Family firms and financial performance literature. A meta regression analysis*

Abstract

We perform a meta-analysis regression to contribute to the discussion of weather family firms exhibit better financial performance than non-family firms. Our approach allows to tackle the publication bias in this literature and incorporate several control variables not present in other meta-analysis papers on the same subject. When we consider the pool sample for all performance variables we found no evidence of significant family effect. We also show that there is no publication bias (no significant effect size). However, when ROA is used as performance variable, there are some positive family effect present but due to publication bias.
Key words: Family firms, performance, meta-analysis.

1 Introduction

Is family firms financial performance better than non-family firms? This question is difficult to answer given the contrasting evidence not only in the theory side of the discussion but also in the empirical side of it. The question is difficult and also important given not only the prevalence of family firms in the world (La-Porta et al., 1999; Claessens et al., 2000; Faccio and Lang, 2002).

The linkage between family firm and performance has been examined in narrative literature reviews as well as in meta-analysis reviews. On the one hand narrative reviews such as the one of Miller and Le Breton-Miller (2006); Chrisman et al. (2007); Matias and Mendes (2012); Garcia-Castro and Aguilera (2014); Amit and Villalonga (2014) and Dow and McGuire (2016)[1], have gathered theory and empirical evidence around different arguments in narrative literature reviews. Most of these reviews lean towards the positive association of family firms with respect to several measures of performance, whether they are workplace relations, environmental, organizational or financial.

O'Boyle et al. (2012); Wagner et al. (2015); van Essen et al. (2015); Carney et al. (2015) undertake literature reviews on the topic using meta-analysis methods. O'Boyle et al. (2012) studied 78 manuscripts and found no relation between family involvement and firm's financial performance conducting Hedges-Olkin Meta Analysis (HOMA) (Hedges and Olkin, 1985). Wagner et al. (2015) reviews 380 studies and found better performance of family firms, particularly in public and large firms, and when Return on Assets (ROA) is the financial performance variable. Both studies approach the assessment family firms financial performance testing differences between groups in multiple dimensions. van Essen et al. (2015) and Carney et al. (2015) methodological's approach is more elaborated, testing different hypothesis via HOMA, Meta-analytic Structural Equation Modeling (MASEM) (Cheung and Chan, 2005; Cheung, 2015) and, Meta-analytic Regression Analysis (MARA) (Lipsey and Wilson, 2001). Carney et al. exploring 48 studies focused on private family firms does not find significant performance differences from non private family firms. van Essen et al. in examining the United States evidence of publicly listed firms finds that previous studies favor the hypothesis of family firms outperforming other public corporations.

This study contributes to the literature in conducting a comprehensive meta-regression analysis of 61 studies paying particular attention to the most salient issues raised in narrative reviews: family firm definition and estimation methods. Furthermore several several paper's characteristics were collected in order to enquire whether there is publication bias or effect size associated to the procedures undertaken by researchers.

2 The family ownership - financial performance debate

The question if family firms perform better than non-family firms is difficult to answer given the contrasting evidence not only in the theory side of the discussion but also in the empirical side of it. The question is difficult and also important given not only the prevalence of family firms in the world (La-Porta and Lopez-de-Silanes, 1999; Claessens et al., 2000; Faccio and Lang, 2002).

Villalonga and Amit (2006) show that family firms financial performance depends on the different ways family are involved in the family business affairs. For instance, they report that family firms create value only when the founder is still present in the direct management of the business (as an active Chief Executive Officer (CEO) or leading the board of directors with a hired CEO); however, when the heirs lead the firm as CEO, the financial performance is poor, on average.

There are many reasons why family controlled firms could be better than non-family firms in terms of financial performance, among others they enjoy lower agency conflict, have longer investment horizon, they focus on firm survivable as an ultimate firm objective. However, there are other reasons why the inverse relation could obtain, among others, consumption of private benefits, aiming non-economic goals, and nepotism. In this section we discuss the positive and negative "family effect".

[1] This is not an exhaustive compilation of literature reviews or papers that in performing or advancing hypothesis development conduct literature reviews on the topic.

2.1 In favor of a positive "family effect"

There are theoretical arguments that used to argue a positive "family effect" in terms of financial performance. From classical agency theory, ownership concentration will help to align conflict of interest between mangers and owners (Jensen and Meckling, 1976). For instance a sole ownership firm, there will be no conflict of interest given that the owner is at the same time the manager of the firm.

Other theoretical arguments in favor of a positive "family effect" are: the long-term focus and firm-specific knowledge (Bertrand and Schoar, 2006; Palia et al., 2008); investment efficiency (James, 1999; Stein, 1988, 1989); lower cost of debt (Anderson and Reeb, 2003b); amenity potential or non-monetary benefits (Demsetz and Lehn, 1985); protect family interest (Burkart et al., 2003); and firm survival as a corporate objective (Casson, 1999; Chami, 2001) among others.

This positive view of a "family effect" in firms' financial performance is backed for number of empirical works such as (among many) McConaughy et al. (1998) and Anderson and Reeb (2003a) where they report a better Tobin's Q (market performance) and ROA (operating performance) for family firms in their sample; however, such outperformance was mainly due to the presence of the founder in the management of the firm (e.g. CEO). Allouche et al. (2008) also found a positive "family effect" using several financial indicators, and Martínez et al. (2007) using ROA, Return on Equity (ROE), and Tobin's Q.

Other empirical papers have found a positive "family effect" examining other indicators. Maury (2006) that report higher profitability for the family firm group, and in Lee (2006) family firms show higher employment and revenue growth.

Using more advance econometric techniques, such as controlling for the potential endogeneity in the family-performance relation, Palia et al. (2008), Villalonga and Amit (2006), Adams et al. (2009), and Fahlenbrach (2009) show a positive "family effect", but again, contingent to whether the founder was present as CEO, so the question that arises is if there is a "family effect" premium or "founder effect" premium.

2.2 Against a positive "family effect"

However, even in the context of agency theory, there are theoretical developments against the positive "family effect". For instance, Demsetz (1983) argue that ownership concentration is an endogenous outcome generated by managers and owners trying to maximize profits neglecting any positive or negative "family effect"; Stulz (1988) argue that family managers can also become entrenched and hard to remove from office, inducing negative firm performance; Shleifer and Vishny (1997) posit that there could be other agency problems between large controlling shareholders and minority shareholders.

