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Introduction

This thesis comprises two distinct essays within the field of applied economics. Despite addressing distinct research inquiries, both chapters are thematically linked by their focus on matters pertaining to the boundaries of firms.

The first chapter is a joint work with prof. Maria Luisa Mancusi and prof. Luca Viarengo. The title of our essay is: "*Across* and *Within* Diversification: a more granular perspective on value creation in M&A deals".

This chapter investigates the impact of corporate diversification on the acquisition gains of bidders engaged in M&A deals. We do so by challenging the conventional classification of M&A deals into *related* and *unrelated* categories based solely on shared industries or sectors. To achieve this objective, we quantify diversification by utilizing the Entropy measure, a well-established index in corporate finance and industrial organization literature: such measure enables the decomposition of corporate diversification into two distinct components, each denoting a different level of industrial aggregation. By leveraging these components and their estimated variations resulting from the deal, we conduct a more detailed analysis of the relationship between diversification and bidders' gains. Our study focuses on a dataset comprising 2,577 deals completed between 1994 and 2017. In line with prior scholarly works, our findings validate the existence of a diversification discount. However, we present empirical evidence showcasing the heterogeneity of this phenomenon across different types of acquisitions: our results suggest that increased diversification is penalized only when the deal leads to an expansion in the number of industries or sectors in which the bidder operates.

The second chapter is a joint work with prof. Valeria Gattai. The title of our essay is: "Family Presence, Productivity and Specificity in Input Procurement: Firm-level Evidence from Italy".

This paper presents an empirical evaluation of the sourcing practices of Italian firms. We rely on the international economics literature on global sourcing, and the family business and international business literature on family firms' internationalisation, to construct a comprehensive framework that delineates how sourcing strategies are influenced by decisions related to location (domestic versus foreign sourcing) and ownership (integration versus outsourcing). Utilizing a novel firm-level, cross-sectional dataset comprising a stratified sample of Italian manufacturing firms, we explore the interconnection between sourcing strategies and various firm-level characteristics. Our results underscore the significance of family involvement in ownership and control, overall productivity, and dependence on specific inputs as principal determinants of sourcing decisions. While family firm status and productivity levels play a minor role in shaping ownership decisions, they significantly impact location choices, encouraging both domestic and foreign sourcing, respectively. Conversely,

the degree of reliance on specific inputs emerges as a pivotal factor guiding ownership decisions, favouring integration over outsourcing.

A version of this paper has been published in *Applied Economics*.

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Contents

Chapter 1

Across and *Within* Diversification: a more granular perspective on value creation in M&A deals

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Abstract
This chapter studies the impact of diversification on bidders' acquisition gains, by challenging the conventional categorization of M&A deals as *related* vs. *unrelated*, based solely on shared industries or sectors. To this aim, we employ the entropy measure of diversification, which allows a decomposition of corporate diversification into two additive components, each referring to a different level of industrial aggregation. Exploiting the two components and their estimated variation resulting from the deal, we can perform a more granular analysis of the relation between diversification and bidders' gains. We perform our analysis on a sample of 2,577 deals completed between 1994 and 2017. Coherently with previous literature, our results confirm the presence of a diversification discount. However, we provide evidence on the heterogeneity of such result across different acquisition types: we show increased diversification is penalized only when the deal results in an increase in the number of industries or sectors in which the bidder operates.

Keywords: mergers and acquisitions, market reaction, corporate diversification, entropy, bidder

JEL: G32, G34, L25

1.1) Introduction

Mergers and acquisitions (M&As) have long been recognized as strategic decisions that corporations might undertake to expand their market, increase competitiveness, enjoy economies of scale or scope, and in general achieve their growth objectives (Haleblian et al., 2009).

Acquisitions may be aimed at, and lead to, expanding the portfolio of activities in which the acquiring company operates. Diversification, as a strategic approach, involves expanding an organization's business activities into new product markets or geographic locations. It allows firms to reduce their exposure to market-specific risks and potentially capitalize on synergistic effects across different business segments (Maksimovic & Phillips, 2013). While diversification can yield various advantages, including increased stability, reduced risk, and improved resource allocation, it may have relevant disadvantages. Agency theory argues that diversification may be inefficient, as managing firms active in multiple industries is complex and capital might be allocated inefficiently across segments; moreover, diversification may fuel managerial opportunistic behaviour, fostering entrenchment and leading to suboptimal allocation of resources (Arikan & Stulz, 2016). From an empirical standpoint, findings on the relation between diversification and firms value are mixed, as well: notable early contributions document a conglomerate discount, while more recent contributions are supportive of the value-enhancing power of diversification (Maksimovic & Phillips, 2007).

The impact of corporate diversification on acquisition gains at the time of the announcement remains a subject of considerable debate in the literature, especially for the bidding firms: early studies argue that diversifying deals are associated to a positive takeover performance for bidders, while results from more recent studies support the idea that diversification is penalized by the market (Renneboog & Vansteenkiste, 2019).

In the context of M&A deals, diversification is usually accounted for as whether bidder and target firms share any n-digit Standard Industrial Classification (SIC) code or not, hence distinguishing between *related* and *unrelated* deals. We argue that this approach provides a rather coarse distinction and fails to adequately consider relevant facets of diversification.

First, the distinction between *related* and *unrelated* deals might be unable to discriminate between deals which are comparable in principle, yet substantially different from a strategic standpoint. The case of an undiversified company acquiring a target operating in a different sector and that of a conglomerate adding a different business to its portfolio would both be rightfully considered *unrelated* deals. However, these acquisitions might considerably differ in terms of the underlying strategic rationale, as well as of the consequences they might have on the organizational structures of the acquiring entities. Similarly, deals that would be categorized as *related* might be characterized by

a significant deal of heterogeneity. Say that a bidder, active in two sectors that are equally relevant in terms of relative sales to the total, acquires a target active in the same two sectors (i.e. a *related* deal). Should the latter present a homogeneous sales distribution across sectors, the acquisition would entail a consolidation in the bidder's initial business mix, which would remain unchanged. Instead, this would not be the case should the distribution of target's sector sales be more concentrated in one of the two sectors, as the acquisition might be intended for bidder's specialization.

Second, when a M&A announcement is made, we believe shareholders and investors may discount the fact that, should the deal come to a positive conclusion, it would imply a change in the bidder's corporate diversification: such variation regards both the array of sectors and industries in which the bidder is active, and in their relative importance within the firm. This would be overlooked if diversification is measured only in terms of whether or not the firms involved share any industry or sector.

In this regard, the aim of this study is to shed more light on the analysis of the relationship between bidder's short-run stock market returns and corporate diversification in mergers and acquisitions, by proposing a way to overcome the aforementioned limitations.

On the one hand, we account for the bidder's corporate diversification with a well-established indicator of corporate diversification, that is, the Entropy measure (Jacquemin & Berry, 1979). By means of such index, we are able to encompass different aspects of a firm's corporate diversification: not only Entropy accounts for the number of industries of activity, but also for the distributions of sales or assets across industry segments (hence, their relative importance within the firm), and the degree of relatedness among product segments (as can be captured by aggregating segments within industries) (Martin & Sayak, 2003). Thanks to its peculiar properties, total Entropy can be decomposed into two additive components, *Across* Entropy and *Within* Entropy, which are, respectively, the firm's diversification across different industries, and a weighted average of the firm's sector diversification within each industry of activity. This will allow us to account for both the scope of diversification, and the relative importance of each sector and industry within the firm.

On the other hand, we propose a way to measure the *change* in corporate diversification that the bidder would experience with the acquisition, under the assumption that shareholders take this into account in their market reactions following the announcement. We do so by calculating the difference between the bidder's Entropy measures before and after the announcement, where the latter are estimated as the weighted sum of the industry segments' information of the firms involved in the deal. To the best of our knowledge, variations in Entropy measures have never been employed in the analysis of short-run bidder takeover gains.

We perform our analysis using data on M&A deals completed over the period from January, 1st, 1994 to December 31st, 2017. Our final sample consists of 2,577 deals, in which bidder are companies incorporated in the US, and both bidder and target are publicly traded.

