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Cost of debt and corporate information transparency under economic depression: the case of Greek family-controlled firms

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Abstract

Research Question: This study investigates whether corporate information opacity affects the association between family ownership and cost of capital. ***Motivation:*** Firms' ownership structure has been identified as a major factor that affects their cost of capital. ***Idea:*** Corporate transparency affects the impact of ownership structure upon firms' cost of capital, especially in the case of family-controlled firms ***Data:*** We examine a sample of companies listed in the Athens Stock Market for the period of 2009-2016. ***Tools:*** We compose a Corporate Opacity Index for each sample firm by adopting the Anderson et al. (2009) approach. Additionally, accounting factors such as firms' size, leverage, profitability and corporate governance characteristics that may affect the above-mentioned association are examined as well. Sensitivity tests have been conducted to check the robustness of the results. ***Findings:*** Family ownership and corporate opacity are only marginally related with firms' cost of capital. Firms' size, liquidity and their leverage appear to be inversely associated with their cost of debt capital. ***Contributions:*** The findings of this study provide insights regarding the impact that corporate transparency has upon cost of debt capital, allowing financial institutions, regulators and market participants to design improved debt contracts under economic depression. Our study sheds light to the impact of information opacity on the association between family ownership and cost of capital within the business environment of Greece that possesses certain structural characteristics in the context of economic crisis.

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1. Introduction

The impact of family ownership on the shareholder–debt holder agency cost of debt has been the subject of wide discussion (e.g., Anderson *et al.*, 2003; Boubakri & Ghouma, 2010; Ellul *et al.*, 2007; Lin *et al.*, 2011; Ma *et al.*, 2015). Previous studies have provided mixed evidence regarding the association between family ownership and firms' cost of debt (Jensen & Meckling, 1976; Johnson *et al.*, 2000; Anderson *et al.*, 2003; Ellul *et al.*, 2007; Djankov *et al.*, 2008; Fahlenbrach, 2009; Achleitner *et al.*, 2014). This paper investigates the impact that corporate transparency has upon the cost of debt of family-controlled firms. In particular, we focus on corporate information opacity, a factor that is supposed to influence the extent of agency conflicts between firms' managers, equity holders and creditors (Jensen *and* Meckling, 1976; Smith *and* Warner, 1979; Bushman *and* Smith, 2001; Bushman *et al.*, 2004; Sheraz, 2015). The perceived information asymmetry that exists between controlling family shareholders and outside investors may lead to an increase in corporate information opacity and as a consequence an increase in cost of debt (Myers & Majluf, 1984; La Porta *et al.*, 2000; Ma *et al.*, 2015).

We investigate these issues within the business environment of Greece. The Greek context offers a particular generous environment for such a study. In Greece, as in other European countries (e.g. France, Italy) many listed firms are characterized by a high degree of ownership concentration (Nobes & Parker, 2000), while a substantial proportion of listed firms can be identified as family controlled (Ballas & Tzovas, 2010). Bank loans constitute a major source of financing for most Greek firms (Bellas & Tzovas, 2008). Greece has been classified as a code-law country with low protection of investors and creditors' rights (Chalevas & Tzovas, 2010; Ballas & Tzovas, 2010). Furthermore, certain characteristics of Greek culture may prompt Greek firms to prefer confidentiality over transparency (Ballas, 1998; Ballas & Tzovas, 2010).

Our sample consists of 130 firms listed at the Athens Stock Exchange in the period 2009-2016. We compose a Corporate Opacity Index for each sample firm by adopting the Anderson et al. (2009) approach. We control for sample firms' size, leverage, profitability and corporate governance characteristics. Our findings indicate that family ownership and corporate opacity are only marginally related with firms' cost of capital. The size of borrowing firms appears to be inversely associated with their cost of debt capital. In addition, firms' liquidity and leverage

reduce cost of debt. Larger companies may benefit from more favorable borrowing terms due to the easier access they may have to capital markets and the long-lasting relations they may have developed with financial institutions.

The findings of this study contribute to the existing literature concerning the impact that ownership structure in general and family ownership in particular, has upon firm's cost of capital. We provide insights regarding the impact that corporate transparency may have upon this cost. The potential significance of the findings of this study is enhanced by the fact that it is conducted within the business environment of Greece that possesses certain structural characteristics. Importantly, this study allows us to examine the above issues under the prism of economic crisis. Greece has experienced a prolonged period of debt crisis that may have influenced the policies of financial institutions and corporations alike. Thus, this study allows us to investigate whether the findings of previous research with relevance to the factors that affect financing cost apply to Greece during the economic crisis. The fact that many European countries have experienced debt crisis, while their business environment possess characteristics similar to the attributes of the business environment of Greece, means that the findings of the present study can be generalized.

The remainder of this paper is organized as follows. Section 2 presents basic characteristics of the Greek business environment. Section 3 discusses the hypotheses regarding the association between family ownership and cost of debt within the context of corporate opacity. Section 4 describes our sample and methodology. In section 5 we discuss the empirical results of our model. In Section 6 we conduct additional tests to check the robustness of our results while Section 7 presents our conclusions.

