Exploring intellectual capital in family firms. 
An empirical investigation

Giulio Greco*, Silvia Ferramosca and Marco Allegrini

Department of Economics and Management, University of Pisa, Via C. Ridolfi, 10-56123 Pisa, Italy
E-mail: g.greco@ec.unipi.it
E-mail: s.ferramosca@ec.unipi.it
E-mail: allegrin@ec.unipi.it
*Corresponding author

Abstract: We investigate the influence of family ownership and family involvement in the management on the firm's intellectual capital (IC). The resource-based theory of the firm predicts both benefits and disadvantages of the family on the firm’s IC. Using Pulic’s VAIC as a proxy for the IC of the company, we test two sets of competing hypotheses through multivariate regressions of panel data from Italian listed companies. The results show that family firms have a significantly higher average VAIC than non-family firms. We find a non-linear association between family involvement in the management and IC. At lower levels, the family involvement has a positive association with IC. At higher levels, when the benefits of the family interaction with the business are overcompensated by the disadvantages, the relationship reverses and becomes negative. The research can contribute to both the academic literature on intellectual capital and to family business studies.

Keywords: family firms; family management; intellectual capital; VAIC.


Biographical notes: Giulio Greco is an Assistant Professor at the Department of Economy and Management of the University of Pisa. He is the Scientific Director of the International MBA programme at the University of Pisa. His research and teaching interests are in the fields of financial accounting, corporate governance, intangible assets and sustainability reporting. Some of his recent works appeared in the Journal of Management and Governance, the Managerial Auditing Journal, Local Government Studies, Public Management Review and Corporate Communications. He is an active reviewer for several international academic journals.

Silvia Ferramosca is a PhD student at the Department of Economics and Management, University of Pisa. Her research interests are focused on: financial accounting, international accounting standard IAS/IFRS, corporate governance and intangible assets. She is the author several publications on these topics.
1 Introduction

Family firms are featured by a specific set of resources, also called ‘familiness’, that emerges from the family influence and interactions with the company (Habbershon and Williams, 1999). Academic literature suggests that this feature is able to bring multiple benefits, such as facilitated opportunity recognition (Barney, 1991), competitive advantage creation (Arregle et al., 2007), entrepreneurial attitude (Sciascia et al., 2012), superior performance (Anderson and Reeb, 2003; Lee, 2006; Martínez et al., 2007; Sraer and Tesmar, 2007). In our paper, we aim at extending prior literature by investigating the effect of family ownership and involvement in the management on the firm intellectual capital. In our research, we use the theoretical framework provided by the resource-based theory of the firm.

The resource-based theory of the firm posits both advantages and disadvantages related to the effect of the familiness on the firm intellectual capital. Some key features of family ownership and family involvement in the management can enrich the firm intellectual capital (Habbershon and Williams, 1999; Cabrera-Suárez et al., 2001). Interacting with the business, the family members can provide: commitment, reputational and emotional long-term investment in the firm, superior knowledge of the firm operations and activities, long-term relationships with stakeholders, such as the capital providers, the suppliers or the customers (Habbershon and Williams, 1999; Sirmon and Hitt, 2003; Miller and Le Breton-Miller, 2006; Gomez-Meja et al., 2007).

Also, the resource-based theory of the firm predicts that under certain conditions the familiness may be a burden and hinder the firm intellectual capital. For example, family firms may: engage in suboptimal recruiting policies (employing poorly skilled and untrained family members as managers), adopt disproportionate remuneration policies for family members, suffer from conflicts among family owners, lack orientation toward business goals (Habbershon and Williams, 1999; Sirmon and Hitt, 2003; Mitter et al., 2012).