Overall, our results provide evidence in support of the existence of a diversification discount, as positive changes in the *Total* Entropy index are negatively welcomed by the market in the short run. When we concentrate on deals resulting in non-null variations in *Total* Entropy, increased diversification is penalized both across and within industries; instead, bidders' *ex ante* diversification as standalones does not seem a relevant factor in explaining takeover returns. Our analysis also suggests that the diversification discount is heterogeneous across different types of deals. In fact, increased diversification is penalized only when it follows the acquisition of targets engaged in at least some sectors or industries other than the bidders' (that is, only when the deals result in an increase in the number of industries or sectors in which the bidder operates). In particular, when bidders and targets do no share any sector or industry of activity, the across industry dimension of diversification is penalized; if, instead, they share some, the diversification discount is driven by its within industry dimension.

Our paper seeks to contribute to the existing body of knowledge by shedding light on the factors influencing the success of M&A deals and uncovering the nuances of diversification strategies in relation to bidder's acquisition gains. By delving into this research area, we aim to provide valuable insights that can guide managerial decision-making, enhance investor understanding, and contribute to the existing literature surrounding M&A transactions.

The remainder of the paper is organized as follows. The next section provides a review of the relevant literature on M&A activity and diversification. In Section 1.3 we describe the sample and data used in the empirical analysis. In Section 1.4 we define the variables used in the analysis and present some descriptive statistics. In Section 1.5 we report our empirical results. Section 1.6 concludes.

1.2) Literature review

1.2.1) M&A motives, corporate diversification and firm value

M&A deals are one of the most significant corporate events in a company's life. The relevance and size of the global M&A market has followed decades-long upward trend, in terms of both number and value of deals: in the 30-year span between 1990 and 2020, more than one million transactions

have been announced worldwide, with a known value of more than 75 trillion USD (Institute for Mergers, Acquisitions and Alliances, 2023).

Several reasons have been discussed in the literature as acquisition motives (Haleblian et al., 2009; Golubov, Petmezas & Travlos, 2013).

Overall, any M&A deal aims to exploit a bidder-target synergy of some kind (Bradley, Desai & Kim, 1988; Jensen & Ruback, 1983). At the economic and operational level, synergies may concern market power consolidation (Kim & Singal, 1993), the exploitation of scale and scope economies to enhance efficiency (Banerjee & Eckard, 1998, Seth, 1990), the creation of internal capital markets (Hubbard & Palia, 1999; Matsusaka, 1993), and market discipline against ineffective managers (Agrawal & Walkling, 1994; Martin & McConnell, 1991; Shleifer & Vishny, 1989).

An alternative rationale to synergistic motives pertains to agency theories, which see managerial self-interest as a driver of takeover activity against the shareholders' interests: managers may engage in value-reducing acquisitions to secure their position (Amihud & Lev, 1981), reduce the risk of being targeted (Field & Karpoff, 2002), or driven by over-confidence (Malmendier & Tate, 2008; Roll, 1986).

Additional motives regard external factors and firm-specific features, such as changes in regulation (Beneish et al., 2008; Matsusaka, 1996), industry shocks (Andrade & Stafford, 2004), booming markets (Savor & Lu, 2009), experience in acquisitions (Barkema & Schijven, 2008).

Most likely than not, acquisitions lead to corporate diversification. Diversification is a multifaceted topic, whose benefits and costs have been investigated from different theoretical perspectives.

Neoclassical theories, for instance, support the idea that diversification is an effective and value-enhancing way to employ firms' valuable scarce assets (Maksimovic & Phillips, 2013). First, diversification might increase shareholders' wealth when a firm's valuable scarce assets have higher returns in industries other than those in which it already operates, or when their outputs are more effectively employed in combination those of other industries (Maksimovic & Phillips, 2002). Second, corporate diversification yields diversified internal capital markets, which are deemed more efficient than external capital markets and limit the effects of financial dislocation in times of financial market stress (Matvos & Seru, 2014; Stein, 1997). Third, when a firm's comparative advantage is not clear a priori, diversification across different industries and activities may help discern those more appropriate (Matsusaka, 2001). Fourth, diversification may entail economies of scope, due to the elimination of redundancies across business lines (such as general costs of operations) (Gomes & Livdan, 2004).

Agency theories, instead, emphasise the negative features of diversification (Arikan & Stulz, 2016). On the one hand, agency theories argue diversification may be inefficient, as managing firms active

in multiple industries is complex and capital might be allocated inefficiently across segments (Rajan, Servaes & Zingales, 2000). On the other hand, they predict diversification fuels and is fuelled by managerial opportunistic behaviours, in an all but virtuous cycle: diversification may foster managerial entrenchment, as larger firms offer higher compensation and benefits to managers; management, in turn, faces incentives not to return cash to shareholders, but use it to keep diversifying to enlarge the company. Therefore, diversification entails agency problems, and the more the agency problems, the larger the incentives to diversify (Amihud & Lev, 1981; Denis, Denis & Sarin, 1997). On this matter, Ataullah, Davidson, Le & Wood (2014) argues that information asymmetries may prevent shareholders to distinguish between aligned and opportunistic executives, leading to discounting the value of diversifying firms even when these are led by managers who act to increase firm value (Gomez-Mejia & Wiseman, 2007).

From an empirical standpoint, findings on the relation between diversification and firms value are mixed as well. Notable early contributions document a conglomerate discount. Lang & Stulz (1994) shows diversified firms have lower Tobin's Q's than specialized firms, and are consistently valued less. On a similar note, Berger & Ofek (1995) estimates the valuation effect of diversification; they document a substantial value loss from diversification, which is larger for higher degrees of diversification, while mitigated when the segments of the diversified firms are in the same industrial *Major Group* (that is, they share the same 2-digit SIC code).[1] Comment & Jarrell (1995) argues shareholders benefit from higher corporate focus, and that diversified firms do not take advantage of some of the underlying financial economies of scope that were believed to be entailed by diversification (such as the greater use of debt or the more frequent recourse to internal capital markets). Maquieira, Megginson & Nail (1998) investigates stock-for-stock operations, focusing on the relationship between diversification and shareholders' or bondholders' gains, and on the existence of any synergistic gains; their results suggest that related mergers entail net synergistic gains, while diversifying mergers do not. Successive works are more supportive of the value-enhancing power of diversification. Graham, Lemmon & Wolf (2002) build on Berger & Ofek (1995)'s definition of excess value and argue the common claim for which diversification destroys value is biased. Using a sample of 356 firms active in the M&A market between 1980 and 1995, they show that a significant fraction of the excess value reduction experienced by the bidder after diversifying acquisitions is due to the acquisition of already discounted units, rather than to diversification itself. Campa & Kedia (2002) attempts at controlling for the endogenous decision of diversifying. By jointly estimating a firm's probability to diversify and its value, they provide evidence in favour of a diversification premium, suggesting diversification is actually value-enhancing if actually pursued. Relying on data

[1] A remarkable summary of these seminal contributions can be found in Maksimovic & Phillips (2007).

from the US Business Information Tracking Series database, Villanonga (2004) yields similar results. Kuppuswami & Villalonga (2016) shows the value of corporate diversification increased significantly during the 2007-2009 financial crisis: they show corporate diversification facilitates access to both credit and internal capital markets, playing an insurance role for investors in times of economic and financial turmoil. Choi, Menon & Tabakovic (2021) addresses the diversification-performance relationship using machine learning techniques, providing evidence in support of the diversification premium. A novel contribution on the relation between diversification and firms value is Mackey, Barney & Dotson (2017), as it makes use of a hierarchical Bayesian modelling approach to estimate the diversification-performance relationship at the individual firm level; interestingly, it shows that both undiversified and diversified firms choose the specific diversification strategy that maximizes value - either focus, or *related* diversification, or *unrelated*.

1.2.2) Measuring diversification in M&A deals

The potential effect of M&As on firm value has been frequently addressed by analysing the short-run outcome of acquisitions, that is, bidder's and target's stock market returns at time of announcement. Empirical evidence is unambiguous with respect to targets, which experience significant gains when acquired. With respect to bidders' gains instead results are mixed. On the one hand, the acquisition of private targets is generally positively welcomed by the market. On the other hand, bidders' returns are mixed when targets are public: most studies provide evidence of negative to null abnormal returns (Andrade, Mitchell & Stafford, 2001), while other document positive gains in acquisitions in presence of certain conditions (Alexandridis, Petmezas & Travlos, 2010).