2. The Greek business environment

Traditionally, the ownership structure of most Greek firms is highly concentrated, particularly in the form of family ownership (Tzovas, 2005; Tsalavoutas *et al.*, 2012). In most cases, the owners are actively involved in their firms' management by occupying important posts within firms' organization structure (Sykianakis, 2004; Tzovas, 2006). Managers communicate information directly to their superior owner-managers without having to rely upon publicly disclosed information. Despite the increased role of equity funds, derived mainly through Athens Stock Exchange, banks continue to be one of the main providers of funds of Greek companies. Banks have developed close and long-lasting relationships with companies (Tzovas, 2006). Larger corporations are supposed to enjoy significant political benefits in the form, among others, of easier access to credit capital (Bellas & Tzovas, 2008). Greece is considered as a code-law country with low

protection of investors and creditors' rights (Chalevas & Tzovas, 2010; Ballas & Tzovas, 2010; Tsalavoutas *et al.*, 2012). In fact, poor legal protection of investors appears to be associated with high ownership concentration (La Porta *et al.*, 1998). Certain aspects of the Greek culture may influence the behavior of Greek firms. Greece is considered to be a low trust society with a strong element of individualism, while large power distances and uncertainty avoidance characterize Greek society (Ballas *et al.*, 1998). The impact of these factors means that Greek firms are more likely to prefer confidentiality over transparency (Ballas & Tzovas, 2010). Confidentiality may have an impact upon the level of firms' information disclosure (Alexander *et al.*, 2011).

The above mentioned factors are not usually associated with high quality published financial statements (Nobes & Parker, 2000). In fact, Leuz et al. (2003) show that Greek firms engage in some of the most extreme earnings management practices in the world. Bhattacharya et al. (2003) provide similar evidence, since in their study Greek firms are the most engaged in earnings management among firms from 34 countries. Despite the fact that Greek listed companies have the legal obligation to adopt certain corporate governance mechanisms (Law 3016/2002) and to implement (Law 3229/2004) International Financial Reporting Standards (IFRS hereinafter), more recent evidence suggests that Greek firms continue to manipulate their earnings (Kapoutsou *et al.*, 2015; Papadaki & Tzovas, 2017).

3. Literature review and hypotheses development

The ownership structure of a firm is supposed to be one of its characteristics that is associated with the cost of its debt capital (Anderson *et al.*, 2003). Previous analysis has been inconclusive regarding the impact that family ownership can have upon firms' cost of debt. Due to the dominant position that a controlling family holds in a firm, it is likely to take advantage of its position at the expense of the interests of other shareholders and creditors (Jensen & Meckling, 1976; Johnson *et al.*, 2000; Ellul *et al.*, 2007; Djakov *et al.*, 2008). In this case there is a direct association between family ownership and firms' cost of debt (Ma *et al.*, 2015). On the other hand, it is maintained that controlling families have an interest in the long-term survival of their firms. As a consequence, family controlled firms are more likely to adopt a long-term and low risk approach (Anderson *et al.*, 2003; Fahlenbrach, 2009; Achleitnere *et al.*, 2014; Muttakin *et al*, 2014; Ma *et al.*, 2015). Within this context family ownership is expected to reduce firm's cost of debt. Taking into account the above controversial findings we cannot predict in advance the impact that family ownership may have upon firm's cost. Therefore we test the following hypothesis:

H1. *Cost of debt capital is associated with the proportion of family ownership*

The impact that family ownership has upon cost of debt can be conditioned upon a number of factors. Environmental factors such as investor protection can affect the cost of debt for a family firm (Sheraz, 2015). Family firms in countries with high investor protection benefit from lower cost of debt, while in low investor protection countries they may face high debt costs (Ellul *et al.*, 2007). As mentioned earlier Greece is supposed to be a low investor protection country.

A factor that may affect the impact of family ownership on cost of debt is the corporate information opacity perceived to be related with family ownership. The provision of accounting information can reduce the agency costs that may arise between managers, creditors and shareholders (Smith & Warner, 1979; Watts & Zimmerman, 1986; Bushman & Smith, 2001). The use of accounting data in firm's negotiations with the providers of credit capital, and the inclusion of accounting numbers-based terms in the debt agreements indicates that accounting information plays an important role in negotiating debt agreements (Wolfson, 1993; Cloyd *et al.*, 1996; Tzovas, 2001). Transparent corporate information allows creditors to asses firms' credit-worthiness. Besides, accounting information provides the opportunity to borrowing firms and providers of credit capital to design efficient debt covenants that alleviate agency costs between firms and creditors (Armstrong *et al.*, 2010; Ma *et al.*, 2013). Consequently, transparent corporate information reduces credit risk and therefore cost of debt. Conversely, increased corporate information opacity may increase firm's cost of debt as well. Creditors will demand higher return for the investment in order to cover the higher cost of debt contraction (Ma *et al.*, 2015).