In this study, we test these competing views exploring how the degree of ‘familiness’ affects the intellectual capital. Our dependent variable is provided by the Pulic’s (2004) value added intellectual coefficient (VAIC). The VAIC is a measure of the efficiency of value added by the firm’s physical capital, structural capital and human capital resources (Pulic, 2004; Chen et al., 2005; Tan et al., 2008). As Pulic (2004) suggests, the VAIC measures the overall intellectual ability of the company to exploit its tangible and intangible resources. The aggregate VAIC indicator is being widely in academic research to proxy for the intellectual capital performance (Firer and Williams, 2003; Ho and Williams, 2003; Chen et al., 2005; Nazari and Herremans, 2007; Tan et al., 2007, 2008; Laing et al., 2010; Chu et al., 2011; Cordazzo, 2012).
We proxy the degree of ‘familiness’ with two variables: the family ownership and the family involvement in the management (Anderson and Reeb, 2003; Villalonga and Amit, 2006). The involvement in the management is measured by the proportion of family directors on the total number of directors in the board (Westhead and Howorth, 2006; Sciascia and Mazzola, 2008). To test our hypotheses, we use a sample of Italian firms listed in the period 2006 to 2010. The Italian setting is well suited for this type of research given the key role of family firms in the economy of the Country (Shleifer and Vishny, 1997; Volpin, 2002; Di Pietra et al., 2008; Minichilli et al., 2010; Greco, 2011; Allegrini and Greco, 2013; Chiu, 2013). Family business represents in Italy the 85% of the total firms and is considered the engine of the Country’s economy even in the period of the world economic crisis (Sole24Ore, 2012).

The remainder of the paper is organised as follows. Section 2 includes the literature review and the hypotheses development. The research methodology is described in Section 3. Section 4 includes the empirical results and the discussion of the findings, whilst Section 5 includes the conclusions.

2 Literature review and hypotheses development

The resource-based theory of the firm suggests that firms can be seen as a unique bundle of complex, intangible, and dynamic resources (Penrose, 1959; Wernerfelt, 1984; Barney, 1991; Grant, 1991). This collection of physical and intangible assets and capabilities provides the core of the firm’s competitive advantages (Grant, 1991; Cabrera-Suárez et al., 2001). Since family firms are considered as unusually complex, dynamic, and rich in intangible resources, the resource-based view provides the researchers with an appropriate theoretical framework for investigating them (Habbershon and Williams, 1999; Cabrera-Suárez et al., 2001; Aldrich and Cliff, 2003; Arregle et al., 2007; Tokarczyk et al., 2007; Mitter et al., 2012). The resource-based view of the firm also provides a primary theoretical framework for the study of the intellectual capital (Bontis, 2001; Sveiby, 2001; Riahi-Belkaoui, 2003; Zambon, 2006). Hence, we develop our hypotheses basing on this theoretical approach.

Family ownership and management can provide the firm with valuable strategic resources and capabilities in the value creation process. Habbershon and Williams (1999) summarise with the concept of ‘familiness’ of the firm the bundle of distinctive resources and capabilities, resulting from the family members interaction with the business. These assets are hardly imitable by competitors, being combined in a unique way and largely dependent on the family relationships with the company.

Family owners may closely identify themselves with the firm, viewing the firm’s health as part of their own wellness (Horton, 1986; Miller and Le Breton-Miller, 2006; Gomez-Mejia et al., 2007; Mitter et al., 2012). This gives them a high degree of commitment and dedication, as well as a long-term horizon to such commitment (Horton, 1986; Dunn, 1995; Anderson and Reeb, 2003; Ali et al., 2007). The same attitude can be observed in other managers and employees, which often feel like members of a team and display a more enthusiastic attitude than in non-family businesses (Gomez-Mejia et al., 2007). Family members with long-term commitment tend to avoid ‘quick-fix’ decisions and expedients that may reduce costs, while destroying morale and eroding the firm’s human capital and knowledge base (Miller and Le Breton-Miller, 2006).
Lengthy job tenures by family members help the on-the-job learning giving better chance to develop capabilities and achieve valuable and inimitable resources (Barney, 1991; Teece et al., 1997). Some of the key intangible assets of family businesses are the superior knowledge of the firm operations and activities by family owners and the long-term relationships with capital providers, suppliers or customers (Habbershon and Williams, 1999; Anderson and Reeb, 2003; Gomez-Meja et al., 2007). The customers’ trust and perceptions of quality are found to be characteristic of family businesses by several researches (Habbershon and Williams, 2001; Cabrera-Suárez et al., 2001; Sirmon and Hitt, 2003). Besides the strong relationship with customers, the family knowledge is found to be associated to greater organisational efficiency (Tokarczyk et al., 2007).

The abovementioned considerations show how the familiness of the firm can significantly enrich the firm’s intellectual capital (Habbershon and Williams, 1999; Cabrera-Suárez et al., 2001; Sirmon and Hitt, 2003). We expect that family ownership and family involvement in the management are positively related to the firm’s intellectual capital. We formulate the following hypotheses:

HP1 Family ownership is positively associated to the firm’s intellectual capital.

