized N. these sources: [4] and [17].

Comparative configuration methods differ epistemologically from traditional quantitative approaches like regression analysis, claim Rihoux and Ragin [27]. Because they allow for two distinct but possibly complimentary ways of approaching the same research subject, epistemological distinctions are more of a strength than a weakness.

When dealing with complex and asymmetrical interactions, the constraints of multivariate analyses need to be overcome, which is why QCA is chosen [33]. Classical methods presume that causative circumstances are "independent" variables with linear and additive impacts on the result; in contrast, QCA is founded on the idea that causation is complicated. Because there is a geometric relationship between the number of causal conditions and the number of possible causal combinations, complicated truth tables might include many rows representing different possibilities. With k being the number of causal conditions, the number of causal combinations is 2^k .

Therefore, to present the outcomes of the fsQCA, we estimate the following equation:

$$\text{COD}_{\text{fct}} = f(\text{Fam}, \text{opacity index}, \text{firm size}, \text{Tobin's } q, \text{ppe}) \quad \text{eq. (4)}$$

Eq. (4) associated the cost of debt with family control, corporate opacity, firm size, Tobin's Q, and net property, plant, and equipment. We noted:

- Y: cost of debt
- F: family control
- S: firm size
- T: Tobin's Q
- P: net property, plant, and equipment
- X: corporate opacity index

Table 9: Intermediate solution

Set	Raw Coverage	Unique Coverage	Solution Consistency
f*S*t*P*X	0.324	0.324	0.849

Notes: Y: cost of debt, F: family control, S: firm size, T: Tobin's Q, P: net property, plant, and equipment, X: corporate opacity index.

Table 4 shows the intermediate solution. The solution term in the truth table 4 presents the relationship between sets of conditions and the outcome (Table 9).

Corroborating within random regression, family control is associated with a lower firm's cost of debt when firms are opaquer and they pay fewer firms' cost of debt. There is no significant effect of the relationship between family control and corporate opacity on the cost of debt. However, using fsQCA, we find in the context of large companies that a higher cost of debt combined with a higher corporate opacity, low controlling families, a higher PPE, and a low Tobin's Q.

We conclude that, although companies are large and have a higher PPE, if they are opaquer, they pay a higher cost of debt in the case of firms less controlled by family members.

Qualitative comparative analysis (QCA) examines how all Boolean conditions affect an outcome. Our research yields Y and predictors F, S, T, P, and X. QCA finds the most likely F, S, T, P, and X pairings to generate Y.

According to the QCA, the capital letter indicates the robust presence of the variable, and the lowercase letter indicates the poor presence of the variable.

5. Conclusion

The purpose of this study was to evaluate the influence that family control plays in the cost of debt for the company. Additionally, this study produced some significant contributions to the literature on corporate governance and family businesses. The inquiry began by enhancing our comprehension of the relationship between the opacity of corporations and the control exercised by families over the cost of debt incurred by the company in the setting of the United States. In the second step of our process, we employ an aggregate assessment of a company's cost of debt. This measurement is derived by utilising the rate of the government bond, a debt adjustment, the proportions of short-term and long-term debt to total debt, and the effective tax rate of the stock. In addition, we utilised a variety of methods in order to enhance the robustness of the results, and we highlighted the limits of both inside and random regression analysis. Taking into consideration the findings, it appears that the fsQCA method offers more profound empirical knowledge. With the help of fsQCA, we discover that in the context of large corporations, a higher cost of debt in conjunction with a greater corporate opacity, low controlling families, a larger PPE, and a low Tobin's Q are all associated with a better financial performance.

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