Other theoretical arguments against a positive "family effect" are for instance the restricted pool of potential good managers (Pérez-González, 2006); conflicts among family members (Colli and Rose, 2003); weak corporate governance Miller et al. (2007); private benefits of control Grossman and Hart (1986); entrenchment (Gomez-Mejia et al., 2001); excessive risk aversion (Fama and Jensen, 1983); special dividends versus expansion plans (DeAngelo and DeAngelo, 2000); deviation of firm's resources to the controlling family (Bennedsen et al., 2007); dilutes high-power incentives Jensen and Meckling (1976); on-the-job consumption Fama (1980); pursuit of non-economic goals (Chrisman et al., 2012); excessive altruism to their children and nepotism (Schulze et al., 2001) among others.

Empirically, Holderness and Sheehan (1988) report negative "family effect" measure by the variation of Tobin's Q in a set of firms in the United States. In the case of Morck et al. (1988), results depend in some firm characteristics, such as age, where older firms show a negative "family effect". In the same vein other papers show a negative family effect when heirs controls the management of the firm (Smith and Amoako-Adu, 1999; Pérez-González, 2006).

2.3 Why the difference?

The numerous literature examining the linkage between family firm involvement and financial performance makes increasingly difficult to reach consensus. There are many factors in the academic research process that influence the findings summarized in the previous section, among others are: the institutional setting (country wise) on which firms operate, the macroeconomic environment reigning in the period of study, the

industry on which firms operate, family firm definition, the choice of financial performance variable, and the empirical methodological approach.

Amit and Hua (2010) found evidence that institutional development affect performance (based on different regions in China). Also, the firm industry sector explain some of the differences on the "family effect" and firm performance found in the literature (Anderson and Reeb, 2003a; Villalonga and Amit, 2006; Amit and Hua, 2010). Amit and Villalonga (2014) posit that changes in economic conditions affect the family-performance relationship. They argue that the "family effect" is countercyclical, making family business more stable and more likely to survive after economic crisis.

Amit and Villalonga (2014) point out that geographical location matters. For instance Barontini and Caprio (2006) found for Western Europe similar results as those found in the United States in terms of the ownership-control decomposition but not negative family effect when firms were managed by heirs. Maury (2006) also for Europe found a positive premium when family was involved in management.

One of the issues derived from the previous review is that the positive or negative family effect depends largely on what a family firm really is. Villalonga and Amit (2006) distinguish three elements in the definition of a family firm: ownership, control, and management. Villalonga and Amit show that on average family ownership create value, family control (in excess of ownership) destroy value but that negative effect was not large not enough to offset the positive effect of family ownership. Regarding family management, Villalonga and Amit show that the positive or negative effect was large enough to offset the effect (positive or negative) of the other two elements. However, the positive sign of the family effect largely depends on whether the founder was still present in the firm.

Beside these factors, there are other elements that drive differences in the results. The control variables included in the regression equation of each study, such as: age of the firm, age of the CEO, growth prospect, corporate governance measures, a complete set of financial characteristics (among many), number of observations, etc. Not only the control variables, but also the characteristics of the final manuscript, such as: author gender, author affiliation, outlet importance, text length, etc. Even more important has become the issue of endogeneity in the econometric estimation for the variable that identifies family ownership. Many studies fail in this regard, without mentioning the effects associated to sample selection and differences in the econometric methods used.

There is also the issue of whether financial performance indicators (e.g. ROA, ROE, Tobin's Q) are the correct measure of value in the context of family firms. It is known in the literature that families value performance in a much broader sense including, for instance, non-pecuniary benefits, such as heritage, legacy, security, reputation, and political influence just to name a few. Even after agreeing in measuring financial performance using the standard financial variables, the majority of family firms are private and therefore subject to less stringent accounting and auditing standard than public firms, which may bias upward the understanding of performance.

As we can see from these theoretical and empirical findings of the positive or negative "family effect" on firm performance, a Meta-Analysis is order to point down all of the different factors and their relative importance that drive these differences shown in the academic literature.

2.4 Hypotheses and contribution

This paper is in line with other studies summarizing the effect of family firm upon financial performance in searching for a concluding figure that elucidate whether there is a (positive/negative) relationship in this phenomena. Hence the hypothesis:

H.1 Does the existing literature in the family involvement and financial performance converges to a positive or negative effect?

This paper departs from the existing literature examining family firm's financial performance paying particular attention to several unexplored issues that can be behind such disperse results discussed above. In particular the family firm definition, methodological choices and manuscript characteristics, are examined. The family firm definition has been argued (cite, cite) to be a defining factor in the findings supporting the existence of a family firm effect upon financial performance. Among the methodological choices are the estimation methods, error correction transformations, or endogeneity. In many studies these issues have

gained acceptance however, it is yet not a widespread approach. Finally, the manuscript characteristics are examined in order to mainly identify a potential publication bias, this is, whether the academic community involved in this topic has leaned towards a particular outcome.

The hypotheses related to this can be stated as follows:

H.2 Is the family firm definition used in the literature a distinguishable factor in the family firm and financial performance effect found in the literature?

H.3 Are methodological choices among the factors that can differentiate the family firm and financial performance effect found in the literature?

H.4 Is there a publication bias that can be linked to the study characteristics in the family firm and financial performance effect found in the literature?

To address these hypotheses the study relies on the meta analysis regression approach to examine each paper as the data generating process of the information collected. This is, each manuscript is taken as a full source of information to understand the findings. The paper characteristics as well as the findings is coded to examine effect size and publication bias. The existing studies examining the financial performance of family firms have not approach the analysis in this comprehensive way. Therefore we extract information regarding the document characteristics, data of the study, details of the explanatory variables, econometric methods used, in order to address the hypothesis above.

3 Data

The goal of the paper is to study the family ownership - financial performance relation, in light of the aforementioned conflicting results found in the literature. Given that the arguments of divergent results rest on the definition of "family firm" concept, and the choice of estimation method, these two become the main variables of interest of the paper. The paper characteristics are used as moderator variables. The procedure was as follows:

1. Define search terms and collect the studies that comply with such criteria (see appendix A.2.1 for a comprehensive list of search terms and search engines used).
2. Code studies in two dimensions. First the "manuscript" characteristics, such as: author, paper, and journal characteristics among others.[2] Second the "study" characteristics, such as: hypothesis, family firm definition, regression coefficient, sample, regression method, presence of robustness results, presence, method and coefficient of endogeneity corrected estimation.[3]
3. Compute effect sizes (partial correlation coefficient).
4. Examine Publication bias.
5. Use meta-regression to explain the multiplicity of results paying particular attention to family firm definition and methodological procedures and choices among the studies.