The impact that corporate information opacity has upon the cost of debt of family controlled firms is conditioned, among others, upon creditors' perceptions regarding the motives of controlling families. When creditors believe that their interests are aligned with those of controlling family they will be less concerned about the provision of transparent information (Ma *et al.*, 2015). As a consequence, corporate opacity does not significantly affect firms' cost of debt. However, if creditors believe that controlling family is likely to exploit its dominant position at the expense of creditors' interests, they will perceive that corporate information is more opaque and less credible (Leuz *et al.*, 2003). In this case, corporate opacity will increase cost of debt, since creditors will require higher returns for their investment (Armstrong *et al.*, 2010; Ma *et al.*, 2013). Due to the fact that we cannot make a priori prediction about the impact of corporate information opacity upon the association of cost of capital and family ownership, we test the following hypothesis:

H2. *Corporate opacity affects the association between cost of capital and family ownership.*

4. Data and methodology

4.1 Sample

Our sample consists of 1.040 annual observations regarding 130 firms listed in the Athens Stock Exchange for the period 2009 to 2016. Our initial sample consisted of total number of companies listed in Athens Stock Exchange. We excluded all companies from banking, insurance, and real estate sectors. Also, we excluded all companies with missing accounting or governance data and we finally ended up with sample of 130 companies. All public entities domiciled in the European Union were required to prepare group accounts in accordance to IFRS from the 1st January 2005. Thus, all firms in our sample report their financial statements under a uniform accounting framework (IFRS). Table1 presents the companies' distribution across industry sectors. In order to collect quantitative data, Thomson Reuters' DataStream data base was used. Qualitative data was derived from the Athens Stock Market website and the website of Naftemporiki newspaper.

Table 1. Companies' distribution across industry sectors

Sector	No. of observations
Beverages	1
Chemicals	4
Construction and Materials	17
Electricity	1
Fixed Line Telecommunications	1
Food Producers	14
General Industrials	6
General Retailers	7
Health Care Equipment and Services	4
Household Goods and Home Construction	9
Industrial Engineering	3
Industrial Metals and Mining	9
Leisure Goods	1
Media	4
Oil and Gas Producers	2
Personal Goods	13
Pharmaceuticals and Biotechnology	1
Software and Computer Services	10
Total	***130***

4.2 Model specification

Our research proceeded in two stages. In the first stage, we examined whether family ownership affects firm's cost of debt. In the second stage we investigated whether corporate opacity affects the association between cost of capital and family ownership. In order to test our hypotheses we estimated the following ordinary least square regression model derived from Ma et al. (2015):

$$COSTOFDEBT = a + b_1 FAMOWN + b_2 FAMOWN*OPACITY + b_3 OPACITY + b_4 PERSONAL + b_5 PERSONAL*OPACITY + b_6 MULTIFOUNDER + b_7 MULTIFOUNDER*OPACITY + \Sigma b_j \ Control\ Variable + \Sigma b_t \ Year\ Dummy + e \quad (1)$$

Where:

Dependent variables	**Description**
COSTOFDEBT	Interest expense for the year divided by the average of short-term and long-term debt during the year
Key independent variables:	
FAMOWN	The fractional equity ownership by the family if a firm is classified as a family firm; zero for all nonfamily firms
OPACITY	An opacity index constructed to measure corporate information opacity. The opacity index ranks four components, *trading volume*, *analyst coverage*, *zero-return trading days*, and *stock return volatility* in deciles (from 0 to 9) and divides the sum of the four components by 36, resulting in an opacity index between 0 and 1. A higher value of opacity index indicates that a firm's information is more opaque
Control variables	
Borrowing firm characteristics:	
SIZE	The natural logarithm of total assets
PPE	Net property, plant, and equipment divided by total assets
DEBTRATIO	The sum of short-term and long-term debt divided by total assets
CURRENTRATIO	Current assets divided by current liabilities
CF	Operating cash flow divided by total assets
ROA	Earnings before interest and taxes (EBIT) divided by total assets
GROWTH	Total sales revenues in the current year minus total sales revenues in last year divided by total sales revenues in the last year

Dependent variables	Description
NEGEQ	A dummy variable that equals 1 if the firm reports negative equity; zero otherwise
BOARDSIZE	The natural logarithm of the total number of directors on the board
OUTDIR	The number of outside directors divided by total number of board directors
Instrumental variables:	
PERSONAL	A dummy variable that equals 1 if the name of the firm at the time of IPO contains (part of) personal name(s) related to the founder(s)
MULTIFOUNDER	A dummy variable that equals 1 if the firm has more than one founder

In order to investigate whether information opacity affects the impact that family ownership has upon cost of debt we estimated our model for two sample clusters. First cluster consists of low-opacity firms, which are defined as those for which opacity index is below median. The second cluster includes the high-opacity firms, which are defined as those for which opacity-index is above median. If the estimated coefficient for variable *FAMOWN* is significantly different, it can be inferred that corporate opacity affects the impact that family ownership has upon firm's cost of debt. In the following sections we elaborate upon the main variables of the models.

4.2.1 Dependent variable

Following the approach adopted in previous studies (Pittman & Fortin, 2004; Kim *et al.*, 2011; Sanchez-Ballesta & Garcia-Meca, 2011; Ma *et al.*, 2015) we measure firm's cost of debt as firm's interest expense for the year divided by the average short-term and long-term debt during the year.