The extant literature attributes a central role to corporate diversification when explaining bidders' takeover gains (Golubov, Petmezas, & Travlos, 2013; Renneboog & Vansteenkiste, 2019). Except for earlier studies on the 1960s' conglomerate merger wave, arguing that diversifying deals were positively welcomed by the markets (Hubbard & Palia, 1999; Matsusaka, 1993), most studies provide evidence that diversifying deals perform worse than related ones (among the others, see Fan & Goyal, 2006; Hoberg & Phillips, 2010; Kaplan & Weisbach, 1992; Morck, Shleifer & Vishny, 1990; Sicherman & Pettway, 1987), in accordance to theoretical predictions (Rhodes-Kropf & Robinson, 2008).

In most studies on M&As and diversification, the latter comes down to the dichotomous distinction between *related* and *unrelated* deals, depending on whether or not bidders and targets are active in the same n-digit SIC code industries or sectors ($n = 2,3,4$) (among the others, see Berger & Ofek, 1996; Campa & Kedia, 2002; Chevalier, 2004; Custodio, 2014; Eckbo, 1985; Feito-Ruiz &

Menéndez-Requejo, 2012; Graham, Lemmon & Wolf, 2002).[2] This is also the case in studies on the bidder's cumulative abnormal returns (among the others, see Arikan & Stulz, 2016; Gloubov, Yawson & Zhang, 2015; Hornstein & Nguyen 2014; Hubbard & Palia, 1999; Kaplan & Weisbach, 1992; Matsusaka, 1993; Morck, Shleifer & Vishny, 1990; Sicherman & Pettway, 1987).

Aiming for a more detailed definition of diversification, we rely on an index that is well-known measure in the Industrial Organization literature, that is, the Entropy measure (Jacquemin & Berry, 1979). The use of diversification indexes is common in corporate finance and industrial organization, with particular regards to the widely employed Herfindal index (among the others, see Berger & Ofek, 1995; Comment & Jarrell, 1995; Denis, Denis & Yost, 2002; Jiraporn, Kim & Mathur, 2008; Lang & Stulz, 1994; Scherer & Ravenscraft, 1984; Thomas, 2002; Vasilescu & Millo, 2016). Entropy measures are not new to the corporate finance and industrial organization literatures, either (among the others, see Clarke, Fee & Thomas, 2004; Custodio, 2014; Rodríguez-Pérez & Van Hemmen, 2010; Tokbolat, Le & Thompson, 2021; Villalonga, 2004); yet, to the best of our knowledge, they have been rarely employed to analyse how diversification in acquisitions is perceived by the market in the short run (for an example, see Ataullah, Davidson, Le & Wood, 2014).

Entropy allows measuring diversification not only with respect to how wide a firm's portfolio of industries and sectors of activity is, but also to how relevant each of them is in terms of relative sales to the total. Compared to other measures (including the aforementioned Herfindal index), the Entropy measure has the advantage to be decomposed into additive elements, measuring the contribution to corporate diversification at different levels of industrial aggregation to the total: *Total* Entropy is, in fact, the sum of *Across* (or *unrelated*) Entropy, measuring diversification across industries, and *Within* (or *related*) Entropy, accounting for diversification at the sector level, within different industries (Jacquemin & Berry, 1979).

1.3) Data and sample construction

Data on M&A announcements are obtained from the Thomson One Banker database, and refer to M&A deals completed over the period from January, 1st, 1994 to December 31st, 2017. The bidder's stock market data are obtained from the Center for Research in Security Prices (henceforth, CRSP).

[2] Various are the definitions of corporate relatedness employed by the literature. Hoberg & Phillips (2010) defines acquirer-target relatedness in terms of product market similarities, measured from text-based analyses of bidder-target couples' 10-K product descriptions. Bena & Li (2014), measures relatedness as technological overlap, namely how similar bidders and targets are in terms of innovation activities and levels of technological competency. Lee, Mauer & Xu (2018) quantifies relatedness in terms of human capital similarities, based on industry-specific occupation profiles. In most studies, however, corporate relatedness is expressed in terms of acquirer-target industry relatedness.

Accounting data are obtained from the Compustat Annual database, focusing on the most recent data available prior to the announcement. Information on the different industries and sectors within which firms are active is retrieved from the Compustat Industry Segment database. We rely on the latest available data before the deal is announced. For each segment, the Compustat Industry Segment database reports basic accounting information, along with a 4-digit SIC code, representing the *Industry Sector* of reference.

In the Compustat Industry Segment database, segments are classified with respect to four criteria (or *Segment Types*): *Business* segments, *Geographic* segments, *Operating* segments and *State* segments. *Business* segments identify the industry segments and product lines in which the firm operates; *Geographic* segments reflect the firm's exposure to domestic and foreign markets; *Operating* segments analyse a company's activities compared to others in a segment area(s) that is a hybrid of business and geographic types; *State* segments regard the domestic activity of North American companies particular to the USA and Canada. For a given firm-year combination, the *Business*, *Operating* and *State* criteria are mutually exclusive; on the contrary, the same firm-year couple could have its segments classified according to both *Geographic* criterion and one of the previous three, simultaneously. However, the main focus of *Geographic* segments is on the markets where the company is active, rather than on the industry sector in which it operates. In fact, even when the alternative criterion shows the firm is active in different sectors, it is frequently observed that all *Geographic* segments of a given firm-year combination refer to different geographic areas, but always present the same 4-digit SIC code. Since we are interested in the different sectors in which companies are active, rather than on their geographic outreach, we concentrate on *Business*, *Operating* and *State* segments.

When different segments have the same 4-digit SIC code, their sales are aggregated; in addition, firms with multiple segments sharing the same, unique 4-digit SIC code, are classified as single-segment firms (Ataullah et al., 2022).

We impose the following restrictions, relying on previous literature (Ahern & Harford, 2014; Berger & Hann, 2007; Bernile & Lyandres, 2019; Crouzet, & Eberly, 2018; Fuller, Netter & Stegemoller, 2002; Golubov, Yawson & Zhang, 2015; Masulis, Wang & Xie, 2007):

- the bidder must be a publicly traded company, listed in the USA;
- acquisition announcements must refer to deals which are successfully completed later in time;
- the bidder must own less than 50% of the target's stocks before the announcement;
- the announced transaction must amount to at least 1 million USD;
- deals where the bidder and/or the target operate in "Finance, Insurance and Real Estate" as primary business (i.e. SIC codes between 6000 and 6999) are omitted;

- buy-backs are excluded;
- multiple deals announced by the same bidder on the same day or within the event window are excluded;
- both bidder and target must have segment-level information available (i.e. they both must have a suitable link to the Compustat Segments database);
- observations with negative or zero sales in any segment for either the bidder or the target are excluded;
- conglomerate companies' segments sales do not always add up to total firm sales: when aggregated segment sales deviate from total firm sales by more than 5% for either the bidder or the target, observations are excluded (Schröder & Yim, 2018).

Our final sample consists in 2,577 deal-year observations.[3]

1.4) Variables[4]

1.4.1) Dependent variable

The dependent variable in our analysis are cumulative abnormal returns (CARs) of the sample acquirers. CARs are computed with the event study methodology over a (-1, +1) event window around the announcement date (Andrade, Mitchell & Stafford, 2001). On the one hand, we estimate CARs as the excess returns with respect to those predicted by a standard market model, whose benchmark is the CRSP value-weighted index; on the other hand, as an alternative measure, estimates are obtained using the Fama-French model. In both cases, parameters are estimated over an estimation window ranging from 140 to 20 days prior to the announcement (MacKinlay, 1997).

1.4.2) Quantifying corporate diversification

The main relationship under scrutiny in this study is the one between bidders' takeover performances and industrial relatedness between bidders and targets. As a consequence, the core explanatory variables are measures of the acquirers' corporate diversification, and their variation resulting from the acquisition.

[3] For the sake of completeness, due to the presence of missing values in some of the control variables included in our regression, our empirical analysis is carried out on a sample of 2,461 observations.
[4] For expositional convenience, Table A29 in the Appendix provides a brief description of the variables used in the main analyses.

To quantify corporate diversification, we rely on the Entropy measure proposed by Jacquemin & Berry (1979), according to which a firm's total Entropy E_{tot} is defined as

$$E_{tot} = \sum_{i=1}^{n} P_i \cdot \ln\left({}^{1}/_{P_i}\right), \qquad E_{tot} \in [0, \ln(n)] \tag{1}$$

where P_i is the share of firm sales in the ith sector (or industry), and n is the number of different sectors (or industries) in which the firm is active.[5]

The value of E_{tot} increases with increasing corporate diversification, and it substantially depends on the level of industry aggregation chosen to calculate the Entropy measure: for a given firm, E_{tot} differs depending on whether it is defined with respect to 4-, 3- or 2-digit SIC codes (namely, *Industry Sectors*, *Industry Groups* or *Major Groups*, respectively).[6]

Compared to other diversification indexes, a relevant advantage of the Entropy measure resides in its ability to be decomposed into additive elements, measuring the contribution to corporate diversification at different levels of industrial aggregation to the total.