The following subsections describe in detail the first three these steps, while separate sections are devoted to publication bias and meta-regression analysis.

3.1 Studies collection

Terms such as "family firms", "family business", "performance", "financial performance", "econometric results" and "econometric estimation" were used to perform document search in bibliographic databases (table 1). The complete list of terms is presented in table A.2.1. The list of words is gathered around three groups of terms: family firm, performance and econometric estimation. This criteria reduces the search only to those studies that undertake an econometric estimation between performance and family firms. Therefore this meta-analysis gathers information exclusively in literature that explores, via an econometric estimation method, the equation

$$Performance = F(Family\ firm) \tag{1}$$

[2] Questionnaire available from authors upon request.
[3] Questionnaire available from authors upon request.

Table 1. Bibliographic databases used in literature search and number of documents retrieved

	Keywords			
Data base	(1) Family firm terms	(2) (1) AND Performance	(3) (2) AND / OR Econometric results	(4) Comply with equation 1
EBSCO	201,592[d]	12,310	101[a c]	10
ISI - web of science	3,364	151	164[b]	7
ProQuest	21,768	2,642	87[a c]	20
Science Direct	1,284	30	32	14
Scopus	7701	113	153	23
Total				74

Note: AND / OR is used as bolean in search engines. a. AND used in search. b. OR used in search c. "family" was used in title for further refinement. d. The high number of documents is due to search upon whole text instead of narrower fields. Column 5 figures correspond to the final source the document was retrieved from, several duplication between sources appeared while sorting the list. Search performed first week of June 2016. The final number of studies examined was reduced to 61 once several studies were not suitable for analysis due to poor reporting of standard error or statistics to derive size effects.

Source: Author's estimation.

Table 1 summarizes the search process of documents given the particular options of each database. Taking ISI-web of science as an example, the search allows terms in the topic, this means searching in: title, abstract, author keywords and keywords plus®. The search including all family firm terms reported 3,364 manuscripts. Refining the search to include performance terms, narrows the number of documents to 151. After including econometric results terms, the number of manuscripts is 164. Finally, after removing duplicates from other sources, and examining each document complies with an econometric estimation such as the one in equation 1, the number of documents included in this study is 7.

3.2 Coding

A total of 61 documents were coded, accounting for 785 observations or estimations. The process of extracting information from documents was split in two. First the "manuscript" characteristics; and second the "research" characteristics. The coder identity and article identification were standardized for both questionnaires. A team of undergraduate research assistants without advanced knowledge in meta-analysis or econometric methods coded the "manuscript" characteristics. Authors and research assistants with knowledge in the family firms literature and econometric methods coded the "research" characteristics, finally authors double checked all "study" characteristics data and fixed minor typing mistakes.

The "manuscript" characteristics are: Outlet type: paper, working paper, book chapter, other;[4] title), Document title, year of publication, abstract, number of references, number of references in family firm literature, self-citations, number of conference the paper was presented, year, pages, number of authors, author(s): name, surname, affiliation, gender; paper's cites per year, paper's H-index, journal's cites per year, journal's H-index.

The "study" characteristics are: hypothesis (verbatim text, page), data(country, structure: cross section, panel data, time series), time span (data begins, data ends), observations (cross section and time dimension), firms listed (yes, no), family firm definition (verbatim text, page), efecto(dependent variable, dependent variable (name, definition, page), independent variables (number, list), corporate government variable (yes, no), fixed effects variable (yes, no), family firm variable (name, definition, page, coefficient, standard error / test statistic,), summary statistics reported (yes, no), functional form (lineal, log-log, log-lineal, lineal-log), estimation method (Ordinary Least Squares (OLS), GMM, Maximum likelihood (ML), other), serial correlation corrected, heterosckedasticity corrected, cluster standard errors, robustness check estimations (yes, no), estimates corrected by endogeneity, endogeneity methodology, instrumental variables, exogenous variable to instrument family firm, family firm instrumental variable coefficient, family firm instrumental variable standard error / test statistic, endogeneity argument (verbatim text, page).

[4]The final account of papers examined reduced only to papers published in academic journals.

Table 2. Description and summary of regression variables

Variable	Description	Mean	Min.	Max.	Std. Dev.
	Document characteristics				
References	References	65.26	14	186	31.18
Ref. Fam. Lit.	References related to family literature.	19.44	0	126	19.86
Self citations	Number of self citations. This is references to articles written by authors.	1.443	0	11	2.133
Conferences	Number of conferences where the document was presented prior to publication.	1	0	16	2.620
Year	Year of publication.	2,010	1,999	2,016	3.896
Pages	Number of pages of document.	23.05	7	64	11.01
Number of authors	Number of authors	2.328	1	4	0.870
Number of male authors	Number of authors (Male)	1.689	0	4	1.057
Number of female authors	Number of authors (Female)	0.639	0	3	0.775
Female authors presence	Takes value of 1 if any author is female	0.475	0	1	0.504
Cites per year (paper)	Paper's Cites per year	22.62	0	269.9	39.38
H-Index (paper)	Paper's H-Index	0.918	0	1	0.277
Cites per year (journal)	Journal's Cites per year	531.7	0	4,589	905.9
H-Index (journal)	Journal's H-Index	22	0	83	18.80
	Data				
Data begins (Year)	First year reported for data.	2,000	1,986	2,010	5.405
Data ends (Year)	Last year reported for data.	2,005	1,988	2,012	5.136
Years studied	Number of years analysed by the study.	5.377	1	12	3.256
Data Listed	Takes value of 1 when used data corresponds to listed firms, and 0 if otherwise.	0.855	0	1	0.352
Data Listed & Non-listed	Takes value of 1 when used data corresponds to listed and non-listed firms, and 0 if otherwise.	0.0984	0	1	0.300
Data Non-listed	Takes value of 1 when used data corresponds to non-listed firms, and 0 if otherwise.	0.0467	0	1	0.208
Firms per study	Total number of firms used in study.	730.4	51	24,084	3,064
Observations	Total firm-year observations used in study.	1,548	135.4	24,084	3,128
Data structure	Takes value of 1 if data structure is longitudinal, and 0 if data structure corresponds to a cross section.	0.820	0	1	0.387
	Explanatory variables				
Effect size	Effect size r is computed as $r = \frac{t}{\sqrt{(t^2+df)}}$ when t statistics are reported and as $r = \frac{z}{n^2}$ when z statistics are reported.	0.0458	-0.568	0.283	0.114
Effect size Fisher	Fisher Z-transformation to obtain a normal distribution of effect sizes is computed as $Zr = 0.5 \times \ln\left(\frac{(1+r)}{(1-r)}\right)$	0.0400	-0.993	0.291	0.160
Expl. variables	The number of explanatory variables used in each regression analysis.	10.05	3	20.47	3.786
Fixed effects	Takes the value of 1 if study takes into account for year, industry or any other type of fixed effects, and 0 if otherwise.	0.767	0	1	0.411
Governance	Takes the value of 1 if study uses a governance measure variable, and 0 if therwise	0.191	0	1	0.387
Fam. Firm definition (Type)	Takes the value of 1 if family firm variable is dichotomous in the study, and 0 if it corresponds to a continuous variable.	0.765	0	1	0.331