HP2 Family involvement in the management is positively associated to the firm’s intellectual capital.

The resource-based theory of the firm also suggests how family ownership and involvement in the management can hamper the firm’s intellectual capital. Family controlled firms can engage in suboptimal recruitment policies, aimed at employing poorly skilled and untrained family members as managers (Dunn, 1995; Sirmon and Hitt, 2003; Mitter et al., 2012). Family firms are often poorly attractive for qualified and well trained outside managers, due to the family lack of willingness to share the control (Cabrera-Suárez et al., 2001; Westhead and Howorth, 2006; Miller and Le Breton-Miller, 2006). The obstacles to outside recruiting can weaken the human capital and produce lack of capabilities and experience in the management team (Sirmon and Hitt, 2003; Miller and Le Breton-Miller, 2006).

The involvement of a high number of family members as executives can increase the risks of conflicts and loss of organisational efficiency. The conflicts among family owners make them use their votes to cancel one another’s initiatives (Claessens et al., 2002). Destructive conflicts among family members in managerial positions can harm the strategic leadership of the company. Academic literature found how factionalism and harsh conflicts among family members negatively affect the focus on the firm business goals and the value creation process (Stewart and Danes, 2001; Miller and Le Breton-Miller, 2006; Gomez-Meja et al., 2007).

Concentrated ownership and strict control by families can also make family firms less attractive to professional investors (Anderson and Reeb, 2003; Villalonga and Amit, 2006). By contrast, such type of investors can bring to family firms both financial resources and a set of knowledge and competences useful to boost growth, expand on international markets, enhance corporate governance practices, increase the financial markets trust in the company and consequently reduce the cost of capital (Ali et al., 2007; Mitter et al., 2012).

The abovementioned features can prevent the acquisition of resources and capabilities by family firms, constraining intellectual capital and making the familiness a burden rather than a driving force (Habbershon and Williams, 1999; Sirmon and Hitt, 2003;
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Gomez-Meja et al., 2007). We develop a further set of hypotheses, competing with the prior ones.

HP3 Family ownership is negatively associated to the firm’s intellectual capital.

HP4 Family involvement in the management is negatively associated to the firm’s intellectual capital.

3 Research methodology

3.1 Sample

The population of Italian industrial and services listed firms composes our initial sample. We discarded the financial companies (banks and investment funds), given the substantial differences in the business model and their activities in regulated market environments. We then discarded the companies that:

1. were not listed continuously in the period 2006 to 2010
2. did not have data financial available on Datastream and AIDA Bureau Van Dijk databases
3. did not have data on ownership structures and governance available.

The final sample is composed by 680 firm-year observations (136 companies).

The financial data were downloaded from Datastream and AIDA Bureau Van Dijk. The data on family ownership and involvement in the management were gathered from the annual reports and from the governance reports, available on the Italian Stock Exchange website or on corporate websites.

3.2 The dependent variable

Despite being recognised as key drivers for the competitive advantage, the measurement and adequate inclusion of the intellectual capital resources measurement and reporting is difficult and subject to a long-lasting debate (Ordonez de Pablo, 2005; Zambon, 2006; Sundara Pandian, 2011). Pulic (2004) methodology considers the performance of financial, physical and human resources. As a comprehensive measure, the VAIC indicator can proxy for the overall corporate intellectual ability and efficiency of the company in exploiting all its economic resources in the value creation process (Pulic, 2004; Cordazzo, 2012).

The VAIC has also been criticised as intellectual capital measure, because it is derived from financial statements accounts and does not develop new ad hoc measurement tools (M didntinos et al., 2011; Ståhle et al., 2011). Ståhle et al. (2011) argues that the VAIC is an efficiency parameter, which combines labour productivity and capital productivity or efficiency. Another critique by these Authors is that the VAIC methodology reduces the human capital to the mere human resources costs and that the VAIC fails to capture the relational capital in its structural capital efficiency indicator. The VAIC is thus a ‘noisy’ and partial measure of the firm intellectual ability and does stock measure the stock of IC available to the firm.
Some of the assumed VAIC weaknesses are also widely considered as point of strengths and the VAIC is widely being used in academic research for several reasons (Ho and Williams, 2003; Chen et al., 2005; Nazari and Herremans, 2007; Tan et al., 2007, 2008; Laing et al., 2010; Chu et al., 2011). Firstly, all the data used in the VAIC calculation are based on audited information (Ho and Williams, 2003; Pulic, 2004). Other IC measures have been criticised being based on unverifiable information (Williams, 2001; Pulic, 2004). Secondly, the VAIC provides a standardised and consistent basis of measure, effective in empirical research using large samples. Other IC measures are unable to provide comparability among firms (Firer and Williams, 2003). Another argument supporting Pulic’s VAIC is that the employees’ knowledge and skills are recognised as the main drivers behind the value added of a company. The employees’ ability in managing the company’s financial and physical resources lies at the heart of the value creation process (Firer and Williams, 2003; Chen et al., 2005; Cordazzo, 2012). Finally, the VAIC methodology is consistent with the stakeholder and resource-based views of the firm (Pulic, 2004; Chen et al., 2005; Cordazzo, 2012).