4.2.2 Independent variables

Family Ownership

A number of definitions of family controlled firms have been provide in the literature (see, Prencipe *et al.*, 2014; Ma *et al.*, 2015). As in prior studies (Fan & Wong, 2002; Dyck & Zingales, 2004; Tzovas, 2005; Prencipe *et al.*, 2014; Ma *et al.*, 2015) we define a firm as a family controlled on the basis of the percentage of firm's share capital controlled by family members. Most studies classify a firm as family controlled one, when family members own more than 5% or 10 % of firm's share capital. Given the high concentration of Greek firms' ownership, we adopted a higher threshold in the study. In particular, we use a dummy variable (FAMOWN) to denote a family firm. The dummy variable takes the value 1 (one), when family members directly or indirectly possess a percentage of more than 30%

of the company's share capital. Otherwise the dummy variable takes value 0 (zero). In the model we introduce an interaction term between corporate opacity and family ownership, FAMOWN*OPACITY. This term measures the impact that corporate opacity may have upon the association between cost of capital and family ownership. For instance, in case that corporate opacity increases, the inversely association between family ownership and firm's cost of debt becomes weaker. Conversely, the inversely association between family ownership and firm's cost of debt becomes stronger when corporate opacity decreases.

Corporate Opacity

We compose the corporate opacity index, on the basis of the model proposed by Anderson et al. (2009). The factors included in the index are: zero-return trading days' ratio, daily return volatility, average daily trading volume. Anderson's model includes an additional factor: the number of equity analysts following a firm. We have not included this factor in our index due to the lack of available data. The underlying assumption for this index is that there is a direct association between trading volume and information transparency. That is investors are more willing to participate in transactions when less information asymmetry is present (Ma *et al.*, 2015).

The components of the index were calculated as follows:

- *Zero-return trading days over the year*. Initially, the daily stock returns were calculated. Subsequently, the number of zero-return trading days was determined. In order to calculate the relative index, the zero-return trading days' number was divided by the sum of trading days of each share in Athens Stock Exchange. Prior research (Lesmond *et al.*, 1999; Bekaert *et al.*, 2007) suggests that rate of zero daily return is a measure of liquidity that captures the value of information signals in relation to the trading costs.

- *Stock return volatility.* For the calculation of volatility, the standard deviation of daily stock returns (dividend adjusted) during the year was estimated. Lang and Lundholm (1993) argue that stock price volatility is negatively associated with information asymmetry between investors and the firm.

- *Trading volume.* For the calculation of trading volume we divided the average daily number of shares traded by the average total number of shares outstanding during the year. Leuz and Verrecchia (2000) suggest that trading volume is an inverse proxy for corporate information opacity.

Subsequently, we construct a corporate opacity index for each firm-year observation of our sample. In order to compose the corporate opacity index, we initially calculate the three individual components of opacity for each firm-year observation of our sample. We then rank each of these three components into deciles, with a value of 0 representing the least opaque firms' value and the value of 9 representing the most opaque firms. The sum of the above three components is divided by a factor of 27, being the maximum possible value. As a result of this process we have for each firm-year observation a corporate opacity index that ranges from 0 to 1, with higher values indicating greater information opacity.

4.2.3. Control variables

In order to control for other factors that may affect firm's cost of debt we include in our model a set of firm characteristics as control variables. These control variables include: firm's size, the ratio of fixed assets to total assets (*PPE*), the ratio of debt to total assets (*DEBT RATIO*), the ratio of current assets to current liabilities (*CURRENT RATIO*), operating cash flow divided by total assets (*CASH FLOW*), return on assets (*ROA*), sales growth (*GROWTH*), a dummy variable indicating negative equity *(NEGEQ)*, board size *(BOARDSIZE)*, and the ratio of outside directors to the total number of directors *(OUTDIR)*. Also, we use dummy variables to control for the cases that the name of the founder exists in the name of a family firm (*PERSONAL*) and also for the firm's ownership state in the context of the founders number (*MULTIFOUNDER*). The year effect is controlled by dummy variable which takes the value one (1) for each individual year it applies and zero (0) otherwise. Descriptions of the variables are detailed in pages 5 and 6.

4.2.4 Control for endogeneity

In order to control for possible endogeneity of our model we include in the model the variables *PERSONAL*OPACITY* and *MULTIFOUNDER*OPACITY* (the variables are described in pages 5 and 6). Previous research has shown that a firm is more likely to remain family controlled when the personal name(s) of the founder(s) is included in the name of the firm at the time of the Initial Public Offering (IPO) and when a firm has more than one founder from different families (Adams *et al.*, 2009; Fahlenbrach, 2009). We multiply the above mentioned dummy variables with opacity index (exogenous variable) in order to highlight the impact between family ownership and corporate opacity.

5. Results

5.1 Descriptive statistics

Table 2 presents the distribution of family and non-family firms per year. The proportion of family firms increases from 66.15% in 2009 to 68.46% in 2016. It seems that the high level of family ownership is a persistent characteristic of the Greek business environment (Ballas & Tzovas, 2010).

Table 2. Family and non-family firms distribution

Year	Total	Family Companies	Non-family Companies	Family companies rate
2009	130	86	44	66.15%
2010	130	84	46	64.61%
2011	130	83	47	63.84%
2012	130	83	47	63.84%
2013	130	87	43	66.92%
2014	130	88	42	67.69%
2015	130	89	41	68.46%
2016	130	89	41	68.46%

Note: The table presents family companies per year. A company is defined as family company when the family ownership rate is more than 30%

Table 3 reports the descriptive statistics, analyzed by family and non-family samples. In order to investigate whether there is a statistically significant difference between the two groups (family versus non-family firms) we apply the Mann-Whitney-Wilcox test for medians. The corporate opacity index of family firms appear to be significantly higher comparing to the corporate opacity index of the non-family firms, implying that family firm may provide less transparent information. It should be noted that family firms appear to have smaller board of directors and smaller proportion of outside directors. These two characteristics of the board of directors are usually related with lower information transparency (Peasnel *et al.*, 2005; Cornett *et al.*, 2009). These results may suggest that there is information asymmetry between controlling family and other investors that leads to increased information opacity. However, that possible information opacity does not seem to increase cost of debt for family-controlled sample firms. The cost of debt of the family and non-family controlled firms are not significantly different. Thus, principally no evidence in support of Hypothesis 1 is provided.