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Variable	Description	Mean	Min.	Max.	Std. Dev.
Fam. Firm def. 1	Takes value of 1 if family firm definition takes family ownership or control into acount, and 0 if otherwise.	0.801	0	1	0.335
Fam. Firm def. 2	Takes value of 1 if family firm definition identifies if a family member occupying a management position within the firm, and 0 if otherwise.	0.363	0	1	0.383
Fam. Firm def. 3	Takes value of 1 if family firm definition identifies if family members occupy governance positions within the firm, and 0 if otherwise.	0.242	0	1	0.361
Fam. Firm def. 4	Takes value of 1 if family firm definition identifies if a family succesion process is taken into account, and 0 if otherwise.	0.241	0	1	0.377
Fam. Firm def. 5	Takes value of 1 if family firm definition identifies if the orginial founder is still present in the firm, and 0 if otherwise.	0.167	0	1	0.318
Fam. Firm def. Complexity	Sum of number of definitions of family firm from the above definitions.	1.814	1	4	0.811
	Methods				
Method hetero.	Takes value of 1 if study explicitly corrects for heterosckedasticity problems, and 0 if otherwise.	0.478	0	1	0.501
Method robust.	Takes value of 1 if study does a robustness check, and 0 if otherwise.	0.536	0	1	0.471
Method cluster SE	Takes value of 1 if study explicitly does a clusterd standard errors procedure, and 0 if otherwise.	0.0984	0	1	0.300
Method serial corr.	Takes the value of 1 if study corrects for serial correlation problems, and 0 if otherwise.	0.252	0	1	0.433
Method error term correction	Takes value of 1 if study undertakes a standard error correction dealing with heteroscedasticity, clustered or serial correlation.	0.541	0	1	0.502
Method summ. Stats	Takes value of 1 if study presents summary statistics, and 0 if otherwise.	0.958	0	1	0.180
Method est. 2SLS	Takes the value of 1 if study estimation is conducted using two stages leas squares.	0.0410	0	1	0.189
Method est. 3SLS	Takes the value of 1 if study estimation is conducted using three stages leas squares.	0.0164	0	1	0.128
Method est. GLS	Takes the value of 1 if study estimation is conducted using generalized least squares.	0.170	0	1	0.374
Method est. GMM	Takes the value of 1 if study endogeneity correction uses generalized method of moments, and 0 if otherwise.	0.115	0	1	0.321
Method est. ML	Takes the value of 1 if study endogeneity correction uses maximum likelihood method, and 0 if otherwise.	0.0164	0	1	0.128
Method est. OLS	Takes the value of 1 if study endogeneity correction uses ordinary least squares, and 0 if otherwise.	0.642	0	1	0.475
Endogeneity	Takes value of 1 if study does an endogeneity correction, and 0 if otherwise.	0.264	0	1	0.409
Endogeneity Argument	Takes value of 1 if study offers an endogeneity argument, and 0 it otherwise.	0.156	0	1	0.330
Endogeneity est. GMM	Takes the value of 1 if study endogeneity correction uses GMM method, and 0 if otherwise.	0.0328	0	1	0.180
Endogeneity est. Heckman	Takes the value of 1 if study endogeneity correction uses Heckman method, and 0 if otherwise.	0.0408	0	1	0.183
Endogeneity est. IV-2SLS	Takes the value of 1 if study endogeneity correction uses IV-2SLS method, and 0 if otherwise.	0.0712	0	1	0.235

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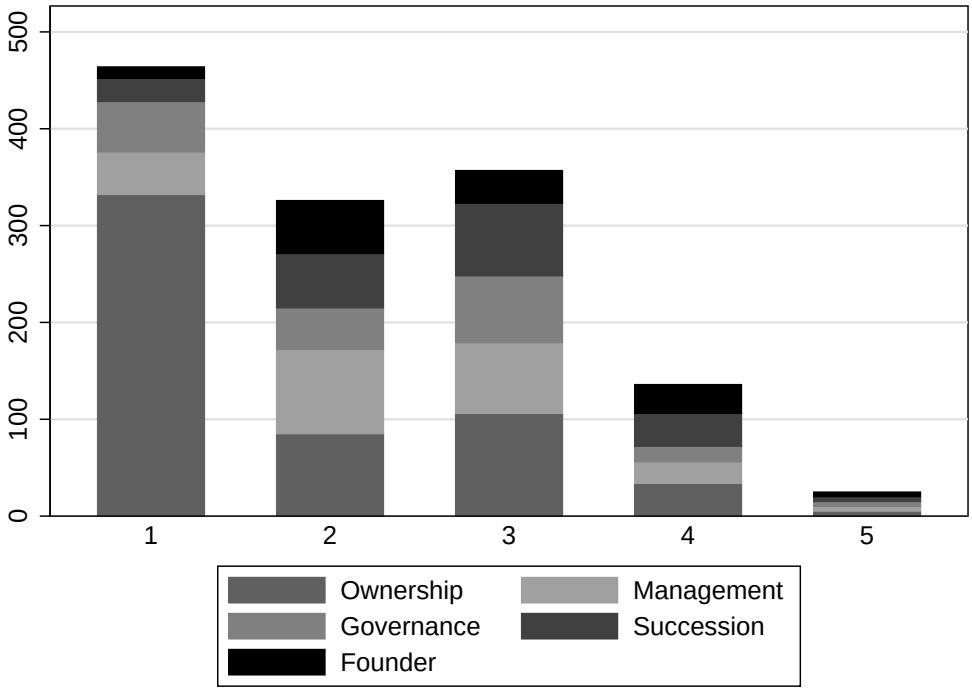

Figure 1. Family firm definition complexity.
Note:.
Source: Author's estimation.