In this study, the VAIC is calculated following the Pulic (2004) methodology. The VAIC is calculated as the composite sum of three indicators (Pulic, 2004; Firer and Williams, 2003; Kujansivu and Lönnqvist, 2007):

1. capital employed efficiency (CEE), indicator of VA efficiency of capital employed
2. human capital efficiency (HCE), indicator of VA efficiency of human capital
3. structural capital efficiency (SCE), indicator of VA efficiency of structural capital.

The following equation is used.

\[
\text{VAIC} = \text{CEE} + \text{HCE} + \text{SCE}
\]

where
\[
\text{VAIC} \quad \text{value added intellectual coefficient}
\]
\[
\text{CEE} \quad \text{VA/CE; capital employed efficiency}
\]
\[
\text{HCE} \quad \text{VA/HC; human capital efficiency}
\]
\[
\text{SCE} \quad \text{SC/VA; structural capital efficiency}
\]

\[
\text{VA} = \text{OP} + \text{EC} + \text{DP} + \text{AM}
\]

\[
\text{VA} \quad \text{computed as the sum of operating profit (OP); employee costs (EC); depreciation expenses (DP); amortisation expenses (AM)}
\]

\[
\text{CE} \quad \text{book value of the net assets of the company}
\]

\[
\text{HC} \quad \text{total salaries and wages for a company}
\]

\[
\text{SC} \quad \text{VA – HC, structural capital.}
\]

3.3 Independent variables

We classify as family firms the firms in which a dominant family owns, either directly or indirectly through holdings, the 30% or more of the voting shares and is able to appoint the majority of directors in the board (Anderson and Reeb, 2003; Villalonga and Amit,
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2006). The 30% of the voting shares control threshold is considered as suitable in prior studies on listed firms (e.g., Anderson and Reeb, 2003; Villalonga and Amit, 2006).

To identify family firms and to gather the data needed, the authors screened governance reports, annual reports and corporate websites. One of the authors used the information to classify the firms as either family or non-family business and to gather the data on family ownership and involvement in the management. Another author separately conducted the same analysis. An inter-coder reliability test was then performed by calculating the Krippendorf alpha coefficient of agreement. The alpha value obtained was well above the acceptable level of reliability of 0.80 proposed by Krippendorf (2004) and used in prior literature (Milne and Adler, 1999; Abraham and Cox, 2007; Greco, 2012).1

The family ownership (FAM) is measured with a dummy variable, 1 if the firm is controlled by a family and 0 otherwise (Villalonga and Amit, 2006; Minichilli et al., 2010). We proxy the family involvement in the management (FAMINV) with the proportion of family directors on the total number of directors in the board (Westhead and Howorth, 2006; Sciascia and Mazzola, 2008). We considered both the executive and the non-executive family directors. Even non-executive family directors can provide advice and stewardship activity adding to the firm IC resources (Sciascia and Mazzola, 2008). The variable is equal to zero for non-family firms and for firms in which families own less than 30% of the total voting shares.

3.4 Control variables

We included in our research, as a control variable, the proportion of independent non-executive directors in the board (IND). Both corporate governance guidelines (e.g., Cadbury Committee Report, 1992) and academic literature (Ho and Williams, 2003; Anderson and Reeb, 2003; Westhead and Howorth, 2006) emphasise how independent non-executive directors can provide relevant resources for the company, such as stakeholders management capabilities, advice on strategy, finance, extraordinary operations.