It is more likely that the name of the founder appears in the name of a family firm, while the non-family firms are more likely to have more than one founder. Family firms appear to be more liquid (*CURRENTRATIO*) and smaller (*SIZE*), despite the fact they exhibit a higher ratio of investment in property plant and equipment (*PPE*).

Table 3. Descriptive statistics

	Total		Family Companies		Non-family Companies		T-test
Variables	***median***	***Standard deviation***	***median***	***Standard deviation***	***median***	***Standard deviation***	
COSTOFDEBT	0.1195	0.0379	0.1196	0.3784	0.1194	0.0382	(-0.076)
OPACITY	0.4500	0.1990	0.4889	0.1777	0.3735	0.1904	(9.661)***
SIZE	4.9940	0.5603	4.8779	0.4940	5.2224	0.6110	(9.781)***
PPE	0.3805	0.1846	0.3905	0.1746	0.3608	0.2016	(-2.453)**
DEBTRATIO	0.3759	0.1969	0.3770	0.2027	0.3737	0.1852	(-0.249)
CURRENTRATIO	1.3588	0.6305	1.3794	0.6500	1.3175	0.5877	(-1.487)
CF	0.0338	0.0488	0.0348	0.4860	0.0318	0.4939	(-0.953)
ROA	0.0100	0.5070	0.0098	0.0507	0.0105	0.0491	(0.184)
GROWTH	-0.036	0.1520	-0.033	0.1483	-0.041	0.1593	(-0.778)
BOARDSIZE	0.8661	0.1030	0.8466	0.0969	0.9094	0.1040	(8.837)***
OUTDIR	0.5702	0.1197	0.5669	0.1154	0.5771	0.1276	(1.336)
NEGEQ	0.0846	0.2784	0.0753	0.2689	0.0968	0.2961	(1.013)
MULTIFOUNDER	0.4538	0.4981	0.3570	0.4794	0.6438	0.4795	(9.122)***
PERSONAL	0.3307	0.4707	0.4179	0.4935	0.1595	0.3667	(-8.662)***

The table presents descriptive statistics, for pool sample and the clusters for family and non-family companies. The last column shows the t-test of the differences between the averages of family and non-family companies. Level of significance is based on *p*-values using the two-tailed t-test for mean (Mann-Whitney-Wilcoxon test for median). *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

5.2 Regression results

Table 4 presents the results of the multivariate analysis regarding the association between family ownership and cost of debt under two different transparency regimes of information (Low – opacity firms and High – opacity firms). The results indicate that 18.8% of cost of debt variability of low-opacity firms is explained by our model, while the corresponding percentage for high-opacity firms is 25.8%. Further, F-stat is 7.65 for low-opacity firms cluster and 10.67 for high-opacity firms cluster both values significant at 0.01 level.

Family ownership appears to be marginally related to the cost of debt of less opaque companies. In particular, for less opaque firms as family ownership increases the cost of debt of increases as well. These results provide weak support for H1. However, in the case of low opacity companies the variable *FAMOWN*OPACITY* is negative and marginally significant (coef=-0.067, t-test=-1.72). The negative sign of the coefficient implies that as corporate opacity decreases, the direct association between family ownership and cost of debt becomes weaker. These results provide support for H2 that the impact of family ownership on the cost of debt is affected by corporate opacity at least for the low-opacity firms.

Table 4. OLS Regression of Cost of Debt on Family Ownership for Low and High Opacity firms

	Low-opacity firms		High-opacity firms
FAMOWN	0.024*	**FAMOWN**	-0.025
	(1.808)		(-1.548)
FAMOWN*OPACITY	-0.067*	**FAMOWN*OPACITY**	0.044
	(-1.721)		(1.607)
OPACITY	0.002	**OPACITY**	-0.028
	(0.076)		(-1.030)
SIZE	-0.014***	**SIZE**	-0.024***
	(-3.898)		(-4.232)
PPE	-0.019*	**PPE**	-0.013
	(-1.726)		(-1.052)
DEBTRATIO	-0.037***	**DEBTRATIO**	-0.044***
	(-3.265)		(-3.804)
CURRENTRATIO	-0.011***	**CURRENTRATIO**	-0.017***
	(-2.846)		(-5.167)
CF	0.006	**CF**	0.067*
	(0.139)		(1.812)
ROA	0.001	**ROA**	0.081*
	(0.011)		(1.962)
GROWTH	-0.021*	**GROWTH**	-0.008
	(-1.761)		(-0.620)
BOARDSIZE	0.022	**BOARDSIZE**	0.008
	(1.093)		(0.397)
OUTDIR	0.061***	**OUTDIR**	-0.017
	(4.300)		(-1.241)
NEQEG	0.001	**NEQEG**	-0.004
	(0.083)		(-0.578)
PERSONAL*OPACITY	0.008	**PERSONAL*OPACITY**	-0.036
	(0.150)		(-1.565)
MULTIFOUNDER * OPACITY	0.029	**MULTIFOUNDER * OPACITY**	-0.032
	(0.782)		(-1.140)
PERSONAL	-0.004	**PERSONAL**	0.017
	(-0.221)		(1.268)
MULTIFOUNDER	0.001	**MULTIFOUNDER**	0.010
	(0.109)		(0.644)
Constant	0.164***	**Constant**	0.299***
	(5.973)		(9.896)
YEAR DUMMIES	YES	**YEAR DUMMIES**	YES
Obs	502	**Obs**	453
F-statistic	7.652	**F-statistic**	10.673
Prob (F-statistic)	0.000***	**Prob (F-statistic)**	0.000***
Adjusted R-squared	0.188	**Adjusted R-squared**	0.258