3.3 Family firm definition

Following Chua et al. (1999) family firm is understood as an entity that differentiates from other firms in the way it is governed and/or managed by a single family or a number of families shaping a vision of the business towards the sustainability of the firm across generations. This broad definition was operationalized by Chua et al. (1999) and O'Boyle et al. (2012) around four concepts: ownership, management, governance and succession. Chua et al. calls for empirical studies to consider this broader dimension when studying family firms. This study takes such breakdown and adds one extra category which accounts for the presence of the founder among the firm. For each paper's family firm definition, this paper classifies whether any of these five categories are considered or any combination of them.

Coders transcribed verbatim the family firm definition and researchers classified using the following criteria. If the definition involved a family which controls or owns the firm we classified it in the ownership category. Studied papers usually operationalized this concept as a binary variable or as continuous variable which showed the amount of stakes owned by the family as percentage. For the management category, definitions which took family involvement through a CEO or a chairman were taken into account. Definitions which were categorized as governance, usually discussed family involvement in a firm as its capacity to influence in the board of directors. For papers that used a generational dimension to a family firm definition we used the succession category. Finally, a number of studies used the presence of the firm's founder as a way to define or distinguish different kind of family firms, for which this study adds this category to the ones suggested by Chua et al..

The complexity of each definition is operationalized by simply counting the number of categories in which each family firm definition can be classified. Figure 1 shows how family firm definition varies in complexity through studied papers. Most of the definitions use only one category (the most used category is ownership), and the number of definitions which use more than one category decreases as the complexity or family firm dimensions taken into account rises.

4 Effect size estimation and publication bias

The partial correlation coefficient is the statistical measure chosen to standardize the coefficients reported in the studies analyzed, this option is based on the practice proposed by Hristos Doucouliagos (2008); Stanley and Doucouliagos (2012) and other meta-analysis research such as Valickova et al. (2014) and Wang and Shailer (2015). The partial correlation coefficient was extracted from each regression analysis reporting a t-statistic or standard error and degrees of freedom (df).

$$r_{ij} = \frac{t_{ij}}{\sqrt{t_{ij}^2 + df_{ij}}} \tag{2}$$

r_{ij} is the partial correlation coefficient (effect size) from the i-th estimation in the j-th study.

The corresponding standard error for each partial correlation coefficient can be computed using Fisher (1954) formula

$$SEr_{ij} = \frac{r_{ij}}{t_{ij}} \tag{3}$$

where SEr_{ij} is the standard error of the partial correlation coefficient r_{ij}, and t_{ij} is the t statistic reported for the i-th estimation in the j-th study.

Once this transformations are computed, a funnel graph is an introduction to the analysis (figures 2 and 3). The funnel graph plots the estimated partial correlation coefficient or effect size and the inverse of its corresponding standard error (Stanley et al., 2013). It acquires its name for its usual funnel shape, which shows how those estimates on the top (those with small standard errors) are tightly dispersed, and those on the bottom of the funnel graphs are widely dispersed and have higher standard errors reflecting less precise estimates and some sort of bias. Figure 2 displays the funnel plot for all the financial performance variables and figure 3 shows the funnel plot separately for each financial performance variable used in the literature reviewed.

In the absence of publication bias, funnel plots should be symmetrical around the effect, suggesting that published studies do not favor any effect size based on the statistical significance. A skewed to the right or left funnel plot indicates some sort of publication bias for statistically significant effects. This publication selection bias, as stated by Card and Krueger (1995) and Stanley et al. (2013) may be due to three reasons: 1) Reviewers and editors who are predisposed to accept papers consistent with conventional views. 2) Researchers may use conventionally expected results as a model selection test. 3) There may be a predisposition to treat statistically significant results favorably.

All funnel plots examined show the expected shape, also an apparent symmetrical distribution of effect sizes. The solid line in each funnel plot suggest a positive effect of the relationship between family firm involvement and financial performance. This is the first piece of evidence in the analysis of this literature, it points out that further tests will revolve around a a positive association between financial performance and family involvement. However the approach to a systematic literature review is to examine further and deeper this relationship, therefore the subsequent analysis conducting simple and multiple regression analysis.

We follow Stanley et al. (2013); Stanley and Doucouliagos (2012); Valickova et al. (2014) and Demena and van Bergeijk (2016), among others, to model publication bias with a meta-regression model as follows:

$$r_{ij} = \beta_0 + \beta_1 SEr_{ij} + e_{ij} \tag{4}$$

the coefficient β_1 is a measure of the publication bias and β_0 is a measure of the average effect corrected by publication bias. When adopting this approach it is known that the variance of our estimated error varies through the estimates, so the meta-regression equation is corrected via weighted least squares and clustered standard errors at the study level. Such correction is conducted after all variables in 4 are transformed using as weight $1/SEr$, therefore, the equation to estimate the meta-regression analysis is:[5]

$$\frac{r_{ij}}{SEr} = \beta_0 \left(\frac{1}{SEr}\right) + \beta_1 + e_{ij} \left(\frac{1}{SEr}\right) \tag{5}$$

[5]This procedure is undertaken automatically by the statistical software employed without the need to actually modify the variables.