We also used the firm market to book value (MTB) and the firm’s profitability (ROE), proxied by a Return-On-Equity index, as control variables (Firer and Williams, 2003; Chen et al., 2005; Tan et al., 2007). Finally we included the company’s size (SIZE), measured by the firm’s total assets (Nazari and Herremans, 2007; Kujansivu and Lönnqvist, 2007; Chu et al., 2011).

4 Empirical results

4.1 Descriptive statistics and t-test for the differences in the means

Table 1 shows the descriptive statistics. Seventy-six companies out of 136 are family controlled firms, representing the 55.88% of the firms (FAM). In family firms, the average proportion of family member in the board (FAMINV) is 27%.

The average family firms VAIC is 3.43, whilst the non-family firms average VAIC is 2.96. The t-test for the difference in the means indicates that the difference is significant (t-statistic 2.00, p-value < 0.05). Also, non-family firms have on average a significantly higher number of non-executive independent directors in the board: 42% versus the 37% in the family firms (t-statistic 3.16, p-value < 0.01). This finding is consistent with prior
research: family firms may be less interested in seeking independent advice and more likely to employ family members as directors, either executive or non-executive (Anderson and Reeb, 2003).

Table 1: Descriptive statistics

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Family firms (n = 380)</td>
<td>Non-family firms (n = 300)</td>
</tr>
<tr>
<td></td>
<td>1st quartile</td>
<td>Mean</td>
</tr>
<tr>
<td>VAIC</td>
<td>2.34</td>
<td>3.43</td>
</tr>
<tr>
<td>FAMINV</td>
<td>0.14</td>
<td>0.27</td>
</tr>
<tr>
<td>IND</td>
<td>0.28</td>
<td>0.37</td>
</tr>
<tr>
<td>MTB</td>
<td>0.88</td>
<td>1.94</td>
</tr>
<tr>
<td>ROE</td>
<td>0.01</td>
<td>–0.07</td>
</tr>
<tr>
<td>SIZE in mld €</td>
<td>0.20</td>
<td>1.78</td>
</tr>
</tbody>
</table>

The average market-to-book value (MTB) is similar for family and non-family firms (1.94 versus 1.92). Both the sub-samples have an average negative ROE. Such data are influenced by the economic crisis that started in Italy at the end of 2008 and impacted heavily in the 2009. The t-test indicates that both the differences in the ROE and in the market-to-book value are not significant. Finally, the family firms average size (SIZE) is significantly smaller than the average size of non-family firms (t-statistic 4.41, p-value < 0.01).

4.2 Correlation analysis

Table 2 reports the Spearman correlation analysis. Our dummy variable for the family ownership (FAM) is significantly associated to the intellectual capital (VAIC). The correlation coefficient is significant at the 1% level. There is no significant association between the VAIC and the proportion of family members in the board (FAMINV). The association between the proportion of independent non-executive directors (IND) and the VAIC has a positive significant coefficient (p-value < 0.05). This is consistent with the idea that such type of directors enriches the firm human capital, providing expert judgement and advice. The VAIC has a strong significant positive association to the market-to-book value (MTB), the ROE and the firm size (SIZE), with p-value < 0.01 in all the cases. The valued added by intellectual capital appears to be priced by the market and have a positive impact on the firm profitability.
Table 2  Spearman correlation analysis

<table>
<thead>
<tr>
<th></th>
<th>VAIC</th>
<th>FAM</th>
<th>FAMINV</th>
<th>IND</th>
<th>MTB</th>
<th>ROE</th>
<th>SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAIC</td>
<td>1</td>
<td>0.110***</td>
<td>0.012</td>
<td>0.245***</td>
<td>0.150***</td>
<td>0.483***</td>
<td></td>
</tr>
<tr>
<td>FAM</td>
<td></td>
<td>0.897***</td>
<td>–0.068*</td>
<td>0.057</td>
<td>0.077**</td>
<td>–0.007</td>
<td></td>
</tr>
<tr>
<td>FAMINV</td>
<td></td>
<td>–0.105***</td>
<td>0.008</td>
<td>0.090**</td>
<td>–0.083**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IND</td>
<td></td>
<td></td>
<td>0.007</td>
<td>0.018</td>
<td>0.293***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MTB</td>
<td></td>
<td></td>
<td></td>
<td>0.118***</td>
<td>0.003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.116***</td>
<td></td>
</tr>
<tr>
<td>SIZE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Notes: All p-values are two-tailed; *** Coefficient is significant at the 0.01 level (two-tailed); **Coefficient is significant at the 0.05 level (two-tailed); *Coefficient is significant at the 0.10 level

The family involvement in the management (FAMINV) has a strong negative association with the proportion of independent directors in the board (coefficient significant at the 1% level).

