

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

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## Abstract

We perform a meta-analysis regression to contribute to the discussion of whether family firms exhibit better financial performance than non-family firms. Our approach allows to examine simultaneously effect size and publication bias in this literature and incorporate the three main factors raised in narrative literature reviews: financial performance measure, family firm definition, and methods used. In all we show evidence of a positive relationship between family involvement and financial performance. When ROA-EBITDA is used as performance variable, there are differential effects due to family firm definition and methods used. In general, our results support the positive association of family firms and financial performance, and highlight the fact that studies that use Tobin's Q are less responsive to bias when several document and data characteristics are examined.

**Key words:** Family firms, performance, meta-analysis.

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We perform a meta-analysis regression to contribute to the discussion of whether family firms exhibit better financial performance than non-family firms. Our approach allows to examine simultaneously effect size and publication bias in this literature and incorporate the three main factors raised in narrative literature reviews: financial performance measure, family firm definition, and methods used. In all we show evidence of a positive relationship between family involvement and financial performance. When ROA-EBITDA is used as performance variable, there are differential effects due to family firm definition and methods used. In general, our results support the positive association of family firms and financial performance, and highlight the fact that studies that use Tobin's Q are less responsive to bias when several document and data characteristics are examined.

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## 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 also important given 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. 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)<sup>1</sup>, have gathered theory and empirical evidence around different arguments in the relationship between family firms and financial performance. 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 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. (2015) exploring 48 studies focused on private family firms and do not find significant performance differences from non private family firms. van Essen et al. (2015) in examining the United States evidence of publicly listed firms find that previous studies favor the hypothesis of family firms outperforming other public corporations.

This study, in focusing on the three most salient issues raised in narrative reviews, choice of financial performance variable, family firm definition and estimation methods, seeks to add to the meta-analytic literature discussed above. We contribute to the literature in using Meta Regression Analysis (MRA) method proposed in Stanley and Doucouliagos (2012); Stanley et al. (2013) that simultaneously analyzes effect size and publication bias. There is also a contribution in disentangling the effect in the literature among three commonly used financial variables (ROA-EBITDA, ROA-Net income and Tobin's Q). Furthermore, our study extracts five family firm definitions and examine each one in terms of the effect upon financial performance; besides, a family firm complexity variable is constructed to account the fact that many studies in the literature reviewed combine some of the five definitions. Lastly, we consider methodological choices taken in the original studies regarding the estimation method, error correction and treatment of endogeneity issues.

Our examination of the literature is conducted over 61 papers seeing whether there is an effect upon financial performance from family firms, even after taking into consideration these

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<sup>1</sup>This is not an exhaustive compilation of literature reviews or papers that in performing or advancing hypothesis development conduct literature reviews on the topic.

three moderators that strongly influence the literature. We find, in line with some of the previous meta-analysis, that there is a positive relationship between financial performance and family firm regardless of the financial performance variable used. However, there is publication bias when the financial variable examined is Tobin's Q. Examining further any effect related to the family firm definition, studies that use ROA-EBITDA as the financial performance, maintain the positive effect. The two family definitions that reduces the effect size are firm involvement through management CEO and founder presence, and at the same time increase the publication bias effect; in other words CEO, and founder overestimate the positive relationship (effect size) in the literature and at the same time there is a publication bias favoring more precise results in terms of lower standard error. The econometric methodology used also makes a difference in ROA-EBITDA studies, the positive effect remains in studies conducting error correction methods and controlling for endogeneity, and studies carrying on a simple OLS estimation reduce bias and increase the effect size estimation.

The remainder of this paper is as follows. Section 2 discusses the existing debate of whether family firm has a positive or negative effect upon performance. Sections 3 and 4 present the data and methods used in the meta-regression analysis. Section 5 shows the estimation results, and section 6 concludes.

## 2 The family ownership - financial performance debate. Hypotheses development

The well documented prevalence of family firms in the world (La-Porta and Lopez-de-Silanes, 1999; Claessens et al., 2000; Faccio and Lang, 2002) continues raising the question if such ownership structure outperforms any other variant. The existing evidence is mixed in the theory side of the discussion and also in the empirical one. For instance, 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, or focus on firm survival as an ultimate firm objective. However, there are other reasons why the inverse relation can emerge, such as: consumption of private benefits, aiming non-economic or financial goals, and nepotism. In this section we discuss the arguments in favor and against a positive "family effect".

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

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 endorsed by several empirical studies such as 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) and Martínez et al. (2007) also found a positive “family effect” using ROA, Return on Equity (ROE), and Tobin’s Q.

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

Studies that take care of bias due to an endogenous relation between family involvement and financial performance are: Palia et al. (2008), Villalonga and Amit (2006), Adams et al. (2009), and Fahlenbrach (2009). They show a positive “family effect”, but again, contingent to whether the founder was present as CEO.

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) proposes 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); dilution of 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).

Empirically, Holderness and Sheehan (1988) report a negative “family effect”, measured 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 have shown a negative family effect when heirs controls the management of the firm (Smith and Amoako-Adu, 1999; Pérez-González, 2006).