To understand this, let a firm be active in n sectors, which can be aggregated in $s \leq n$ industries.[7] Following Jacquemin & Berry (1979), the share of firm's total sales within a given industry is

$$P_s = \sum_{i \in s} P_i \tag{2}$$

and the sector diversification *within* said industry is

$$E_W = \sum_{i \in s} \frac{P_i}{P_s} \ln \frac{P_s}{P_i} \tag{3}$$

On the other hand, diversification *across* different industries is

$$E_A = \sum_{s=1}^{s} P_s \ln \frac{1}{P_s} \tag{4}$$

As a consequence, the total Entropy index can be written as

$$E_{tot} = \sum_{s=1}^{s} P_s \cdot (E_W) + E_A = \left[\sum_{s=1}^{s} P_s \cdot \left(\sum_{i \in s} \frac{P_i}{P_s} \ln \frac{P_s}{P_i}\right)\right] + \left[\sum_{s=1}^{s} P_s \ln \frac{1}{P_s}\right] \tag{5}$$

[5] Diversification measures are based on segment sales, rather than assets, also because there are more missing data in the latter (Ataullah et al., 2022).

[6] Let the fictional company Alpha Inc, be active in four 4-digit *Industry Sectors* relative to the manufacturing of Dairy Products: 2021 (i.e. *Creamery Butter*), 2024 (i.e. *Ice Cream and Frozen Desserts*), 2037 (i.e. *Frozen Fuits, Fruit Juices, and Vegetables*), and 2038 (i.e. *Frozen Specialties, Not Elsewhere classified*). Sector sales are 100, 300, 200 and 200, respectively. If E_{tot} is defined with respect to 4-digit SIC codes, it is equal to 1.3209. If it is defined with respect to 3-digit *Industry Groups* (namely, 202 and 203), it is equal to 0.6931. If it is defined with respect to 2-digit SIC codes, it is equal to 0, since all sectors belong to the same 2-digit *Major Group*.

[7] Jacquemin & Berry (1979) present their analysis defining sectors as 4-digit SIC codes, and industries as 2-digit SIC codes. This choice comes without loss of generality, since alternative combinations of industry aggregation levels could be employed to define industries and sectors, as well.

The first term is the weighted *Within* Entropy (henceforth, wE_W): is a weighted average of the firm's sector diversification within each industry (E_W), the weight being each industry's relative importance (P_s).[8] The second term is the aforementioned *Across* Entropy (E_A), that is, the firm's Entropy measure across different industries. Weighted *Within* and *Across* Entropy are also referred to as *related* and *unrelated* Entropy, respectively (Robins & Wiersema, 2003).

Therefore, the *Total* Entropy index of corporate diversification stems from the combination of a weighted average of the firm's sector diversification within each industry of activity, and the firm's diversification across different industries. It is sensitive to the number of industries in which the firm is active, to the distribution of sales across segments, and to segments' relatedness across different industries (Martin & Sayak, 2003).

In this study, we compute Entropy indexes using 4-digit SIC codes for sectors and 2-digit SIC codes for industries (Custodio, 2014). Henceforth, we refer to "sectors" and "industries", denoting the level of aggregation at the 4- and 2-digit level, respectively. [9]

We employ a normalized version of the Entropy measure, obtained by dividing E_{tot} by its maximum possible value, $\ln(n)$:[10] hence, the normalized Entropy measures are expressed as percentages of the maximum value they could achieve, given the number of sectors in which each firm is active.[11]

To quantify the change in bidders' diversification resulting from the deal, we proceed as follows. First, we compute E_{tot}, wE_W and E_A for the bidder before the announcement, using the bidder's segment information. Second, since the acquisition may entail a change in the bidder's diversification, we estimate the same indexes for the consolidated entity that would result from the merger between each bidder-target couple, should it reach its closing. These measures are intended as a proxy for the bidder's diversification after the takeover, given the set of public information available at the announcement. To derive them, we assume that, once the announcement is made, investors value the bidder as a union between the bidder itself and the target, thus active both bidder's and target's sectors and with sales equal to the sum of their sales (weighted by the percentage of target shares acquired by the bidder).[12,13] Third, we calculate the changes in the bidder's *Total*, weighted *Within*, and *Across*

[8] Note that a sector's (industry's) relative importance is defined as the ratio of sectorial (industrial) sales to total sales.

[9] As a robustness checks, we also computed an alternative set of Entropy indexes using 4-digit SIC codes for sectors and 3-digit SIC codes for industries (see Section 1.5.3).

[10] As a consequence, also wE_w and E_A are normalized accordingly.

[11] Consider the aforementioned fictional company Alpha Inc. The normalized value of E_{tot} (defined with respect to 4-digit SIC codes, its normalized value is equals 1.3209/ln(4)=0.9528: Alpha Inc. is 95.28% as diversified as it could be without increasing the number of 4-digit sectors of activity.

[12] Consider the aforementioned fictional company Alpha Inc. Suppose it acquires 70% of the company Beta Co., active in sectors 2021 and 2026 (i.e. manufacturing of *Fluid Milk*), with sector sales of 100 and 200, respectively. Hence, the estimated bidder emerging from the deal would be active in sectors 2021, 2024, 2037 and 2026, with sector sales equal to 170, 300, 200, 200 and 140, respectively.

[13] Instead of making this assumption, one might compute the bidder's Entropy indexes using its earliest segment data after the acquisition, without relying on the target's pre-announcement segment data. We believe our approach is more

Entropy measures due to the deal (namely, our main explanatory variables ΔE_{tot}, ΔwE_W and ΔE_A), as the difference between the diversification indexes after and before the announcement. Negative values of ΔE_{tot} signal that the deal would result in a decrease in bidders' diversification, due to corporate polarization in certain industries and/or sectors of activity, at the expense of others.[14] On the contrary, positive values of ΔE_{tot} denote an increase in diversification, attributable to the broadening of the portfolio of industries and/or sectors, and/or to a more homogeneous distribution of sales across different industries and sectors of activity.[15]

In addition to measuring the variation in diversification of the acquiring firm resulting from the acquisition, we also account for the initial diversification level of the acquiring firm itself, prior to the announcement. Firms that are already diversified may possess a higher capacity to expand in novel sectors or industries through M&As, and/or could be more inclined to do so: among the others, Hornstein & Nguyen (2014) mentions earnings stability, enhanced cash reserves, robust internal capital markets and increased access to external financing as conglomerate firms' features potentially fostering further diversification.

We provide two alternative measures for the bidder's diversification as a standalone before the acquisition. On the one hand, we use the value of the *Total* Entropy index of the bidder, computed as a standalone before the announcement; on the other hand, we create an indicator variable equal to one for those bidders active in only one 4-digit sectors as standalones (and 0 otherwise).

1.4.3) Bidder- and deal-specific controls

We employ a list of controls, to account for bidder- and deal-specific characteristics which may influence bidders' takeover performances at time of announcement, in accordance with the literature on acquirers' returns in mergers and acquisitions (in particular, Golubov, Petmezas & Travlos, 2012, 2013; Golubov, Yawson & Zhang, 2015; Masulis, Wang & Xie, 2007).

The bidder features we control for are size, *market-to-book* ratio, leverage, free cash flow and sigma.

convenient for two reasons. First, the use of accounting-based measures following M&A deals is likely to suffer from merger-related noisiness (Renneboog & Vansteenkiste, 2019). Second, we believe our method better approximates the public information (namely, bidder's and target's pre-announcement characteristics at the segment level) available to the bidder's shareholders when evaluating the effect on bidder's diversification potentially entailed by the deal.

[14] Let the fictional company Omega Co. be active in sectors 2021 and 2024, with sector sales of 100 and 50, respectively. Suppose it acquires the company Psi Inc., active in sector 2021 with sales 50. Omega's polarization towards sector 2021 yields $\Delta E_{tot} = -0.107$.