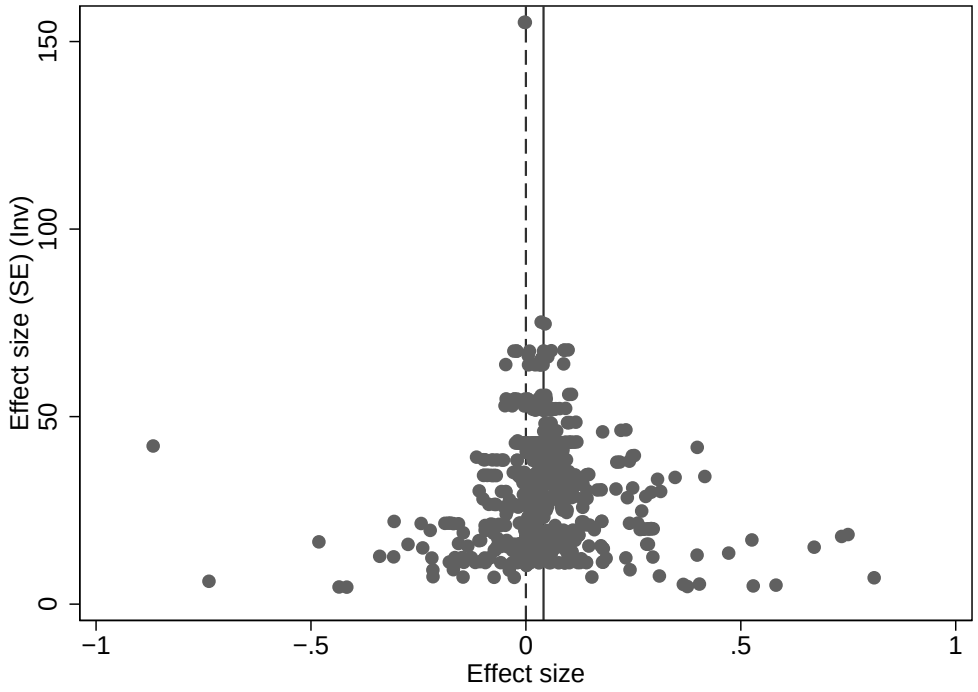

Figure 2. Funnel plot all dependent variables.
Note: Solid line shows the average effect size.
Source: Author's estimation.

In this setting, conventional t-tests upon both coefficients become central in the assessment of the literature. When testing whether the slope coefficient is statistically significant different from zero or not (β_1 in equation 4 and β_0 in equation 5), a test of publication bias is being conducted. The statistical significance of this coefficient indicates whether there is a publication bias of the effects being investigated. This test is labeled Funnel Asymmetry Test (FAT) since it tests, in terms of the funnel figure, if effects are evenly distributed along different standard error distributions. The constant coefficient in equation 4 (and β_1 in equation 5) is a measure of the empirical effect found in the literature. Testing whether this coefficient is different from zero is a test of whether there is a genuine underlying empirical effect in the literature, accounting for any potential publication bias. This test is labeled Precision Effect Test (PET). Both the FAT and PET are examined after estimating equation 5, therefore it is labeled FAT-PET.

Following Stanley and Doucouliagos (2012) and Stanley et al. (2013) if there is publication bias ($\beta_1 \neq 0$ in equation 4) the β_0 coefficient measuring the effect size will be biased downward. A correction for this effect suggests using SEr^2 as the weight in the weighted least squares estimation. This estimation is labeled Precision-Effect Estimate with Standard Error (PEESE), which renders a more precise measurement of the intercept and therefore the effect size of the literature studied. Stanley and Doucouliagos (2012) suggest this estimate should only be examined when the PET suggests a statistically significan relationship in the literature being examined.

Table 3 shows the estimation results for equation 4 after the correction suggested in 5. The constant coefficient is the effect size of the relationship between family firm and financial performance (PET). The slope coefficient, Effect size (SE), examines the existence of asymmetric distribution of standard errors around the effect size, therefore inform of publication bias (FAT). The results are presented for all the financial performance variables examined in the literature, and separately. In all this set of estimations suggests there is a positive effect between family firms and financial performance, disregarding the type of financial performance variable and ROA-Earnings Before Interest, Taxes, Depreciation, and Amortization (EBITDA), ROA-Net income and Tobin's Q (columns FAT-PET), the coefficient is corrected in columns PEESE; and there is no effect size when ROE and Tobin's Q is used. The effect size is measured between 0.030 and 0.057.

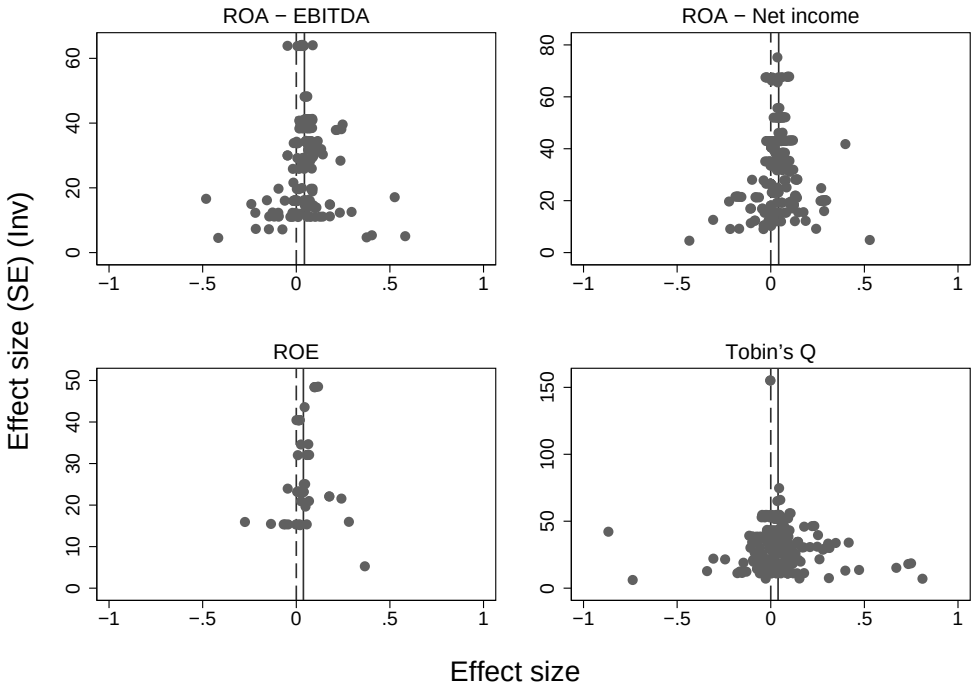

Figure 3. Funnel plot by dependent variable.
Note: Solid line shows the average effect size.
Source: Author's estimation.

Regarding publication bias there is no evidence of such except in the Tobin's Q FAT-PET estimation. This result suggests that when studying firm financial performance via Tobin's Q, journals are more prone to publish those studies with tighter precision upon the effect. In this case, as discussed previously, the PET can be biased downward and the PEESE estimation is in order. Therefore the correct measure summarized from the literature linking family involvement and financial performance is 0.026.