Given the conflicting theoretical results from family firms, and the diverse empirical evidence, we begin summarizing the effect of family firm upon financial performance conducting a meta-regression analysis. Hence the first hypothesis we want to post is:

**H.1** Existing literature in the family involvement and financial performance converges to a positive (or negative) effect

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 industry on which firms operate, the macroeconomic environment reigning in the period of study, the choice of financial performance variable, the family firm definition used, or the empirical methodological approach.

In relationship to institutional settings, industry sector or macroeconomic environment, [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, however found no negative family effect when firms were managed by heirs. [Maury \(2006\)](#) also for Europe found a positive premium when family was involved in management.

The choice of financial performance indicator, family firm definition and methodological approach, are the next topics examined in this study. Beginning with financial performance (e.g. [ROA](#), [ROE](#), Tobin’s Q) the question of which is the correct measure of value in the context of family firms is debatable. 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, among others. 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 the family firm performance, and therefore the empirical literature.

Following the literature on family business, there are several studies using industry-adjusted [ROA](#), [ROA-net income](#), [ROA-Earnings Before Interest, Taxes, Depreciation, and Amortization \(EBITDA\)](#) and Tobin’s Q as performance measures (see, e.g., [Anderson and Reeb, 2003a](#); [Andres, 2008](#); [Maury, 2006](#); [Smith and Amoako-Adu, 1999](#), among others). A salient feature of these variables is that the first three are accounting measures of financial performance, while Tobin’s Q a market financial performance. This leads to our second hypothesis:

**H.2** The financial variable chosen to examine the family involvement and financial performance relationship affect the outcome.

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, and 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. Therefore our third hypothesis is:

**H.3** The family firm definition used in the literature is a distinguishable factor in the family firm and financial performance effect found in the literature.

Finally we consider the methodological approach taken in original studies. Issues such as correction over the error term, estimation method and endogenous variables become pivotal in terms of final results. Many studies fail in adopting sophisticated estimation methods, adding to the variety of results discussed previously. More importantly in empirical studies, the relation between financial performance and ownership can be deemed as endogenous. On the one hand, direct ownership leads to better supervision (lower agency costs) that translates into better financial performance (Demsetz and Lehn, 1985; Himmelberg et al., 1999); on the other hand, families or other blockholders could decide to keep their stakes in firms they expect to perform well in the future (Anderson and Reeb, 2003a; Villalonga and Amit, 2006). Bennedsen et al. (2007) yields an alternative endogeneity argument in which family managers can yield better financial performance (due to lower agency costs, long-term vision, and specific knowledge about the firm's operation) inducing families to appoint a family member as manager knowing ex-ante a positive outcome, refraining the firm to have a more experienced external manager. On the contrary, if the firm's prospects are poor, the family might hire an external manager. Based on these arguments, our final hypothesis is:

**H.4** Methodological choices in the estimation of the family firm effect upon financial performance has a differential effect.

As we can see from these theoretical and empirical findings the state of the literature, swinging among positive and negative "family effect" on firm performance, a Meta-Analysis is in order to pin down some of the different factors and their relative importance that drive these differences reported in the literature. To address these hypotheses this study relies on meta analysis regression approach to examine the literature. Each paper studied becomes the data generating process of the relationship between family firms and financial performance, this is, each manuscript is taken as a full source of information to explore the hypotheses. Therefore we extracted information regarding financial performance variables, family firm definition, and econometric methods. Also, the document characteristics, data of the study and, details of the explanatory variables, were also collected in order to improve identification of the coefficients and isolate the relationship of interest. This comprehensive approach to study the literature becomes itself a contribution of this study, where not only we examine if there is a significant positive (or negative) relationship in existing manuscripts, but also identify publication bias, focusing on the key issues that permeate the literature.

### **3 Methodological procedures**

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 some of the arguments of divergent results rest on the choice of financial variable, the definition of "family firm" concept, and the choice of estimation method, these become the main variables of interest of this study. The procedure to collect the data was the following:

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. Second the “research” characteristics, such as: hypothesis, family firm definition, regression coefficient, sample, regression method presence of robustness results; presence, method and coefficient of endogeneity corrected estimation.<sup>2</sup>
3. Compute effect size (partial correlation coefficient) from regression coefficients showing the relationship between financial performance and family firm (See section 3.1).
4. Use meta-regression to examine effect size and publication bias.
5. Use meta-regression to examine how the financial performance variable, family firm definition and methodological procedures tame the family firm ownership - financial performance relationship in the literature.

The following subsections describe in detail the first three steps, while sections 5 is devoted to 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. 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 to those studies that undertook an econometric estimation examining financial performance using family firm (in any sense) as an explanatory variable. Therefore this meta-analysis gathers information exclusively of literature that explores, via an econometric estimation method, the following equation:

$$\text{Financial performance} = F(\text{Family firm}) \quad (1)$$

Table 1 summarizes the search process of documents given the particular options of each database used. Taking ISI-web of science as an example, the database allows search in the topic of manuscripts, 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 financial 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 was 7.

TABLE 1 HERE

### 3.2 Coding

A total of 61 documents were coded, accounting for 785 observations or estimations that include a regression coefficient suitable with equation 1. 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 research assistants without advanced knowledge in meta-analysis or econometric methods coded the “manuscript” characteristics. Authors and research assistants

<sup>2</sup>Both questionnaire available from authors upon request.