[15] As examples, consider the following deals: (i) Chi Inc., active in sectors 2434 and 5021 (manufacturing of *Wood Kitchen Cabinets* and *Furniture wholesale trade*), with respective sales of 100 and 50, acquires Phi Inc., active in sector 2611 (manufacturing of *Pulp Mills*) with sales 50; (ii) Chi Inc. acquires Ypsilon Inc., active in sector 5021 with sales of 30; (iii) Chi Inc. acquires Tau Inc., active in sectors 2611 and 5021, with respective sales of 50 and 30. In all cases, $\Delta E_{tot} > 0$, attributable to broadening of the portfolio of industries and/or sectors in (i), to a more homogeneous distribution of sales across different industries and sectors of activity in (ii), and to both in (iii).

Size is measured as the log of bidder's market value, four weeks prior to the announcement. In general, prior studies suggest it is negatively related to bidder announcement returns. Following the theories of managerial hubris (Roll, 1986), Moeller, Schlingemann & Stulz (2004) argue larger bidders are more prone to pay higher premiums and acquire targets generating negative synergies. Masulis, Wang & Xie (2007) suggest opportunistic managers might make use of firm size as an anti-takeover instrument: hence, managers of larger firms may be more entrenched and face incentives to pursue value-reducing acquisitions. Hornstein & Nguyen (2014), instead, suggests the impact of size on bidders' announcement returns may be ambiguous: on the one hand smaller acquirers might enjoy larger relative benefits from growth than their larger peers, which might have already exploited most profitable investment opportunities in the past (Jensen, 1986); on the other hand, larger acquirers might be able to engage in valuable acquisitions thanks to increased market power (Hankir, Rauch & Umber, 2011) or a larger array of capable managers (Bloom & Van Reenen, 2007).

Market-to-book is measured as the ratio between the bidder's market value and its common equity, for the latest fiscal year prior of the acquisition announcement. Dong et al. (2006) provide evidence on the existence of a positive relationship between announcement returns and bidders' *book-to-market*: when undervalued bidders announce a takeover, investors might correct their undervaluation, acknowledge their potential and lead to an increase in returns. Therefore, one would expect the opposite holds for *market-to-book*.

Leverage is measured as the sum of long- and short-term debt as a fraction of total assets, for the latest fiscal year prior of the acquisition announcement. Previous analyses are generally agreed in suggesting leverage is positively related to acquirer returns (Maloney, McCormick & Mitchell, 1993). On the one hand, higher debt entails more stringent monitoring by creditors, which translates in a performance-enhancing incentive for managers (including in the acquisition activity) (Jensen, 1986). On the other hand, higher debt limits cash flows, leaving less room to opportunistic managerial behaviour in their use (Stulz, 1990).

Cash flow is measured as the net cash flow from operating activities (expressed in billion USD), for the latest fiscal year prior of the acquisition announcement. Previous results usually suggest higher cash flows are detrimental to bidders' takeover performances (Lang, Stulz & Walkling, 1991); in particular, they are seen as an incentive towards managerial opportunistic behaviour to pursue empire-building deals (Jensen, 1986). From another standpoint, Masulis, Wang & Xie (2007) point out free cash flow might as well be the result of recent positive performance due to virtuous managers, who may make use of those resources to pursue value-enhancing takeovers.

Sigma is a measure of total volatility, defined as the standard deviation of market-adjusted returns for the bidder's stock, computed over a 120-day window (-130, -11). Past contributions provide evidence

that higher sigma, intended as a proxy for information asymmetries, is associated with lower bidder CARs at the announcement (Moeller, Schlingemann & Stulz, 2007).

We also control for some deal characteristics, concerning the size of the deal and the forms of payment of the transaction.

The relative deal size is measured as the value of the deal, divided by the bidder's market value four weeks prior to the announcement. Previous literature usually argues larger M&A deals are associated with more positive market reactions for the bidder (Asquith, Bruner & Mullins Jr., 1983), although the relationship might reverse for larger bidders (Moeller, Schlingemann & Stulz, 2004).

Concerning methods of payment, we employ two indicator variables: one accounts for whether equity is said to be employed in the payment, the other if payment would be only cash. The use of equity as a mean of transaction in takeovers is generally associated with lower bidder returns, in particular for public targets (Travlos, 1987): according to the adverse selection problems in equity issuance, firms issue equity when it is overvalued; hence, investors penalize bidders issuing equity to pay for acquisitions (Myers & Majluf, 1984). On the contrary, all-cash takeovers are associated with higher announcement returns, compared to all equity bids (Bhagat, Dong & Noah, 2005; Loughran & Vijh, 1997; Savor & Lu, 2009): the use of cash is preferred by the bidder's management when its stock is undervalued, and the market adjusts its price accordingly (Renneboog & Vansteenkiste, 2019). Year fixed effects are also included, to account for potential time trends.

1.4.4) Descriptive statistics

Table1 illustrates bidder's and target's distribution across industry divisions. The majority of both bidders and targets are Manufacturing companies (49.01% and 45.67%, respectively). About one company out of four is active in Services (23.55% of bidders and 27.16% of targets), while 12.50% (11.49%) bidders (targets) operate in the fields of Transportation and Public Utilities. In most cases, bidders and target belong to the same industry division (82.62 %).

[Table 1 approximately here]

Table 2 reports the number of 4-digit sectors in which bidders and the targets operate, both considered standalone or as a consolidated entity (that is the entity that results from the union of the bidder and the target). A considerable share of bidders and targets in the sample are active in a single business sector (61.93% and 79.63%, respectively), while more than 90% present at best three. Bidders (Targets) operating in four or more different business segments are 8.78% (1.83%) of the whole sample. Focusing on the merged entities resulting from the acquisitions, only 725 (28.13%) are still

operating in a single sector, implying both merging firms are active in the same, single 4-digit SIC code.

[Table 2 approximately here]

Table 3 illustrates how many 4-, 3- and 2-digit SIC codes are common to both bidders and targets (panel (a), (b) and (c), respectively), given the number of different 4-digit sectors of the consolidated entity: it highlights the degree of overlap of sectors and industries among each bidder-target couple. Focusing on panel (a), bidders and targets do not have any 4-digit sector of activity in common in 1,208 observations (46.88% of the sample). In 1,313 cases, bidders and targets share one 4-digit SIC code; in particular, comparing it to the number of sectors of the merged firms, it is one out of two sectors in 267 cases out of 924, and out of three sectors in 166 cases out of 414. There are only 56 observations in which the merging bidders and targets have more than one segment in common. Panels (b) and (c) illustrate that it is often the case bidders' and targets' sectors of activity refer to the same industry (defined with respect to 3- or 2-digit Industry Groups or Major Groups). In most cases, the merging firms only share one industry of activity out of a few; nevertheless, their degree of overlap is quite pervasive across the sample, as the fraction of bidder-target couples with no common industries is considerably lower than that of couples with no common sectors. This evidence suggests that the attempt to disentangle the relevance of industry vs sector diversification on bidders' takeover gains would be a relevant contribution to the literature.

[Table 3 approximately here]

Table 4 illustrates the distribution of the Entropy index before and after the announcement across our sample. The vast majority of M&A deals in our sample entail a change in corporate diversification. Only 38.07% bidders in the sample are characterized by a non-null value of E_{tot} before the acquisition; after the announcement, the share of firms engaged in multiple 4-digit sectors and featured with positive values of the Entropy measure of diversification is 71,87%. In particular, 871 bidders with $E_{tot} = 0$ before the announcement show positive values of diversification after the event. On the contrary, the 725 observations with $E_{tot} = 0$ after the announcement merge with a target active in the same, sole sector of the bidder. Diversification before the deal is mostly due its *across* component, rather than its *within* component: in fact, 744 observations out of 981 show positive values of E_A, while only 535 have $w.E_w > 0$. Interestingly, after the deal, although *across*

diversification remains predominant, the relative importance of *within* diversification increases, as it contributes to 1,114 observations out of the 1,852 cases with $E_{tot} > 0$.

[Table 4 approximately here]

Table 5 illustrates the change in *Total* Entropy (ΔE_{tot}) across the sample, that is the difference between the estimated value of E_{tot} of the consolidated entity after the announcement, and that of the standalone bidder before the announcement. Variations in *Total* Entropy are broken down into the *Across* (ΔE_A) and weighted *Within* (ΔwE_W) components, allowing us to distinguish between their contributions to overall changes in diversification.

[Table 5 approximately here]

There are 725 observations (28.13% of our sample) where no change in Entropy occurs as a consequence of the acquisition. All acquirers with $\Delta E_{tot} = 0$ are firms active in a single 4-digit sector before the announcement, merging with a target firm that is uniquely active in the same sector.[16] As a consequence, they can be seen as companies consolidating their activity and increasing overall concentration in the industry they operate in.