Table 3. FAT-PET and PEESE analysis

	All financial performance variables		ROA-EBITDA		ROA-Net income		ROE		Tobin's Q	
	FAT-PET	PEESE	FAT-PET	PEESE	FAT-PET	PEESE	FAT-PET	PEESE	FAT-PET	PEESE
Publication bias										
Effect size (SE)	0.320		-0.215		0.0666		-0.855		0.768c	
	(0.319)		(0.480)		(0.567)		(1.054)		(0.440)	
Effect size (SE) Sq		1.054		-2.649		-0.972		-3.867		5.992
		(2.218)		(3.533)		(4.731)		(10.35)		(3.693)
Effect size										
Constant	0.0309^{a}	0.0383^{a}	0.0570^{a}	0.0537^{a}	0.0421^{a}	0.0447^{a}	0.0705	0.0476^{c}	0.0118	0.0260^{a}
	(0.00992)	(0.00577)	(0.0182)	(0.0104)	(0.0128)	(0.00517)	(0.0466)	(0.0259)	(0.0126)	(0.00942)
Observations	785	785	168	168	250	250	59	59	308	308
R-squared	0.003	0.000	0.003	0.005	0.000	0.000	0.035	0.007	0.010	0.004
F-stat	1.003	0.226	0.200	0.562	0.0138	0.0422	0.658	0.140	3.044	2.632

Note: Weighted least squares estimator. Cluster standard errors at document level in parentheses. Significance level: $a.\ p < 0.01$, $b.\ p < 0.05$, $c.\ p < 0.1$.

Source: Author's estimation.

This first set of results allow to summarize and conclude that family firm involvement studies, on average, support a positive association. Studies that examine this relation using ROA-EBITDA, ROA-Net and Tobin's Q are the most reliable in establishing this association, while those relying on ROE are not. There is also evidence of poor asymmetry in studies using Tobin's Q. The first conclusion leads into answering hypothesis 1, the basic meta-analysis regression suggests there is a positive association in the relationship family firm - financial performance. The last finding suggests there is publication bias in studies using Tobin's Q. Following the methodological approach adopted in this meta-analysis, the next step is to conduct the estimation of meta-regressions in a multivariate setting, this implies extending equations 4 and 5 including several of the paper and research characteristics described in section 3.

5 Meta-regression analysis

The meta-regression analysis allows to examine publication bias and effect size conditional on other relevant characteristics of the literature under scrutiny. Those moderator variables may account for any unobserved heterogeneity and possible bias not considered when equation 4 and 5 are studied as in section 4. In particular, variables that describe the original research process of the literature are desirable as explanatory variables reduce any bias coming from omitted variables, and at the same time, to understand the sources of variation in the effect size and publication bias (if any).

Such analysis is based on the estimation of equation 6 proposed in Stanley and Doucouliagos (2012). This summarizes that the effect size is conditional on the realization of the K explanatory variables $\beta_0 + \sum_k \beta_k$; in the same way, publication bias is represented by $\beta_1 + \sum_k \delta_k$. The K variables now capture whatever that can influence the effect size in the sense that shows author's choices in reporting an estimate; and publication bias in favoring (or not) such estimate.

$$r_{ij} = \beta_0 + \beta_1 SEr_{ij} + \sum_k \beta_k Z_{ki} + \sum_k \delta_k SEr_{ij} Z_{ki} + e_{ij} \tag{6}$$

As discussed in section 4 equation 6 is heteroscedastic, therefore the same transformation upon the observed variables is needed. Weighted least squares, clustered at study level, was used to correct the error structure:

$$\frac{r_{ij}}{SEr_{ij}} = \beta_0 \frac{1}{SEr_{ij}} + \beta_1 + \sum_k \beta_k Z_{ki} \frac{1}{SEr_{ij}} + \sum_k \delta_k Z_{ki} + e_{ij} \tag{7}$$

Equation 7 is the one used in this study to investigate covariates that add to size effect and to publication bias (those interacted with the effect size standard error).[6] Given the design of this study several variables characterizing the published literature examining family firm performance were collected (see section 3) and gathered around document, data, explanatory variables and methodological characteristics. This section presents regression estimation results for such set of variables.

5.1 All characteristics

This section examines how effect size and publication bias are associated with a subset of studies characteristics among those described in table 2. This estimation is summarized in table 4 (standard errors are excluded to reduce space).

The first results correspond to the one that examines all financial performance variables, in this case there is no evidence of significant family effect (constant in the regression equation). There is no publication bias evidence either in this estimation. Except for the female author presence variable, which shows a statistically significant coefficient in the family effect and publication bias.[7]

The estimation results that show a positive effect, after controlling for all the chosen characteristics, are the ones that use as the financial performance variable examined ROA-EBITDA and ROA-Net income, at the same time there is no publication bias for ROA-EBITDA, but there is for ROA-Net income (at the 10% significance level). For both variables the result also reveals significant effect of the different variables used as

[6] An equation using $SE^2 r_{ij}$ is also estimated for the extended meta-regression analysis in equation 7 to account for the PEESE.
[7] This variable is discussed broadly below.

proxies for documents, data, explanatory variables, and methodology characteristics. In particular two variables appear statistically significant and affect the bias and the effect size, these are male author presence, increasing bias and reducing the effect size, and OLS estimation reducing bias and increasing effect size.

In terms of data characteristics (for the ROAEBITDA) years studied yield a positive and significant coefficients, increasing the positive effect in the relationship between family firm and financial performance reported in the literature, while the same variable reduces the publication bias. Contrary to this effect, the data structure (longitudinal versus cross section) significantly reduces the effect and increases the bias. Considering now explanatory variables characteristics control variables, the family type (the use of a dichotomous variable to classify a family firm) negatively affect the family firm performance measure and increases the bias; the complexity of the definition increases the effect size and decreases the bias. That is, simple ways to group family firms in the studies significantly reduce publication bias. Finally, in terms of methodology characteristics, OLS estimations increase the effect size while reduces the publication bias.

The interactions effect with the standard errors also yield significant coefficients, consistent with the discussion above. For instance, male presence reduces the publication bias when ROA-EBITDA and ROA-Net income are used as performance measure. Publication bias also increases with variables such as: data structure, whether the countries studied belong to Asia and Latin America, and family firm definition.

Taking this together, the literature that uses ROA-EBITDA and ROA-Net income shows a positive relationship between family firm and financial performance whether or not control variables are included. However the fact that some of the control variables are significant induces to conclude that the results reported in the literature can be explained by the document, data, explanatory variables and methods used, instead of a genuine association between family firm and financial performance. Regarding publication bias, these results are in line with results reported in table 3 given the statistically significant effect size (SE) and the corresponding interaction with several control variables, as explained above.