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. To reduce errors in the coding process, a web based questionnaire was used to systematize the information capture. Precise instruction and examples of the necessary information was summarized in the questionnaire and several training sessions were conducted among coders to ensure accuracy in the information collected.

The “manuscript” characteristic’s collected focused on: Outlet type (published paper in academic journal, working paper, book chapter, other), 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, author (number of authors, name, surname, affiliation, gender), paper’s cites per year, paper’s H-index, journal’s cites per year, journal’s H-index<sup>3</sup>.

The “research” characteristics focused on: 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), 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, heteroskedasticity 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).

The variables are summarized in table 2. The same procedure was conducted in all five databases used in the search process. The final number of studies examined was 61, once several studies were not suitable for analysis due to poor coefficient reporting in regards to standard error or statistics to correctly derive size effects.

TABLE 2 HERE

### 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. (1999) calls for empirical studies to consider this broader dimension when studying family firms.

Our study takes these four categories and adds one extra dimension which accounts for the presence of the founder in the firm. Because of this diverse view of family firm definition in the literature we conduct a classification of how the papers defined family firm. Furthermore, we construct a measure of family firm complexity. This approach departs from the existing meta-analysis studies on the relationship between family firm and financial performance.

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<sup>3</sup>These four variables dealing with literature impact factor were extracted using Harzing (2007)

This paper classifies which of these five categories used or if a combination of them is used in the papers analyzed. Coders transcribed verbatim the family firm definition and researchers classified them 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 (both measures were collected). 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 upon the 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, in those cases, this study adds the succession category to the previous four proposed by Chua et al. (1999).

The family firm complexity definition is operationalized by 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.

FIGURE 1 HERE

#### 4 Effect size and funnel graph

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*).

$$r_{ij} = \frac{t_{ij}}{\sqrt{t_{ij}^2 + df_{ij}}} \quad (2)$$

$r_{ij}$  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

$$SEr_{ij} = \frac{r_{ij}}{t_{ij}} \quad (3)$$

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 generated. The funnel graph plots on the x-axis the estimated partial correlation coefficient or effect size and on the y-axis the inverse of its corresponding standard error (Stanley et al., 2013). It acquires its name for its usual funnel shape, which shows how the 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.

In the absence of publication bias, funnel plots should be symmetrical around the effect, suggesting that published studies do not favor any effect size (positive or negative partial correlation) 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 (positive or negative “family effect” in our context). 2) Researchers may use conventionally expected results as a model selection test. 3) There may be a predisposition to treat statistically significant results favorably.

FIGURE 2 HERE

FIGURE 3 HERE

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. All funnel plots examined show the expected shape, also an apparent symmetrical distribution of effect sizes. The solid line in each funnel plot shows the average effect size suggesting a positive effect of the relationship between family firm involvement and financial performance. This is the first piece of evidence or result answering to hypothesis 1, on average family firm literature suggests there is a positive effect of family firm upon financial performance. However our approach to a systematic literature review is to examine further and deeper this relationship, therefore the subsequent analysis conducting simple and multiple regression analysis becomes useful.

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

$$r_{ij} = \beta_0 + \beta_1 SEr_{ij} + e_{ij} \quad (4)$$

the coefficient  $\beta_1$  is a measure of the publication bias and  $\beta_0$  is a measure of the average size 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 equation 4 are transformed using as weight  $1/SEr$ , therefore, the equation to estimate the meta-regression analysis is:

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

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 ( $\beta_1$  in equation 4 and  $\beta_0$  in equation 5), a test of publication bias is being conducted. This test is labeled Funnel Asymmetry Test (FAT) since it tests, in terms of the funnel figure, if effect sizes are evenly distributed along different standard error distributions. The constant coefficient in equation 4 (and  $\beta_1$  in equation 5) is a measure of the empirical effect size 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 the estimation is labeled FAT-PET.

Following Stanley and Doucouliagos (2012) and Stanley et al. (2013) if there is an effect size ( $\beta_0 \neq 0$  in equation 4) the  $\beta_0$  coefficient measuring the effect size might 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 significant relationship in the literature being examined.

Table 3 shows the estimation results for equation 4 after the correction suggested in equation 5. The constant coefficient is the estimated 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 evidence of publication bias (FAT). The results are presented for all the financial performance variables examined in the literature, and separately.<sup>4</sup> This set of estimations suggests there is a positive effect between family firms and financial performance when pooling all the financial performance measures (0.0293 in column 2), additionally as explained above, the PEESE estimation shows a higher average effect size of 0.0379, both estimates are statistically significant. Besides, the publication bias coefficient is not different from zero. This result supports hypothesis 1 in the sense of a positive relationship in the literature linking financial performance and family firm.

In analyzing different financial performance variables, ROA-EBITDA, ROA-Net income and Tobin's Q, there is evidence of positive relationship when examining ROA measures in both the FAT-PET and the PEESE estimates. The coefficients range from 0.042 to 0.057 and are all statistically significant at 1%. In the case of Tobin's Q, the average effect size is not significantly different from zero, however the standard error is. Both results suggests no effect size in this literature but presence of publication bias. A reading of this result suggests that, on average, papers using Tobin's Q as a performance measure can not render conclusive results, and at the same time effect size are correlated with standard errors, implying published results can be explained by their precision, suggesting publication bias. In other words, high precision (low standard errors) estimates are typically more prevalent in the literature.