t-values in parentheses calculated from the heteroscedastic corrected standard errors, (White, 1980).
The variables are defined in Table 1.
* Significant at the 0.10 level.
** Significant at the 0.05 level.
*** Significant at the 0.01 level.

A significant negative association exists between firms' size and their cost of debt. This applies for both low-opacity (coef=-0.014, t-test=-3.90) and the high-opacity firms (coef=-0.024, t-test=-4.23). Larger firms appear to have easier access to debt financing. Further, it is likely that the providers of debt financing assign greater importance on firm's size as a criterion of credit worthiness, rather than the quality of the information being provided. Similarly, a negative association exists between sample firms' investment in plant and equipment (PPE) and their cost of debt. The association is marginally significant only for low-opacity firms (coef=-0.009, t-test=-1.73). Current ratio, as an indicator of firm's liquidity, is negatively associated with cost of debt. This association is significant for low-opacity firms (coef = -0.011, t-test=-2.85) and high-opacity firms (coef=-0.017, t-test=-5.17) alike. Firms' liquidity may be perceived by creditors as an indicator of firms' ability to repay their debts. The inverse effect that firms' liquidity and value of fixed tangible assets have on firms cost of debt suggest that the providers of debt capital consider these two factors as significant indicators of firms' credit worthiness.

The relation between cost of debt and leverage is negative and statistically significant for the low-opacity firms (coef=-0.037, t-test=-3.27) and for the high-opacity firms (coef=-0.044, t-test=-3.80) alike. This finding indicates that high borrowing may create long lasting relations between the creditor and the borrowing entity. As a consequence, as the borrowing increases, the cost of debt falls. Pittman and Fortin (2004) argue that, when firms have developed long-lasting relation with banks, confidence between contracting parties increases and thus information asymmetry is reduced. As a consequence cost of debt declines.

The relation between cost of debt and the number of outside members of the board of directors appears with the same sign. The outside directors' role, among others, is to promote corporate transparency, reduce information asymmetry and agency costs. The observed relationship is statistically significant only for the cluster of the low opacity firms (coef=0.061, t-test=4.30). It appears that creditors assign importance to the role of outside directors only in the case of low-opacity firms. For low-opacity forms, outside directors seem to reveal information that raises red flags for the creditors.

Collinearity diagnostics were also developed. The coefficients in the correlation matrices (Table 5a, 5b) which fluctuate between -0.7 and 0.7 (Tabachnick & Fidell, 1996) indicate the lack of multilicolinearity in the calculated models.

Table 5a. Spearman's rho Correlation matrix among the variables of the study for the family firms

	COST OF DEBT	OPACITY	SIZE	PPE	DEBT RATIO	CURRENT RATIO	CF	ROA	GROWTH	BOARD SIZE	OUTDIR	NEGEQ	PERSONAL* OPACITY	MULTIFOUNDER* OPACITY
COSTOFDEBT	1.000													
OPACITY	-0.063	1.000												
SIZE	-0.176***	-0.280***	1.000											
PPE	-0.128***	0.141***	0.195***	1.000										
DEBTRATIO	-0.102***	0.111***	0.110***	0.124***	1.000									
CURRENTRATIO	-0.145***	-0.093**	-0.171***	-0.287***	-0.555***	1.000								
CF	0.072*	-0.110***	0.054	-0.205***	-0.246***	0.218***	1.000							
ROA	-0.028	-0.135***	0.230***	-0.205***	-0.268***	0.295***	0.446***	1.000						
GROWTH	0.039	-0.078*	0.087**	0.009	-0.095**	0.071*	0.032	0.369***	1.000					
BOARDSIZE	-0.018	-0.202***	0.453***	-0.093**	0.011	0.006	0.048	0.071*	0.042	1.000				
OUTDIR	0.133***	0.108***	-0.047	-0.180***	0.113***	-0.182***	-0.018	-0.081**	0.065	-0.099**	1.000			
NEGEQ	0.031	0.114***	-0.002	0.039	0.424***	-0.304***	-0.201***	-0.260***	-0.086**	-0.075*	0.071*	1.000		
PERSONAL* OPACITY	-0.054	0.442***	-0.212***	0.242***	0.228***	-0.082**	-0.134***	-0.167***	-0.077*	-0.168***	0.007	0.185***	1.000	
MULTIFOUNDER *OPACITY	-0.052	0.134***	0.046	0.093**	0.089**	-0.094**	-0.031	-0.077*	0.014	0.072*	-0.026	0.020	-0.082**	1.000

The variables are defined in Table 1
* Correlation is significant at the 0.10 level (2-tailed).
** Correlation is significant at the 0.05 level (2-tailed).
*** Correlation is significant at the 0.01 level (2-tailed).