In contrast to the set of studies that examine ROA-EBITDA and ROA-Net income, those that used ROE and Net income and Tobin's Q as performance measure show negative significant family influence (constant in the regression equation) and publication bias. Although the set of papers that used ROE still show significant control variables that influence the family effect upon performance they are not discussed further given the small sample and dubious coefficient sizes, for instance no bias effect was found and effect size suggests a negative effect corresonding to a 96% correlation.

Finally, for the set of studies that used Tobin's Q as their performance variable, there is evidence of negative family influence upon performance and positive publication bias. This set of results also show how OLS estimation reduces bias significantly and increasies the size effect. Tobin's Q is also the set of studies which error correction has a significant effect reducing the size effect. These results implied that, on average, the papers that use ROA - EBITDA and ROA-Net Income are bias toward reporting positive family influence. On the contrary, the literature that uses Tobin's Q, yields negatively biased results on average. Not surprisingly the overall (all financial performance variables) literature shows inconclusive results regarding there is a significant effect size and publication bias.

Our results are consistent on the view that family by itself do not lead to a good or bad financial performance per se, but are other factors such as XXXXXX (CITES)

Summarizing these results in terms of hypotheses 2 to 4. Hypothesis 2 and 4 are strongly supported in the regression using ROA-EBITDA and ROA-Net Income. When family firm is codded as a dummy variable (in contrast to a continuos variable, regardless of its definition), the size effect is smaller and increases publication bias. Based on the descriptive statistics 76% of the studies examined treat family firm in such way. When studies use a complex or several definitions of family firms, there is a larger association with the effect size and bias is lower. Suggesting ultimately that referees and editors end up favoring studies with male authors, less lower time span (Years studied), a cross section data structure, a dummy family firm definition, simpler family firm definitions and OLS estimation.

Hypothesis 3 is not supported in regards to the treatment of endogeneity in any estimation and error correxion. However the coefficients corresponding to estimation using OLS support hypothesis 3. In the estimations using ROA-EBITDA, ROA-Net income and Tobin's Q such variable increases the size effect and reduces the publication bias significantly in statistical terms as well as in the literature effect.

Table 4. FAT-PET and PEESE meta regression analysis with all paper characteristics.

		All financial performance variables	ROA-EBITDA	ROA-Net income	ROE	Tobin's Q
		FAT-PET	FAT-PET	FAT-PET	FAT-PET	FAT-PET
		Publication bias				
	Effect size (SE)	7.129	-2.794	-11.44c		24.50b
Doc. Charac.	Conferences (SE)	-0.118	0.0387	1.313	-283.3a	-1.497
	Male authors (SE)	-3.800	7.791b	12.08c		-19.80
	Cites p/y (paper) (SE)	0.0179	-0.0192	-0.157	25.91a	-0.0123
	Cites p/y (journal) (SE)	-0.000970	-0.00745	0.00299	0.751a	-0.00526
Data	Years studied (SE)	0.0136	-0.650b	-1.057	-136.6a	0.403
	Observations (SE)	0.0103	-0.0157	-0.0297	-0.0679	0.00827
	Data structure (SE)	-1.079	4.160a	-2.646		-7.970
	Country Asia - LA (SE)	2.473a	-2.385	6.507a		0.546
Expl. Var.	Expl. variables (SE)	-0.181	-0.00747	-0.422c	1.015a	0.0522
	Fam. Firm def. (Type) (SE)	0.656	2.010b	1.028	-68.33	1.561
	Fam. Firm def. Compl. (SE)	0.507	-1.420b	0.404	-11.23	1.735
Methods	Error term correction (SE)	0.542	2.583	-3.424	396.5a	4.101
	OLS (SE)	-1.416	-5.311a	-2.457c		-7.290c
	Endogeneity (SE)	-0.104	0.0699	2.421	-376.3a	-3.486
		Effect size				
	Constant	-0.356	0.645c	1.153b	-96.68a	-1.078b
Doc. Charac.	Conferences	0.000910	-0.000308	-0.0601	-3.681	0.0274
	Male authors presence	0.174	-0.350a	-0.446c	47.79a	0.967
	Cites p/y (paper)	-0.000465	0.00123	0.00693	-3.202a	0.000229
	Cites p/y (journal)	1.39e-05	0.000222	-9.70e-05c	0.171a	0.000111
Data	Years studied	0.000876	0.0293b	0.0390	4.085a	-0.0170
	Observations	-9.90e-05	0.000153	0.000254	0.000796	-0.000131
	Data structure	0.0454	-0.134b	0.0661		0.384c
	Country Asia-LA	-0.0871b	0.0673	-0.168	20.71a	-0.0597
Expl. Var.	Expl. variables	0.00125	0.00190	0.0110c	-0.0179a	-0.00365
	Fam. Firm def. (Type)	-0.0397	-0.125b	-0.0423		-0.0591
	Fam. Firm def. Compl.	-0.0119	0.0370b	-0.0189	0.232	-0.0372
Methods	Error term correction	-0.0799	-0.107	0.0948	26.06a	-0.280c
	OLS	0.0216	0.105c	0.0686c	56.92a	0.182c
	Endogeneity	-0.00109	-0.00150	-0.0584	5.620a	0.0783
	Observations	783	168	250	59	306
	R-squared	0.139	0.469	0.414	0.699	0.353

Note: Weighted least squares estimator. Cluster standard errors at document level in parentheses. F-stat reported corresponds to a weighted least squares estimator not clustered. Significance level: $a.\ p < 0.01$, $b.\ p < 0.05$, $c.\ p < 0.1$.

Source: Author's estimation.

6 Conclusion

Results presented in this papers contrast to the literature positing a positive family effect on firm performance. In this paper, after including a full set of control variables, we found that papers that use ROA-EBITDA as a financial performance variable, still show a positive family effect, but this is due to publication bias that document, data, explanatory variables, and methodological characteristics bring to the estimation.

In contrast to the set of studies that examine ROA-EBITDA, those that used ROA- Net income and Tobin's Q as performance measure show no significant family influence and no publication bias. These results implied that, on average, papers that use ROA-EBITDA are bias toward reporting positive family influence. On the contrary, papers that used Tobin's Q, yield unbiased results on average, and are not significant effect on

family influence.

Our results are consistent on the view that family by itself do not lead to a good or bad financial performance per se. Therefore, there must be another set of variables that the family firm literature still lacking to identify that relates on how family firms enhance or deprive management talent that is what really gear financial performance.

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