#### TABLE 3 HERE

This first result allows to conclude that the literature supports the family firm involvement, on average, implies a positive association with financial performance. Studies that examine this relationship using ROA-EBITDA and ROA-Net income are the most likely to establishing this association, while those relying on Tobin's Q are not. There is also evidence of publication bias in studies using Tobin's Q, which is not found in all variables or ROA-EBITDA and ROA-Net income. This result leads into answering hypothesis 1.

Continuing 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 the variables of interest in relation with our hypothesis.

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<sup>4</sup>Studies using ROE were also collected and examined, however results refrain from reporting this measure due to the weakness of ROE to inform precisely about financial performance.

## 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 unobserved heterogeneity and possible bias not considered when equation 4 and 5 are studied as in section 4. In particular, family firm definition and estimation methods used in the literature.

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.

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

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:

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

Equation 7 is the one used in this study to investigate covariates that add to effect size and to publication bias (those interacted with the effect size standard error).<sup>5</sup> Given the objective of this study, family firm definition and estimation methods were included as explanatory variables (see section 3). This section presents regression estimation results for such set of variables.

### 5.1 Family definition

One of the salient issues discussed in the family business literature is how family business are defined and studied. This section examines the effect size and potential publication bias in the literature analyzing whether, first, family firm is defined by a dummy variable or a continuous measure, second, the five family firm definitions discussed in section 3.3 and third, the family firm definition complexity proposed in section 3.3.

Meta-regression analysis was undertaken as proposed in equations 6 and 7. Most of the regression results show no effect size or publication bias after these variables were included. The only salient result appears when the equation is estimated for the ROA-EBITDA financial performance measure (table 4). The absence of significant results in the remaining financial performance variables is by itself important in our context. This result implies family firm definition does not influence the relationship between family firm and performance, except when the study examines ROA-EBITDA. This is a not so obvious result when conducting a narrative review or standing from a specific approach towards the family - performance relationship. Notably, Tobin's Q is used in many papers discussing the relationship, concluding a positive effect, however as shown in table 3 and confirmed in table 4 we can not establish a systematic effect. One approach to understand

<sup>5</sup>An equation using  $SE^2 r_{ij}$  is also estimated for the extended meta-regression analysis in equation 7 to account for the PEESE.

such result is the fact that listed firms (the only ones able to use Tobin's Q as a performance variable) have a higher sensibility to many other factors than ROA measures, which ultimately can be easily affected by family CEO or founder.

Table 4 shows how neither the type of family firm variable used, nor family firm definition complexity has an effect upon the effect size or publication bias. However, when family firm involvement is explained using CEO as the family involvement (with respect to the any other family definition) there is evidence of a differential effect. In particular, the family firm effect and publication bias when the CEO defines the family presence are both statistically and economically significant with respect to any other definition. The same result applies when family firm is examined in regards to the founder with respect to any other definition. This result is in line with narrative reviews and the preponderant view of the literature that shows CEO and founder involvement and family firm performance as positive. This set of results does not comply with hypothesis 3. Only for the studies that use ROA-EBITDA as the financial performance variable and family firm definition around CEO and founder provide evidence of a differential effect, in the relationship family involvement and financial performance.

TABLE 4 HERE

## 5.2 Methodological choices

Now, in exploring hypothesis 4, three methodological choices are examined, first whether the study included any correction method upon errors, such as: heteroscedasticity, clustered or serial correlation. Second, whether the study used OLS as estimation method of the reported coefficient, and third, whether the study corrected for endogeneity issues. Results are shown only for those studies that use ROA-EBITDA (table 5).

TABLE 5 HERE

Firstly, the effect size found in previous estimations remains when considering the estimation method chosen. In particular when the existence of an error correction methodology is examined, the magnitude of the effect size increases from 0.057 to 0.098. Those studies that presented OLS estimates have a higher effect size and publication bias is reduced. This is, econometric results from an OLS estimation have a higher effect size and lower bias with respect to any other estimation method. This result can be explained from the practice of reporting baseline results using this method, as well as the secondary effect of other methods upon the error term.

Finally, studies that include a endogeneity correction reduce the effect size in 0.042. This result in particular is in line with the endogeneity arguments used in the literature in which performance can also effect family presence. Therefore, not correcting for such endogeneity bias leads to overestimating the positive relationship, in fact the average effect is  $0.0665 - 0.0424 = 0.0241$ , a lower figure than the one found in previous estimations around 0.057 (see table 3 and 4).

This set of results are in line with hypothesis 4 in the sense that the estimation method has an impact upon the effect size and publication bias. No other evidence of these choices were found in the remaining three financial performance variables.

### 5.3 All characteristics

This section examines whether effect size and publication bias are associated with a subset of studies characteristics among those described in table 2. In contrast to previous estimations, all variables are included simultaneously. This estimation is summarized in table 6 (standard errors are excluded to reduce space).