There are 676 bidders experiencing a negative change in corporate diversification as a result of the acquisition (26.23% of the sample; panel (b)). First, all these observations are characterized by a positive value of E_{tot} before the announcement, that is a necessary condition for $\Delta E_{tot} < 0$: hence, a significant fraction (68.91%) of the 981 bidders featuring positive values of diversification before the deal result in a loss in diversification. Second, on balance, negative changes in *Across* diversification occur slightly more frequently than in *Within* diversification: 469 observations out of 676 show negative ΔE_A, while ΔwE_W is negative in 340 cases. Third, the sample distribution across alternative combinations of ΔE_A and ΔwE_W resulting in negative ΔE_{tot} is rather balanced: this suggests corporate polarization is pursued with strategies targeting both diversification across and within industries.

Announcements resulting in an increase in bidders' corporate diversification are 1,176 (45.63% of the sample; panel (c)). Notable regularities emerge in our data. On the one hand, the largest contribution to positive variations in diversification comes from positive changes in *Across*

[16] In principle, it would be possible to have $\Delta E_{tot} = 0$ also with bidders and targets active in more than the same, single sector. However, for that to be possible, bidders and targets in each deal wuld have to be perfectly identical, not only in terms of sectors of activity, but also of sales.

diversification: in particular, 546 cases out of 1,176 (46.43%) are characterized by positive changes in E_A and null changes in wE_W. On the other hand, the second largest contribution to positive changes in E_{tot} is diametrically opposed to the former: in fact, in 395 cases out of 1,176 (33.59%) there are no changes in E_A, and positive variations in wE_w. Therefore, when the acquisition results in increased corporate diversification, data suggest that, in most cases, a relation of *de facto* mutual exclusivity exists between *Across* and *Within* diversification: when acquirers diversify via acquisitions, acquirers either target companies active industries other than their own ($\Delta E_A > 0, \Delta wE_W = 0$), or more similar companies, operating within their respective industries, but in different sectors ($\Delta E_A = 0, \Delta wE_W > 0$).

Panels (c.1) and (c.2) distinguish between bidders whose diversification prior to the announcement is null and those whose is not. Most diversifying acquirers were initially single-sector undiversified firms: in fact, among the 1,176 observations with $\Delta E_{tot} > 0$, 871 belong to the former cluster. Amongst them, one every two bidders (50.98%) only diversify across industries, while 40.53% only diversifies at the sector level within industry. As far as ex-ante diversified bidders are concerned, about one out of three increases diversification through *Across* diversification, only.

Table 6 provides descriptive statistics on our sample. On average, CARs are negative, yet their mean is not statistically different from zero; however, they see to vary significantly from deal to deal, as their standard deviation testifies. Focusing on prior diversification, about 62% bidders are undiversified if considered as standalones (hence the null median value of bidders' E_{tot} before the announcement). As far as changes Entropy measures are concerned, notice that ΔE_{tot} is characterized by high variance, as well; in addition, the change in Entropy seems to be almost evenly split between its *Across* and *Within* components.

[Table 6 approximately here]

Table 7 reports pairwise correlations between the set of explanatory variables. For the sake of completeness, we also calculated variance inflation factors to rule out any risk of multicollinearity: in both cases, there seem to be no multicollinearity issue.[17]

[Table 7 approximately here]

[17] The two variables measuring bidders' diversification as standalones before the acquisition are obviously highly correlated. However, this is no cause of concern as they are employed alternatively as a control for prior diversification and never enter the same regression simultaneously.

1.5) Empirical analysis

1.5.1) Main analysis: bidders' CARs and the change in diversification

The results of our main analysis are reported in Table 8. Cumulative abnormal returns (CARs) of the sample acquirers are regressed on either *Total*, or *Across* and *Within* Entropy changes, and the aforementioned set of bidder- and deal-specific controls, including alternatives measures of acquirers' diversification as standalones prior to the acquisition, and year fixed effects. Robust standard errors are estimated.[18]

Column (1) is our baseline model of reference, with no measure of prior diversification, nor Entropy change. Columns (2), (4) and (5) include ΔE_{tot} as a measure for the change in bidder's diversification; the last two also include a measure of prior diversification (i.e. bidder's *Total* Entropy before the announcement, and an indicator variable equal to one for no diversification, respectively). Columns (3), (6) and (7) follow the same pattern, with ΔE_A and ΔwE_W in place of the overall index.

[Table 8 approximately here]

The size of the bidding firm is significantly and negatively related to the market reaction to its acquisition announcements across all specifications (except for the baseline model): this is consistent with theories discussing managerial hubris and empire building motives, according to which larger acquirers' managers might overpay suboptimal targets or strategically leverage their firm's size as a defensive tactic against takeovers.

In all models, the estimated coefficients for leverage are positive and significant at the 5% level: this result is in line with previous literature arguing the role of leverage as a self-discipline mechanism on managers, who cannot afford to carry out suboptimal acquisitions.

Consistently with prior contributions highlighting the adverse selection problems related to equity issuance, our results suggest firms employing stocks as a mean of payment for acquisitions experience lower CARs at the announcement.

As far as bidders' *ex-ante* diversification is concerned, estimated coefficients of E_{tot} before the deal are positive and significant at the 5% level in both columns (4) and (6), suggesting that, on average, deals announced by already diversified acquirers are welcomed more favourably by the market compared to those announced by undiversified bidders. The same holds with reference to indicator

[18] For the sake of completeness, we also estimated all regressions presented in Section 1.5 with clustered standard errors at the acquirer's level. All results are highly consistent to those presented here.

variable for no prior diversification: compared to firms active in multiple sectors, bidders that are not diversified before the acquisition are penalized in short-run takeover returns.

Focusing on the relationship between announcement returns and acquirers' change in corporate diversification resulting from the acquisition, the coefficient of ΔE_{tot} in column (2) is negative and highly significant, suggesting the existence of an inverse relation between acquisition returns and diversification. This result is also robust to controlling for prior diversification (columns (4) and (5)). When the overall variation in *Total* Entropy is decomposed into the additive components ΔE_A and ΔwE_W, we notice that both coefficients are significant when prior diversification is omitted (column (3)). However, once *ex-ante* diversification measures are included (columns (6) and (7)), while the *Within* component remains significant (although at the 10% level, only), the *Across* component loses all its significance; in either case, both the Entropy measure of bidder's diversification as a standalone and the indicator variable for no prior diversification are highly statistically significant.

These results suggest the whole negative effect of increasing total diversification highlighted in columns (2), (4) and (5) seems to be driven by diversification at the sector level, within industries, rather than (also) across industries.

As of the results in Table 8, our sample includes observations in which the deal entails a variation in bidders' corporate diversification, as well as deal-year combinations in which bidders experience no change in *Total* Entropy. As discussed in Section 1.4.4, when $\Delta E_{tot} = 0$, the acquisition consists in single-sector acquirers targeting firms that are uniquely active in the same sector. As a consequence, these observations have limited informative power with regards to the relationship between bidders' takeover returns and the change in diversification entailed by the deal.

Therefore, we replicate the analyses whose results are illustrated in Table 8, focusing on the sub-sample in which the acquisition would entail a non-null variation in the bidder's degree of corporate diversification. Results are showed in Table 9.

[Table 9 approximately here]

As far as our deal- and bidder-specific set of controls is concerned, our results are mostly in line with those relative to the whole sample in terms of coefficients' sign and significance. We notice that the estimated coefficients for Leverage are still positive, yet compared to the full sample estimates they lose statistical significance. On the contrary, the negative coefficients regarding relative deal size are now significant at the 1% level.[19]

[19] This result is coherent with the evidence provided by Moeller, Schlingemann & Stulz (2004), according to which relative deal size and takeover performance at the announcement might be negatively related in presence of larger firms.

Focusing on the estimates regarding our measures of diversification, two regularities emerge. On the one hand, both measures of bidders' diversification prior to the announcement are now insignificant across all specifications. On the other hand, when changes in diversification are accounted for using *Across* and *Within* Entropy, coefficients for both additive components are now highly statistically significant.

1.5.2) Estimating our model on different sub-samples

So far, the use of Entropy indexes has allowed to account for multiple dimensions of corporate diversification, namely, the number of industries and sectors of activity, the distribution of sales across sectors, and the degree of relatedness among different industries (Martin & Sayak, 2003). In addition, changes in *Across* and *Within* Entropy measures have made possible to quantify the contribution of different levels of industrial aggregation to the total variation in bidders' diversity of operations.