4.3 Multivariate analysis

To test the influence of family ownership and involvement in the management on the firm intellectual capital, we use the following model.

Model 1

$$VAIC_t = \beta_0 + \beta_1 FAM_t + \beta_2 FAMINV_t + \beta_3 IND_t + \beta_4 ROE_t + \beta_5 MTB_t + \beta_6 SIZE_t + \epsilon_t$$

where $VAIC_t$ = value added intellectual capital coefficient (Pulic, 2004) for firm $i$ at time $t$, $FAM_t$ = dummy variable, 1 if the firm is controlled by a family, 0 otherwise, for firm $i$ at time $t$; $FAMINV_t$ = truncated variable, equal to the percentage of family members on the total number of directors in the board, if the firm is controlled by a family, and 0 otherwise, for firm $i$ at time $t$; $IND_t$ = proportion of independent non-executive directors in the board for firm $i$ at time $t$; $ROE_t$ = profitability, return on equity for firm $i$ at time $t$; $MTB_t$ = market-to-book value index for firm $i$ at time $t$; $SIZE_t$ = firm size, proxied by the total assets for firm $i$ at time $t$.

Before undertaking the analysis, we checked for the presence of autocorrelation in panel data using the Wooldridge (2002) test for serial autocorrelation. We detected autocorrelation with the xtserial command in Stata. Hence, we used the Newey-West specification in the least squares regression (Woolridge, 2002; Greene, 2003; Gujarati, 2004). The Newey-West is a least squares regression that provides estimates robust to heteroskedasticity and autocorrelation (HAC standard errors).

Table 3 displays the results of the regression analysis of Model 1. Consistently with the correlation analysis, the family ownership (FAM) is significantly positively associated to our intellectual capital measure (VAIC). The coefficient is significant at the 1% level. The family control of the firm can significantly enrich the firm’s intellectual resources in several ways: providing commitment, knowledge and capabilities, strengthening the relationships with key stakeholders, preserving the firm reputation and
projecting it over a long term (Cabrera-Suárez et al., 2001; Sirmon and Hitt, 2003; Miller and Le Breton-Miller, 2006). This empirical evidence provides support for HP1.

The positive relationship is not confirmed with regard the family involvement in the management (FAMINV). In Model 1 the coefficient of the family involvement proxy is not significant.

We made further investigations searching for a possible non-linear effect of the family involvement in the management on the firm intellectual capital. Following recent researches on family business (Sciascia and Mazzola, 2008; Mitter et al., 2012; Sciascia et al., 2012), we included the quadratic term of our proxy for family involvement in the management in the prior model, obtaining a second model (Model 2 in Table 3). The regression of Model 2 provides new interesting insights. The linear term of the family involvement in the management (FAMINV) is positively and significantly related to the firm intellectual capital ($p$-value < 0.05). The quadratic term of the family involvement in the management (FAMINVSQ) has a significantly negative coefficient (the coefficient is $-7.20$, significant at the 5% level). The relationship between family involvement in the management and intellectual capital appears to be non-linear, having the shape of an inverted U. The introduction of the new variable in the original model, which differentiates among family firms, weakens the association between family control and intellectual capital. In Model 2, the family control (FAM) is poorly significant ($p$-value < 0.10).

Table 3  Regression analysis (n = 680)

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th></th>
<th>Model 2</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Coef.</td>
<td>t-stat</td>
<td>Coef.</td>
<td>t-stat</td>
</tr>
<tr>
<td>Const</td>
<td>1.769***</td>
<td>4.03</td>
<td>1.771***</td>
<td>4.03</td>
</tr>
<tr>
<td>FAM</td>
<td>1.092***</td>
<td>2.62</td>
<td>0.695*</td>
<td>1.80</td>
</tr>
<tr>
<td>FAMINV</td>
<td>–0.500</td>
<td>–1.09</td>
<td>3.243**</td>
<td>2.01</td>
</tr>
<tr>
<td>IND</td>
<td>0.819</td>
<td>1.13</td>
<td>0.672</td>
<td>0.93</td>
</tr>
<tr>
<td>MTB</td>
<td>0.400***</td>
<td>5.23</td>
<td>0.399***</td>
<td>5.19</td>
</tr>
<tr>
<td>ROE</td>
<td>–0.369</td>
<td>–0.63</td>
<td>–0.351</td>
<td>–0.59</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.000***</td>
<td>6.33</td>
<td>0.000***</td>
<td>6.37</td>
</tr>
<tr>
<td>FAMINVSQ</td>
<td></td>
<td></td>
<td>–7.208**</td>
<td>–2.40</td>
</tr>
<tr>
<td>F-statistics</td>
<td>11.88</td>
<td></td>
<td>10.22</td>
<td></td>
</tr>
<tr>
<td>P-value(F)</td>
<td>&lt; 0.000</td>
<td></td>
<td>&lt; 0.000</td>
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</tbody>
</table>