The first result worth to highlight is 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 studies reporting OLS estimation where publication bias decreases (consistent with our previous finding and observable across all financial variables measures reported in the table). The column showing results for estimations using Tobin's Q reflect the reduction in publication bias when the estimation comes from OLS, a lower publication bias and higher effect size explained by the number of observations. Both results are in sharp contrast with the coefficients found in ROA-EBITDA and ROA-Net Income where several explanatory variables appear as statistically significant in the meta-regression analysis. Such result suggests studies using Tobin's Q are less responsive to document, data and other paper characteristics as ROA estimates are. In general this is an important finding of this analysis, the studies examining the relationship between family involvement and financial performance using Tobin's Q are unrelated to the characteristics of the research process.

In terms of data characteristics (for the ROA-EBITDA) years studied yield 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.

Taking these results together, the literature that uses ROA-EBITDA 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.

TABLE 6 HERE

## 6 Conclusion

In this paper we approach the discussion of the relationship between family involvement and firm financial performance using meta-regression analysis. The meta-regression analysis focuses on simultaneously showing effect size and publication bias after estimating whether financial



performance measure, family firm definition and methods become moderators in the relationship. Based on theoretical arguments and empirical results these three issues have become the preponderant themes in existing narrative reviews of the literature.

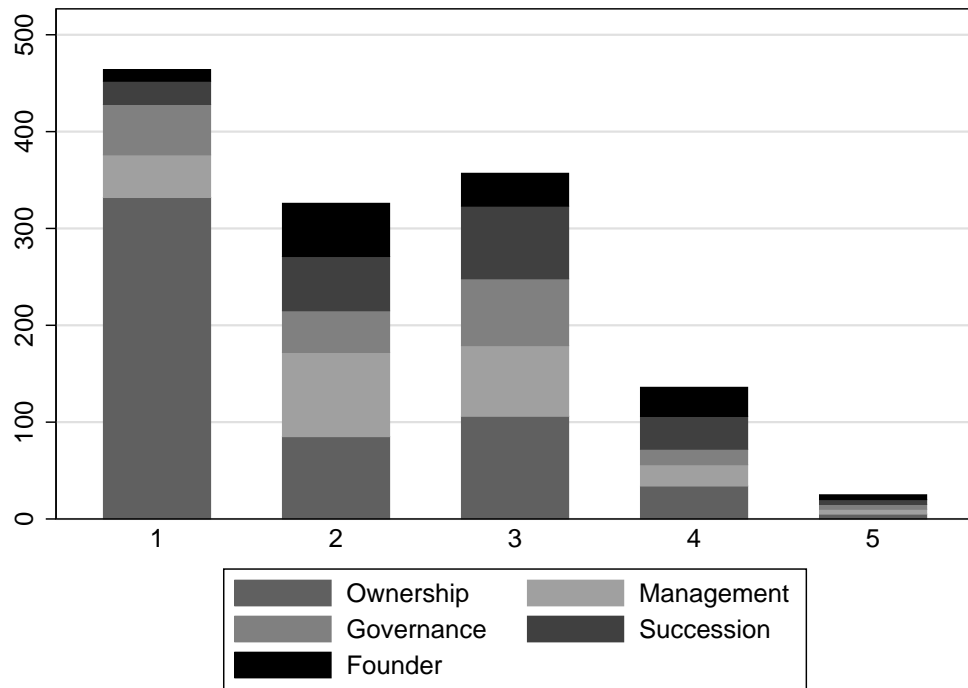
The results regarding the financial performance measure including all the performance measures together (ROA-EBITDA, ROA-Net income and Tobin's Q) suggests a positive correlation between financial performance and family firm involvement. Once the performance measures are examined separately, this result holds for ROA-EBITDA and ROA-Net income, but not for Tobin's Q. Based on this set of results we also find evidence of publication bias when the financial variable examined is Tobin's Q. Both results allow to understand better the conflicting evidence of previous reviews, the financial measure matters in a non trivial way, market based measures do not allow to define an effect due to the myriad variables affecting performance, while the accounting measures do.

Regarding family firm definition upon financial performance we find that regardless of the definition used, the positive effect previously found remains and there is no evidence of publication bias or changes in the size effect. Only when ROA-EBITDA is used we found some evidence of publication bias and different size effect when CEO and founder distinguish the family involvement. This result is in contrast with narrative reviews which stress the need to narrow family firm definition to understand the relationship. Our finding suggests that complexity of family firm definition used in the literature we study has not significant effect upon the performance measures reported in the literature. Finally, the econometric methodology used also makes a difference in ROA-EBITDA studies, the positive effect remains in studies conducting error correction methods and controlling or endogeneity, and studies carrying on a simple OLS estimation reduce bias and increase the effect size estimation.

When pooling these three factors together with control variables examining document and data characteristics the meta-regression shows how studies using Tobin's Q are less responsive to document, data and other study characteristics. On the contrary, studies that use ROA-EBITDA can be explained by such factors, which clouds the family involvement - performance relationship.

Our results, based on the existing literature, are consistent with the view that family involvement is linked with a good financial performance. This approach is not without questioning once the type of financial performance, family firm definition or estimation methods are considered. However most of the results maintain the outcome of a positive association regardless such potential taming factors. The only consistent case when there is a differential effect is observed in ROA-EBITDA, such set of studies do show effect sizes and publication bias linked to family firm definition and estimation methods.