However, at the present state, our analysis does not account for the fact that analogous variations in bidder's diversification (as measured by the *Total* Entropy index) might be achieved through substantially different takeover strategies. For instance, we are currently unable to distinguish between deals in which a given value for ΔE_{tot} is caused solely by the expansion of the acquirer's number of industries or sectors of activity, and operations in which a similar variation is instead due to changes in the relative weight of pre-existing industries or sectors, without any modification to the firm's activity portfolio.[20]

Using the segment-level information for both acquirers and targets, it is possible to categorize different instances of M&A deals, with respect to the degree of overlap between bidders' and targets' industries and sectors of activity. From a bidder's perspective, M&A deals might entail the acquisition of a target firm with:

- either *Full Overlap*, that is, active exclusively in sectors (hence, industries) common to the bidder;[21]
- or *No Overlap*, that is, active exclusively in industries (hence, sectors), other than the bidder;[22]

Indeed, results from a mean comparison test for bidders with $\Delta E_{tot} \neq 0$ against $\Delta E_{tot} = 0$ shows that acquirers from the former group (i.e. our sub-sample of reference) are significantly larger than those from the latter.

[20] Suppose that the fictional company Gamma Inc., active in sectors 2021 and 2024, with respective sector sales of 100 and 200, acquires the fictional company Delta Co., active in sector 5451 (i.e. *Dairy Product Stores*), with sector sales of 150. Alternatively, suppose that Gamma Inc. acquires the fictional company Epsilon Co., active in sector 2021, with sector sales of 30. One can easily show that Gamma's ΔE_{tot} would approximately be equal to +0.047 and +0.048, respectively.

[21] Gamma Inc. acquiring Epsilon Co. would be an example of a deal with bidder-target *Full Overlap*, since Gamma Inc. as a standalone is already active in (all) Epsilon's 4-digit sector(s).

[22] Gamma Inc. acquiring Delta Co. would be an example of a deal with bidder-target *No Overlap*, since Gamma Inc. as a standalone is not active in (any) Delta's industry(ies) (nor sectors) of activity.

- or *Partial Overlap*, that is, active in some sectors (hence industries) in common with the bidder, but also in some others that are different.[23]

In the first case, such acquisition would result in a variation in the relative importance of said industries and sectors, only, leaving the set of industries and sectors of activity unchanged. On the contrary, in the second case, the takeover would entail an expansion in the portfolio of industries and sectors in which the bidder is active. In the third case, a combination of the two factors would occur: on the one hand, the acquirer would consolidate its presence in some industries or sectors in which it was already as a standalone, while, on the other hand, it would expand its portfolio towards new businesses.

Aiming to investigate the heterogeneity in the effect of corporate diversification changes on bidder's takeover performances, we replicate the analysis of Table 8 on three subsamples of M&A deals, one for each of the aforementioned *Overlap* category. Results are reported in Table 10, using ΔE_{tot} as main explanatory variable.

[Table 10 approximately here]

Columns (1) and (4) refer to deals with bidder-target *Full Overlap*. In both cases, the coefficient for ΔE_{tot} is negative, yet insignificant: this seems to suggest that, when the acquisition does not result in a change in the number of bidders' industries and sector of activity, the market does not attach a statistically significant discount, nor a premium, to increased diversification. As far as the degree of diversification prior to the announcement is concerned, instead, estimates for both measures are statistically significant (at the 1% and 5% level), suggesting that acquisitions are better welcomed by the market in the short run if acquirers are already diversified (at least to some extent).

Columns (2) and (5) refer to deals with bidder-target *Partial Overlap*, while columns (3) and (6) with *No Overlap*. Across all these specifications, two regularities emerge: firstly, coefficients regarding the change in diversification are always negative and significant (although at the 10% level, except for column (3)), providing evidence consistent with the full sample analysis presented in Section 1.5.1; secondly, estimates pertaining to the measures of bidders' prior diversification are insignificant across all specifications.

Table 11 replicates the analysis, breaking down the overall effect of ΔE_{tot} into the usual *Across* and *Within* components.

[23] Suppose the aforementioned fictional company Gamma Inc. (active in sectors 2021 and 2024) acquires one of the following companies: (i) Theta Co., active in sector 2026; (ii) Iota Co., active in sectors 2021 and 5451; (iii) Cappa Co., active in sectors 2024, 2026 and 5451. Each of these cases would be an example of deals with bidder-target *Partial Overlap*, as all bidder-target couples share certain sectors and/or industries, but not all.

[Table 11 approximately here]

Focusing on the *Full Overlap* subsample, results are in line with those from Table 10, as both ΔE_A and ΔwE_W present negative and insignificant coefficients.

Meaningful insights emerge with regards to the *Partial* and the *No Overlap* subsamples estimates.

In the former case (columns (2) and (5)), although both Entropy dimensions display negative coefficients, only the *Within* component is significant (at the 10% level). This suggests that, when the firms involved in an M&A deal operate in industries or sectors both in common, and different, a significant discount exists for increased diversification at the sectorial level (i.e. within the set of industries in which the conglomerate entity would operate). On the contrary, on average and ceteris paribus, no significant difference emerges among acquirers increasing or decreasing diversification at the industry level.

When the firms involved in an acquisition do not share any common industry (nor sector) of business, instead, in both columns (3) and (6), it is the coefficient for ΔE_A to be negative and significant (at the 5% and 10% level, respectively). In the case of column (6), the coefficient of ΔwE_W is positive and significant at the 10% level. Nevertheless, among the estimates concerning the main explanatory variables on diversification, this is the only result that does not find confirmation in any of the robustness checks outlined in the subsequent section. In fact, such coefficient is always insignificant across all alternative specifications illustrated in the following subsection.

1.5.3) Robustness checks

To verify the consistency of our findings, we carry out a number of robustness checks. Results are available in the Appendix.

First, we replicate our analyses using an alternative measure for acquirers' CARs, namely, estimated with the Fama-French model (Tables A1 to A4). All estimates are highly consistent with previous results.

Second, we re-run our regressions using an alternative definition for our Entropy measures, namely, we define sectors as 4-digit SIC codes, while industries as 3-digit SIC codes (rather than 2-digit SIC codes) (Tables A5 to A8). Again, results are well in line with those included in Sections 1.5.1 and 1.5.2.

Third, we reiterate our analyses employing an alternative metric for prior diversification: instead of defining it with respect to 4-digit SIC codes, we do so with respect to 2-digit SIC codes, aiming to

grasp ex-ante diversification at a broader level (Hornstein & Nguyen, 2014) (Tables A9 to A12). Also in this case, results are coherent with those from our original analysis.[24]

Fourth, we impose an additional sample restriction, by imposing that the acquirer must own 100% of the target stock after the deal (Gloubov, Yawson & Zhang, 2015) (Tables A13 to A16). Also in this case, results are confirmed.

Fifth, we include an additional control for the bidder's stock liquidity. To that aim, on the one hand, we compute the acquirer average pre-announcement Bid-Ask spread over the window (-40, -10); on the other hand, we calculate the average trade volume over the same time span (Tables A17 to A20).[25] Regardless of the measure adopted, results are robust.

Sixth, we replicate our analyses including a control for the acquirer's market-adjusted price run-up before the announcement, over the window (-40, -10), aiming to account for any possible information spillovers about the acquisition before its announcement (Tables A21 to A24). Also in this case, results are confirmed.

Seventh, rather than with robust standard errors, we re-run our models with standard errors clustered at the year level (Tables A25 to A28). Our estimates are in line with our previous results, coherently with previous literature on the topic (Szücs, 2016).

1.5.4) Discussion

Presented in Table 8, our main empirical analysis provides evidence suggesting that, overall, the market penalizes deals that increase bidders' corporate diversification, at least in proximity of the announcement. This result is consistent across all specifications, as well as with previous studies arguing diversifying deals perform worse than related ones (among the others, see Fan & Goyal, 2006; Hoberg & Phillips, 2010; Kaplan & Weisbach, 1992; Morck, Shleifer & Vishny, 1990; Sicherman & Pettway, 1987); this is especially the case if, as in our sample, targets are public companies (Andrade, Mitchell & Stafford, 2001). However, unlike previous studies, such finding does not merely pertain to the overlap or lack thereof between bidders' and targets' industries or sectors of operation. Indeed, through the utilization of the *Total* Entropy index (and the estimation of its variation consequent to the acquisition), our results account for both the effect of expanding or consolidating the portfolio of industries and sectors of operation, and that of the variation in their weight within the acquiring firm.