Notes: All p-values are two-tailed; *** Coefficient is significant at the 0.01 level (two-tailed); ** Coefficient is significant at the 0.05 level (two-tailed); * Coefficient is significant at the 0.10 level. Variables definition: VAIC$_i$ = value added intellectual capital coefficient (Pulic, 2004), FAM$_i$ = dummy variable, 1 if the firm is controlled by a family and 0 otherwise; FAMINV$_i$ = truncated variable, equal to the percentage of family members on the total number of directors in the board, if the firm is controlled by a family (or by a group of families) with at least the 30% of the total voting shares, and 0 otherwise; IND$_i$ = proportion of independent non-executive directors in the board; ROE$_i$ = profitability return on equity for firm $i$ at time $t$; MTB$_i$ = market-to-book value index; SIZE$_i$ = firm size, proxied by the total assets; FAMINVSQ$_i$ = family involvement squared, square term of family involvement in the management variable.
The results show that when the family involvement in the business overcomes certain threshold levels, the positive relationship of the family members contribution to intellectual capital reverses and becomes negative. Therefore, HP2 and HP4 can be both supported at different levels of family involvement in the management. At lower or moderate levels of family involvement, the firm intellectual capital enjoys the benefits of the family interaction with the business. However, when an excessive number of family members is involved in the management, the advantages are overcompensated by the disadvantages. The benefits deriving from the knowledge, the motivation and the long-term commitment of family members can be compensated by the recruitment of insufficiently skilled family members as managers. The suboptimal recruiting policy may reduce the competencies and the human capital of the firm, by preventing the acquisition of capabilities from the outside (Habbershon and Williams, 1999; Gomez-Meja et al., 2001; Sirmon and Hitt, 2003; Sciascia and Mazzola, 2008; Mitter et al., 2012). Also a high number of family members can bring other disadvantages, such as excessive directors pay, increased related party transactions, factionalism and conflicts among shareholders (Anderson and Reeb, 2003; Villalonga and Amit 2006; Miller and Le Breton-Miller, 2006). In this context, the conflicts among family members harm the sense of belonging and commitment. The costs of solving them can be very high and prevent effective managerial actions (Danes and Amarapurkar, 2001; Stewart and Danes, 2001).

The findings reported in Table 3 also show that the VAIC has a strongly significant association with the market-to-book value (MTB) in both Model 1 and Model 2 (p-value <0.01). This provides some support to the idea that the VAIC captures a financial value, priced by the market (Pulic, 2004; Tan et al., 2008; Giuliani and Marasca, 2011). Finally, our proxy for the intellectual capital is significantly associated with the firm size; the coefficient is significant at the 1% level across models (SIZE).

We tried to understand which is the inflection point of the inverted-U-shaped relationship between family involvement in the management and intellectual capital, by analysing the average VAIC per range of family involvement. The findings are reported in Table 4. The average VAIC grows and reaches the maximum (5.85) in the range of family involvement between the 11% and the 20% of the total number of directors in the board. It then declines to 4.43 in the family involvement range between 21% and 30%, being still above the overall average of 3.43. When more than one out of three members of the board are family members, the average VAIC begins to decline. This analysis may suggest that the inflection point of the inverted-U-shaped relationship is somewhere around the 20% of family involvement in the management.