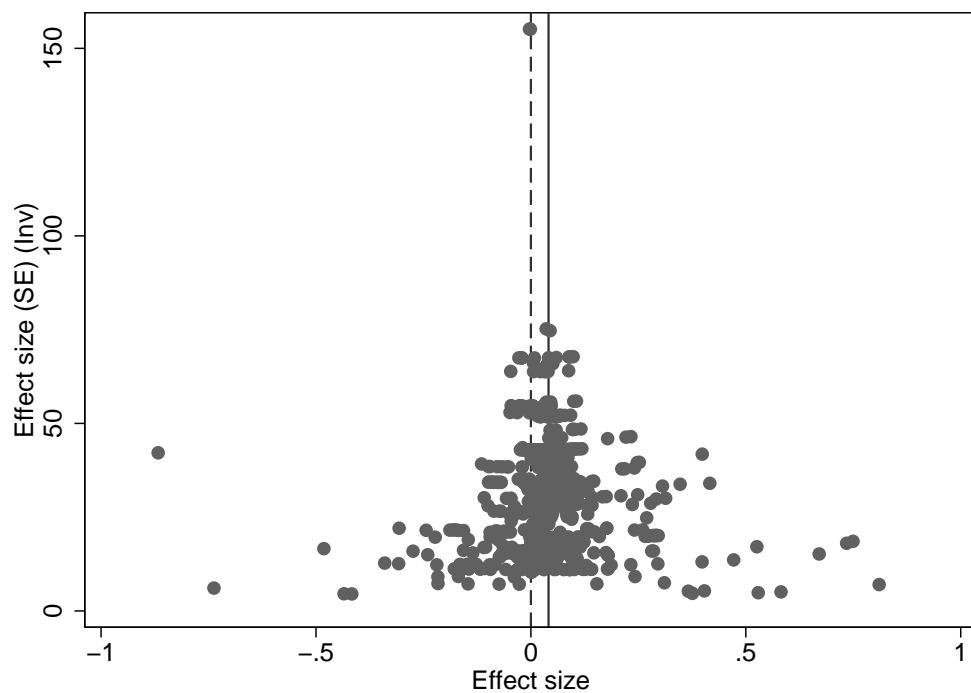
## Figures



**Figure 1.** Family firm definition complexity.

*Note:* The number of definitions in each estimation is reported in the x-axis. The number of estimations is reported in the y-axis. Shaded areas in each bar represent the definition used.

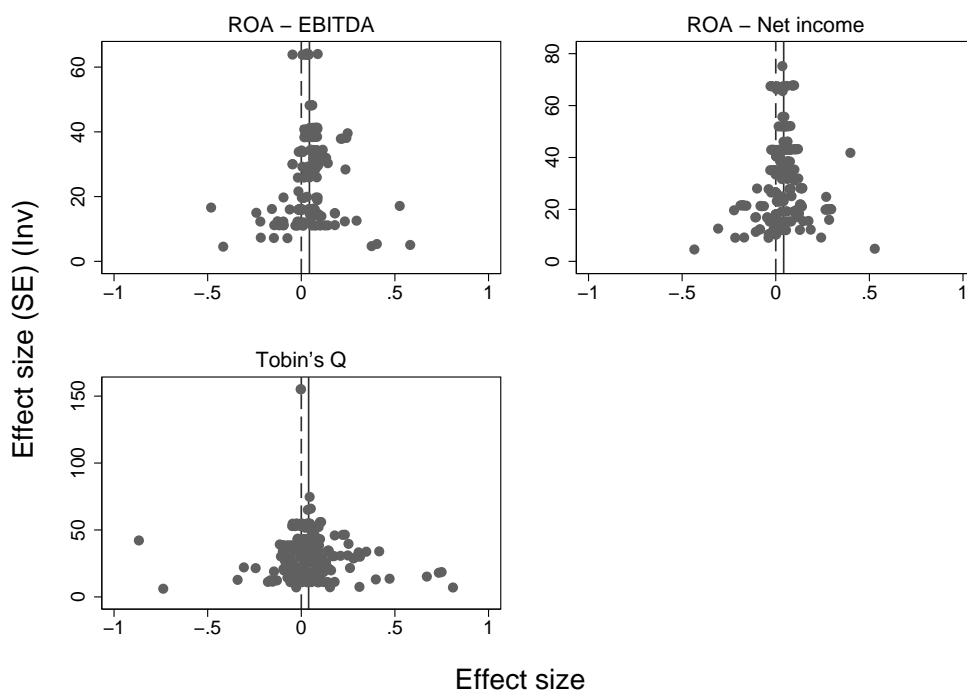
*Source:* Author's estimation.



**Figure 2.** Funnel plot all dependent variables.

*Note:* Solid line shows the average effect size.

*Source:* Author's estimation.



**Figure 3.** Funnel plot by dependent variable.

*Note:* Solid line shows the average effect size.

*Source:* Author's estimation.

## 7 Tables

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

Data base	Keywords			
	(1) Family firm terms	(2) (1) AND financial performance	(3) (2) AND / OR Econometric results	(4) Comply with equation 1
EBSCO	201,592 <sup>d</sup>	12,310	101 <sup>ac</sup>	10
ISI - web of science	3,364	151	164 <sup>b</sup>	7
ProQuest	21,768	2,642	87 <sup>ac</sup>	20
Science Direct	1,284	30	32	14
Scopus	7,701	113	153	23
Other sources <sup>e</sup>				
Total				74

*Note:* AND / OR is used as boolean 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 4 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.