Table 5b. Spearman's rho Correlation matrix among the variables of the study for the non-family firms

	COST OF DEBT	OPACITY	SIZE	PPE	DEBT RATIO	CURRENTRATIO	CF	ROA	GROWTH	BOARD SIZE	OUTDIR	NEGEQ	PERSONAL * OPACITY	MULTIFOUNDER *OPACITY
COST OF DEBT	1.000													
OPACITY	-0.059	1.000												
SIZE	-0.228***	-0.483***	1.000											
PPE	-0.133**	0.164***	0.127**	1.000										
DEBTRATIO	-0.170***	0.152***	0.125**	0.163***	1.000									
CURRENTRATIO	0.002	0.031	-0.050	-0.141**	-0.409***	1.000								
CF	-0.053	-0.079	0.294***	0.008	-0.144***	0.178***	1.000							
ROA	-0.072	-0.104*	0.320***	-0.056	-0.177***	0.325***	0.434***	1.000						
GROWTH	-0.103*	-0.161***	0.165***	-0.009	-0.063	0.067	-0.005	0.270***	1.000					
BOARDSIZE	-0.090	-0.248***	0.549***	0.087	0.048	-0.103*	0.218***	0.288***	-0.035	1.000				
OUTDIR	0.036	-0.081	0.025	-0.223***	0.245***	-0.366***	-0.009	-0.023	-0.034	-0.014	1.000			
NEGEQ	0.036	0.020	-0.131**	-0.074	0.351***	-0.332***	-0.124**	-0.263***	0.011	-0.211***	0.230***	1.000		
PERSONAL* OPACITY	-0.086	0.318***	-0.125**	0.294***	-0.151***	-0.040	-0.036	-0.038	-0.068	-0.095*	-0.109**	-0.130**	1.000	
MULTIFOUNDER *OPACITY	0.053	0.388***	-0.291***	-0.171***	0.197***	-0.046	-0.130**	-0.012	0.005	-0.034	0.045	-0.110**	-0.015	1.000

The variables are defined in Table 1
* Correlation is significant at the 0.10 level (2-tailed).
** Correlation is significant at the 0.05 level (2-tailed).
*** Correlation is significant at the 0.01 level (2-tailed).

6. Sensitivity tests

We examine the joint determination of family ownership and cost of debt, because founding families are more willing to control their firms when they can borrow at low cost. Following Ma et al. (2015) to address for possible endogeneity problem the following simultaneous equation system of family ownership and cost of debt is estimated:

$$FAMOWN = a + b_1\ COST\ OF\ DEBT + b_2\ PERSONAL + b_3\ PERSONAL * OPACITY + b_4\ MULTIFOUNDER + b_5\ MULTIFOUNDER * OPACITY + \Sigma bt\ Year\ Dummy + e$$

$$COST\ OF\ DEBT = a + b_1\ FAMOWN + b_2\ FAMOWN * OPACITY + b_3\ OPACITY + \Sigma b_j\ Control\ Variable + \Sigma b_t\ Year\ Dummy + e \quad (2)$$

The results presented in Appendix Table 1 do not differ significantly between two-stage least squares (2SLS) and OLS analyses.

For the calculation of the corporate opacity index, the Anderson et al. (2009) approach was adopted. Given that the components of our corporate opacity index are solely based on stock-market data, such index may be characterized more as liquidity index, rather than corporate opacity index. In order to check the robustness of our results an alternative corporate opacity index is applied. This index is based on the earnings quality which is negatively correlated with earnings manipulation by firm's management. According to the Greek Law (2190/1920), external certified auditors' reports should provide detailed information regarding:

a) the annual accounts that are the subject to the statutory audit, as well as the specific financial reporting framework applied in their preparation,
b) the scope of statutory audit, including the auditing standards under which the statutory audit was carried out,
c) the matters where auditors wish to draw attention without expressing reservations to the audit opinion.

Auditors not only express but also publish their opinion (audit opinion) clearly on whether the annual accounts give a true and fair view in accordance with the relevant financial reporting framework, whether the annual accounts comply with the law and whether the annual management report of the Management Board corresponds to the annual accounts for the same financial year.

In this context someone would expect that the audit of the financial statements by one of the Big Four auditors increases the likelihood that the firm's published financial statements provide a fair, complete and accurate representation of its financial position. Therefore it can be considered that transparency and financial reporting integrity depends on auditor's type.

Auditor's type has been used as proxy of earnings quality. Thus, dummy variable (*BIGAUDIT*) has been used which takes value one (1) if the firm's financial statements are audited by one of the Big Four auditing firms and zero (0) otherwise.

The results for the pool sample are in line with the results presented earlier, enhancing the validity of our findings (Appendix Table 2).