<table>
<thead>
<tr>
<th>Range of family involvement</th>
<th>Average VAIC</th>
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</thead>
<tbody>
<tr>
<td>10% or less</td>
<td>3.40</td>
</tr>
<tr>
<td>11%–20%</td>
<td>5.85</td>
</tr>
<tr>
<td>21%–30%</td>
<td>4.43</td>
</tr>
<tr>
<td>31%–40%</td>
<td>3.19</td>
</tr>
<tr>
<td>40%–60%</td>
<td>2.79</td>
</tr>
<tr>
<td>Over 61%</td>
<td>2.50</td>
</tr>
<tr>
<td>All</td>
<td>3.43</td>
</tr>
</tbody>
</table>
To check the robustness of our results, we also used other proxies for the family ownership: a control threshold of 50% of the voting shares (instead of the 30%), being the family the largest shareholder or having at least one family director in the board (Villalonga and Amit, 2006). We obtained consistent results. We also included other control variables as the leverage and the ROA (instead of the ROE). Our results are robust to these checks.

5 Conclusions

The resource-based theory of the firm posits both advantages and disadvantages related to the effect of the familiness on the firm intellectual capital. Using a sample of Italian listed companies in the period 2006 to 2010, we test two competing hypotheses, predicting either a positive or a negative influence on the firm intellectual capital, exerted by the family ownership and involvement in the management. Pulic’s (2004) VAIC is used as a proxy for the firm intellectual ability in exploiting its resources.

The findings initially show that family ownership is positively associated to the VAIC, consistently with the expectation that the family owners enrich the firm intellectual capital with a set of unique resources and capabilities (Habbershon and Williams, 1999; Simon and Hitt, 2003; Miller and Le Breton-Miller, 2006).

Further investigations show that the family involvement in the management has a non-linear inverted-U-shaped relationship with intellectual capital. At lower levels of family involvement, the firm intellectual capital enjoys the benefits of the family interaction with the business. At higher levels of family involvement, the benefits are overcompensated by the disadvantages. Once reached certain thresholds, the benefits deriving from the motivation, the long-term commitment and the competences of family members are overcompensated by disadvantages, like excessive pay, suboptimal recruiting policies and conflicts among shareholders and managers (Miller and Le Breton-Miller, 2006). The use of family members as managers may reduce the competencies and the human capital efficiency of the firm (Sciascia and Mazzola, 2008; Mitter et al., 2012). The costs of solving the conflicts among family members can harm the sense of belonging and commitment, as well as prevent organisational efficiency and effective managerial actions (Danes and Amarapurkar, 2001; Stewart and Danes, 2001).

The findings show that the seemingly competing predictions of the resource-based theory are supported at different levels of family involvement in the management. When the family involvement in the business overcomes certain threshold levels, the positive relationship of the familiness to the firm intellectual ability in exploiting its resources reverses and becomes negative.

The study may contribute to prior literature in several ways. It can contribute both to the literature on intellectual capital and to the family business studies, providing evidence about the effect of the familiness on the firm intellectual resources and capabilities. This research also highlights how the family involvement in the management has a non-linear inverted-U-shaped relationship with intellectual capital. Such non-linear effect features also the relationship among familiness and other phenomena, such as the international entrepreneurship (Sciascia et al., 2012) and the internalisation process (Mitter et al., 2012). These findings emphasise the diversity within family firms, deriving from the different degree of family involvement and interaction in the management.
Exploring intellectual capital in family firms

The results of this study may be of interest to practitioners and market participants. Depending on firm-specific conditions, the family control over a firm can give a relevant contribution to the firm intellectual resources base and to its success on the market, as well as be a burden to value creation.

This study acknowledges some limitations. Our study uses the VAIC as a proxy for the intellectual ability and efficiency of the company in exploiting all its resources in the value creation process. The VAIC does not measure the stock of IC available to the firm; rather it measures the company’s performance in the efficient usage of both capital resources and intellectual ability. Our findings show that the family involvement in the management affects the efficiency in the exploitation of the firm tangible and intangible resources. Also our study does not investigate whether the level of family ownership has a non-linear relationship with the intellectual capital. However, we expect that once the company control is formally granted (regardless of the percentage of voting shares), it is the involvement in the management that can substantially affect the firm intellectual capital.

Future research could use multiple measures of IC based on the financial statements, to investigate the consistency and reliability of our results with different methods. Future research could explore the background and professional experience of family directors to understand how they contribute to the firm intellectual capital. Also, another research avenue is the study of the differences within family firms and the possible classification of different types of family firms.

References


**Notes**

1 We observe that a number of family firms clearly presented themselves as family businesses, with ample sections on their corporate websites or in their annual report dedicated to the founder’s history and entrepreneurial career.

2 We used the xtserial Stata programme, written by Drukker (2003).