*Source:* Author's estimation.

**Table 2.** Description and summary of regression variables.

Variable	Description	Mean	Min.	Max.	Std. Dev.
Manuscript 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
Manuscript characteristics					
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

*Continued on next page*

Variable	Description	Mean	Min.	Max.	Std. Dev.
Explanatory variables					
Effect size	Effect size $r$ is computed as $r = \frac{t}{\sqrt{(t^2+df)}}$ when $t$ statistics are reported and as $r = \frac{z}{\sqrt{n}}$ 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 otherwise	0.191	0	1	0.387
Fam. Firm definition (Type)	otherwise				
Fam. Firm def. 1	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
Fam. Firm def. 2	Takes value of 1 if family firm definition takes family ownership or control into account, and 0 if otherwise.	0.801	0	1	0.335
Fam. Firm def. 3	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. 4	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. 5	Takes value of 1 if family firm definition identifies if a family succession process is taken into account, and 0 if otherwise.	0.241	0	1	0.377
Fam. Firm def. Complexity	Takes value of 1 if family firm definition identifies if the original founder is still present in the firm, and 0 if otherwise.	0.167	0	1	0.318
Method hetero.	Sum of number of definitions of family firm from the above definitions.	1.814	1	4	0.811
Method robust.	Methods				
Method cluster SE	Takes value of 1 if study explicitly corrects for heteroskedasticity problems, and 0 if otherwise.	0.478	0	1	0.501
Method serial corr.	Takes value of 1 if study does a robustness check, and 0 if otherwise.	0.536	0	1	0.471
	Takes value of 1 if study explicitly does a clustered standard errors procedure, and 0 if otherwise.	0.0984	0	1	0.300
	Takes the value of 1 if study corrects for serial correlation problems, and 0 if otherwise.	0.252	0	1	0.433

*Continued on next page*

Variable	Description	Mean	Min.	Max.	Std. Dev.
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 least squares.	0.0410	0	1	0.189
Method est. 3SLS	Takes the value of 1 if study estimation is conducted using three stages least 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 if 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
Endogeneity est. LIML	Takes the value of 1 if study endogeneity correction uses LIML method, and 0 if otherwise.	0.00345	0	0.211	0.0270
Endogeneity est. Treat. Eff.	Takes the value of 1 if study endogeneity correction uses Treatment effects method, and 0 if otherwise.	0.00820	0	0.500	0.0640

Note:

Source: Author's estimation.



**Table 3.** FAT-PET and PEESE analysis.

	All financial performance variables		ROA-EBITDA		ROA-Net income		Tobin's Q	
	FAT-PET	PEESE	FAT-PET	PEESE	FAT-PET	PEESE	FAT-PET	PEESE
	Publication bias							
Effect size (SE)	0.376 (0.335)		-0.215 (0.480)		0.0666 (0.567)		0.768c (0.440)	
Effect size (SE) Sq	1.294 (2.297)		-2.649 (3.533)		-0.972 (4.731)		5.992 (3.693)	
	Effect size							
Constant	0.0293a (0.0100)	0.0379a (0.00582)	0.0570a (0.0182)	0.0537a (0.0104)	0.0421a (0.0128)	0.0447a (0.00517)	0.0118 (0.0126)	0.0260a (0.00942)
Observations	726	726	168	168	250	250	308	308

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.

**Table 4.** Family definition effect on literature. [FAT-PET for ROA-EBITDA](#).

	Publication bias					
Effect size (SE)	-0.215 (0.480)	-1.835c (1.017)	0.0732 (0.615)	-1.144a (0.350)	0.199 (0.696)	-0.352 (0.435)
Fam. Firm definition (Type) (SE)		1.791 (1.176)				-0.501 (0.542)
Fam. Firm def. Complexity (SE)		0.458 (0.640)				
Fam. Firm def. Ownership / Control (SE)			-0.473 (0.873)			
Fam. Firm def. Management (CEO) (SE)				1.164c (0.617)		
Fam. Firm def. Governance (Board) (SE)					-1.413 (1.004)	
Fam. Firm def. Succession (SE)						1.704b (0.712)
Fam. Firm def. Founder (SE)						2.585a (0.785)
<hr/>						
	Effect size					
Fam. Firm definition (Type)		-0.107 (0.0706)				
Fam. Firm def. Complexity						
Fam. Firm def. Ownership / Control			0.0218 (0.0314)			
Fam. Firm def. Management (CEO)						
Fam. Firm def. Governance (Board)						
Fam. Firm def. Succession					0.0450 (0.0298)	
Fam. Firm def. Founder						-0.0355 (0.0238)
Constant	0.0570a (0.0182)	0.158b (0.0683)	0.0424b (0.0177)	0.104a (0.0213)	0.0461b (0.0213)	-0.0631b (0.0290)
Observations	168	168	168	168	168	168
R-squared	0.003	0.041	0.009	0.096	0.025	0.038
F-stat	0.200					

*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.