7. Concluding remarks

The present study investigates the impact that family ownership has upon Greek firms' cost of capital. We focus on the impact the corporate opacity has upon the association between family ownership and cost of capital. The study period covers the years from 2009 to 2016 in order to shed light to the factors that affect the financing cost under conditions of economic depression. Our results suggest that the cost of debt of Greek firms is only marginally affected by ownership structure. It is likely that family ownership is such a common occurrence in the Greek business environment that is not taken into consideration in the negotiations between lenders and borrowing firms. In fact, the family controlled firms constitute more than 60% of our sample-firms. In comparison, the percentage of family firms in Ma et al. (2015) was around 30%. However, in line with previous research (Armstrong *et al.*, 2010; Ma *et al.*, 2013; Ma *et al.*, 2015), we provide evidence that corporate transparency can be a factor that may affect firms' cost of debt. We found that in the case of low-opacity firms, the direct association between family ownership and cost of debt becomes weaker.

Furthermore, it appears that firms' liquidity and size play important role in determining firms' cost of debt. This can be attributed to the fact that information regarding firms' size and liquidity along with the investment in PPE is easily available information which can be derived with relatively low cost. Furthermore, the structural characteristic of the Greek business environment may affect firms' cost of debt. Larger companies may benefit from more favorable borrowing terms due to the easier access they may have to capital markets and the long-lasting relations they may have developed with financial institutions. The persuasiveness of these characteristics does not appear to be significantly affected by the prolonged debt crisis that has experienced Greek Economy.

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APPENDIX

Table 1. 2SLS regression results of the simultaneous equation Model 2 on Cost of Debt and Family Ownership for Low and High Opacity Firms

2SLS Model		
Panel A		
FAMOWN (*Dependentvariable*)		
	Low-opacity firms	**High-opacity firms**
COSTOF DEBT	0.404	-0.167
	(0.776)	(-0.289)
PERSONAL	-0.043	0.010
	(-0.340)	(0.087)
PERSONAL*OPACITY	0.842**	0.196
	(2.398)	(1.084)
MULTIFOUNDER	-0.590***	0.268**
	(-7.016)	(2.112)
MULTIFOUNDER*OPACITY	0.865***	-0.569***
	(3.592)	(-2.760)
Constant	0.635***	0.775***
	(7.374)	(7.947)
YEAR DUMMIES	YES	YES
Obs	502	453
chi2	120.49	24.66
Prob	(0.000)	(0.016)
Adjusted R-squared	0.193	0.052

Table 1 (continued)

Panel B		
COSTOFDEBT (*Dependent variable*)		
	Low-opacity firms	**High-opacity firms**
FAMOWN	0.017	-0.049
	(0.941)	(-1.471)
FAMOWN*OPACITY	-0.021	0.078
	(-0.324)	(1.409)
OPACITY	0.012	-0.068*
	(0.363)	(-1.958)
SIZE	-0.012***	-0.016***
	(-3.749)	(-4.255)
PPE	-0.028***	-0.019**
	(-3.140)	(-2.291)
DEBTRATIO	-0.022***	-0.045***
	(-2.716)	(-5.178)
CURRENTRATIO	-0.010***	-0.012***
	(-4.882)	(-6.029)
CF	0.018	0.057***
	(0.614)	(2.836)
ROA	0.021	0.043**
	(0.924)	(1.970)
GROWTH	0.000	-0.001
	(-1.057)	(-0.169)
BOARDSIZE	0.017	0.002
	(0.796)	(0.085)
OUTDIR	0.039***	-0.028**
	(-2.703)	(-2.120)
NEGEQ	0.000	-0.005
	(0.045)	(-0.728)
Constant	0.174***	0.302***
	(7.874)	(8.751)
YEAR DUMMIES	YES	YES
Obs	502	453
chi2	134.89	189.75
Prob	(0.000)	(0.000)
Adjusted R-squared	0.212	0.295

t-values in parentheses calculated from the heteroscedastic corrected standard errors, (White, 1980).
The variables are defined in Table 1.
* Significant at the 0.10 level.
** Significant at the 0.05 level.
*** Significant at the 0.01 level.

Table 2. OLS Regression of Cost of Debt on Family Ownership

Dependent variable: COSTOFDEBT	
FAMOWN	-0.010*
	(-1.806)
FAMOWN*BIGAUDIT	0.009
	(-1.347)
BIGAUDIT	-0.004
	(-0.579)
SIZE	-0.014***
	(-5.187)
PPE	-0.022***
	(-3.114)
DEBTRATIO	-0.039***
	(-4.689)
CURRENTRATIO	-0.013***
	(-5.519)
CF	0.042
	(-1.483)
ROA	0.027
	(0.859)
GROWTH	-0.016*
	(-1.696)
BOARDSIZE	0.016
	(-1.211)
OUTDIR	0.017
	(-1.610)
NEGEQ	0.001
	(0.285)
PERSONAL*BIGAUDIT	-0.010
	(-1.427)
MULTIFOUNDER*BIGAUDIT	0.005
	(0.816)
PERSONAL	0.006
	(0.992)
MULTIFOUNDER	-0.003
	(-0.544)
Constant	0.211***
	(-11.009)
YEAR DUMMIES	YES
Obs	954
F-statistic	12.095
Prob (F-statistic)	(0.000)
Adjusted R-squared	0.175

t-values in parentheses calculated from the heteroscedastic corrected standard errors, (White, 1980).
The variables are defined in Table 1.
* Significant at the 0.10 level.
** Significant at the 0.05 level.
*** Significant at the 0.01 level.