**Table 5.** Methodology effect on literature. **FAT-PET** for **ROA-EBITDA**.

Publication bias				
Effect size (SE)	-0.215 (0.480)	-0.792 (0.611)	4.153b (1.886)	-0.439 (0.400)
Method error term correction (SE)		0.427 (0.715)		
Method est. OLS (SE)			-4.660b (1.863)	
Endogeneity (SE)				1.328 (0.802)
Effect size				
Method error term correction		-0.0483 (0.0382)		
Method est. OLS			0.0868b (0.0382)	
Endogeneity				-0.0424c (0.0234)
Constant	0.0570a (0.0182)	0.0986b (0.0351)	-0.0289 (0.0370)	0.0665a (0.0175)
Observations	168	168	168	168
R-squared	0.003	0.067	0.139	0.018
F-stat	0.200			

*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.

**Table 6.** FAT-PET and PEESE meta regression analysis for paper characteristics.

		All financial performance variables	ROA-EBITDA	ROA-Net income	Tobin's Q
Publication bias					
	Effect size (SE)	4.856	1.354	0.703	9.380
Doc. Charac.	Conferences (SE)	0.0282	1.005	0.924	-1.137
	Cites per year (paper) (SE)	0.0168	-0.0551c	-0.0230	0.0157
	Cites per year (journal) (SE)	-0.000717	0.00641	0.000218	-0.00183
Data	Years studied (SE)	0.0587	-0.337	-1.164	0.173
	Observations (SE)	0.0131	-0.0206c	-0.0295	0.0274
	Data structure (SE)	-0.746	2.970a	-0.0460	-4.487
	Country Asia-LA (SE)	2.301b	-6.313c	4.096c	-0.580
Expl. Var.	Expl. variables (SE)	-0.189	-0.00707	-0.386c	0.0197
	Fam. Firm definition (Type) (SE)	0.893	1.692c	1.376	1.515
	Fam. Firm def. Complexity (SE)	0.357	-1.171c	0.324	2.288
Methods	Method error term correction (SE)	0.0737	4.392c	-5.000c	1.036
	Method est. OLS (SE)	-2.007c	-3.186b	-2.615c	-6.608b
	Endogeneity (SE)	-0.514	-0.0600	0.421	-0.778
Effect size					
Doc. Charac.	Conferences	-0.00239	-0.00593	-0.0512	0.0227
	Cites per year (paper)	-0.000404	0.00187	0.00383	-0.000414
	Cites per year (journal)	9.46e-06	-0.000222	-3.89e-05	4.42e-05
Data	Years studied	-0.000516	0.0129	0.0419c	-0.00904
	Observations	-0.000120	0.000271b	0.000254	-0.000275c
	Data structure	0.0218	-0.0767	0.0366	0.169
	Country Asia-LA	-0.0649	0.188	-0.0985	0.0656
Expl. Var.	Expl. variables	0.00188	0.00126	0.00950	-0.00624
	Fam. Firm definition (Type)	-0.0460	-0.108c	-0.0417	-0.0562
	Fam. Firm def. Complexity	-0.00865	0.0288c	-0.0147	-0.0491
Methods	Method error term correction	-0.0605	-0.193a	0.151	-0.113
	Method est. OLS	0.0337	-0.0157	0.0724c	0.164b
	Endogeneity	0.0122	-0.00801	-0.0118	0.0149
	Constant	-0.299	0.543c	0.640	-0.742
	Observations	724	168	250	306
	R-squared	0.137	0.439	0.381	0.295
	F-stat	8.056	4.444	153.7	88.97

Note: Weighted least squares estimator. Cluster standard errors omitted to reduce table length. 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.

# Appendices

## **A.1 Acronyms**

<b>CEO</b>	Chief Executive Officer
<b>EBITDA</b>	Earnings Before Interest, Taxes, Depreciation, and Amortization
<b>FAT</b>	Funnel Asymmetry Test
<b>GMM</b>	Generalized Method of Moments
<b>HOMA</b>	Hedges-Olkin Meta Analysis
<b>MASEM</b>	Meta-analytic Structural Equation Modeling
<b>MARA</b>	Meta-analytic Regression Analysis
<b>MRA</b>	Meta Regression Analysis
<b>ML</b>	Maximum likelihood
<b>OLS</b>	Ordinary Least Squares
<b>PEESE</b>	Precision-Effect Estimate with Standard Error
<b>PET</b>	Precision Effect Test
<b>ROA</b>	Return on Assets
<b>ROE</b>	Return on Equity

## A.2 Meta-analysis data

### A.2.1 Keywords

**Table A.1.** Keywords used in documents search

Family firm	(family firms family business family control family influence family ownership family - controlled firms family ceo's family managed firms family involvement founder firms founding family control founding family ownership founder influence founder - ceos )
Performance	(financial performance roa roe tobin's q)
Econometric results	(econometric results econometric estimation)

*Note:* Key words used in search of documents. The set of words within a parenthesis were used unconditionally. The set of words between parenthesis were used conditionally to the appearance of each other. This means that all searches would include a term from the first set, corresponding to family firms, second set, corresponding to performance, and third set, corresponding to econometric estimation.

*Source:* Author's estimation.

### A.2.2 Documents studied

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