[24] In Table A11, column (6), the estimated coefficient of ΔE_{tot} is not significant, while it is in Table 10. However, in Table A12, results are all in line with the other robustness checks.

[25] We also compute the same controls over the window (-35, -5). Results are coherent with those presented.

Regression results on the whole sample yield two additional noteworthy results, as well: first, that *ex-ante* diversified bidders seem to experience higher CARs, compared to undiversified peers; second, that the negative effect of diversification on bidders' returns is driven by diversification within industry, rather than across. In the former case, one could hypothesize that already diversified acquirers possess expertise in fostering synergies among different business divisions, thereby rendering post-acquisition integration more efficient and effective; additionally, prior diversification could stem from prior experience in acquisitions, thus being a proxy for M&A experience. In the latter case, it might be that the market reacts more favourably to diversifying deals that are better suited at reducing risk, i.e. deals that expand the portfolio of industries in which the bidder operates, compared to deals that imply the acquisition of targets that have performances which are highly correlated with the bidder's.

However, results change significantly once we omit those observations with bidder-target couples operating in the same, single sector, namely, whose diversification is null both before and after the acquisition. Consider results from Table 9. First, prior diversification becomes insignificant, suggesting that bidder's takeover performance is irrespective of whether the firm is already diversified before the deal or not. Second, also the *Across* component of the change in Entropy becomes significant. As a consequence, the market appears to negatively discount both dimensions of increased diversification, whether it involves expanding the bidder's portfolio of activities, or achieving greater uniformity in the relative weighting of each activity (both at the industry and sector levels). This suggests that, during acquisitions, investors seem to focus exclusively on the costs associated with increased diversification, rather than on the (potential) synergies emerging from diversifying deals. Looking at the results from the opposite point of view, it appears investors reward acquiring firms that increase their polarization in businesses where they were already active before the deal (both within and across industries): this approach allows firms to consolidate their market shares, and avoids the challenges associated with integrating considerably diverse companies.

The analysis by sub-samples, categorized with respect to varying degrees of bidder-target overlap, enables a comparison between transactions where the bidder's set of industries or sectors remains unaltered, and others in which, to varying extents, the acquirer expands its portfolio of operation. As a consequence, it allows analysing whether any heterogeneity emerges in the results from the main across different instances of acquisitions.

Consider the evidence from Table 10. In the *Full Overlap* scenario (that is, when the bidder acquires a target operating in businesses where it was already active alone), results suggest the market neither associates a significant discount, nor a premium, to total diversification. In other words: as long as the set of industries and sectors of activity remains unchanged with the acquisition, whether the bidder

increases its focus on specific businesses, or becomes more internally homogeneous, appears to play no significant role in predicting the market reaction at the announcement. A possible motivation for this result is that, although acquisitions in a *Full Overlap* scenario might still entail an increase in overall bidders' diversification[26], the integration process between companies operating within the same sectors might be smoother, and thus, not be penalized by the market.

This differs from the aggregate evidence from the main analysis (Tables 8 and 9), whose results are in fact driven by deals in which targets, at least to some extent, operate in areas that are new to the bidder. Indeed, when the acquisition entails a modification of the bidder's portfolio of operations (that is, in the *Partial* and *Full Overlap* scenarios), regardless of the extent of the overlap, increased diversification is penalized.

Therefore, our findings seem to suggest that the market does not indiscriminately penalize increased diversification. Instead, it does so only when such diversification is associated with the acquisition of targets active (only or also) in businesses other than the bidders' (hence, with a subsequent rise in the bidder's number of industries or sectors of activity).

Table 11 sheds additional light on these results, as it allows disentangling the effect of the change in *Total Entropy* into the additive *Across* and *Within* industry components.

In particular, when the target is active only in industries (hence, sectors) other than the bidder (i.e. in the case of *No Overlap*), the negative variation in *Total Entropy* seems to be attributable to diversification across industries. This result is, to some extent, foreseeable, as targets and bidders not only lack any common business sector, but also operate in entirely distinct industries: hence, the very algebraic definition of the Entropy index ensures that a greater weight is assigned to variations across industries.[27]

On the contrary, when the target is active in industries or sectors both in common and different to the bidder (i.e. in the case of *Partial Overlap*), only the change in *Within* industry diversification is significant: a possible explanation is that acquisition of companies that operate in a sector that is similar to the ones in which the bidder already operates may hide inefficiencies due to duplication of similar activities.

To conclude, we notice that prior diversification is never significant, with the exception of the *Full Overlap* scenario. However, it is likely that such result is driven by the fact that all deals with bidder-target couples operating in the same, single sector fall in such category.

[26] For an example, see Note 20.

[27] In this context, variations in *Within* Entropy do occur, but only in presence of bidders and/or targets that are diversified within industry as standalones.

1.6) Conclusion

This study delves into the relationship between corporate diversification and the short-run stock market returns of bidders involved in M&A deals.

In the M&A literature, diversification generally boils down to the dichotomy between *related* and *unrelated* deals, simply based on whether bidders and targets share any industry or sector of activity (i.e. whether they are active in common n-digit SIC codes). However, such coarse distinction runs the risk of treating substantially different operations on equal footing, overlooking relevant dimensions of corporate diversification.

Aiming for a more comprehensive measure of corporate diversification and for its variation in consequence of an acquisition, we refine the measurement of diversification by means of the Entropy index, which allows to account for both the array of sectors and industries in which the bidder is active, and in their relative importance within the firm. Using segment-level balance sheet data for both targets and bidders, we estimate what the change in the bidder's diversification would be, should the deal come to a positive conclusion. Moreover, *Total* Entropy (and the respective variation) is also decomposed in two additive components, measuring diversification *Across* and *Within* industries.

These measures are then used as main explanatory variables in a regression analysis of bidders' CARs estimated around the announcement, and a set of deal- and bidder-specific controls. Our empirical analysis is carried out on a sample of US public acquirers, targeting public firms from 1994 to 2017. Our findings highlight the existence of a diversification discount, as market reactions indicate a negative response to increased diversification, both across and within industries, in the aftermath of M&A announcements. However, our results suggest this penalty is significant only when the acquisition leads bidders to expand into sectors or industries different from their existing ones, emphasizing the market's sensitivity to strategic shifts.

We believe our research could contribute to the literature from two standpoints. On the one hand, we implement a method to quantify diversification in M&A deals which, to the best of our knowledge, has not been utilized before. Estimating changes in bidders' Entropy indexes allows accounting for both the variation in the number of industries or sectors entailed by the M&A deal, and their relative weight and relatedness within the bidder's corporate portfolio. On the other hand, our findings, although consistent with the established thesis of the existence of a diversification discount, appear to suggest that this phenomenon is, in reality, heterogeneous across different types of deals: this is a result that, to the best of our knowledge, is a novel contribution to the related literature.

We acknowledge the presence of limitations in our study; nevertheless, these constraints may represent promising avenues for further investigations.

First, our sample only considers publicly traded targets. We believe that including deals in which targets are private might be of significant interest to test the external validity of our results.

Second, in this paper, we are limiting ourselves to analysing the relationship between bidder takeover gains and diversification in the short run. Extending this analysis over the long term could hold a dual significance of interest. On one hand, the application of the tools proposed in this analysis would be innovative even in the long run. On the other hand, it would enable the verification of whether short-term results find resonance over a more extended period.

Third, the inclusion of other variables pertaining to the Industrial Organization literature could enhance our analysis. Specifically, in future extensions, we aim to incorporate variables related to the innovative activities of the involved firms, as well as to the change in the market concentration entailed by the acquisition within the relevant industries.

We leave these suggestions to future research.

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Figures and tables

Table 1: distribution of bidders and targets across industry divisions

	Bidders		Targets	
	Freq.	Perc.	Freq.	Perc.
A - Agriculture, Forestry & Fishing	5	0.19	10	0.39
B - Mining	121	4.70	140	5.43
C - Constructions	20	0.78	24	0.93
D - Manufacturing	1,263	49.01	1,177	45.67
E - Transportation & Publ. Utilities	322	12.50	296	11.49
F - Wholesale Trade	80	3.10	81	3.14
G - Retail Trade	159	6.17	149	5.78
I - Services	607	23.55	700	27.16
Total	2,577	100.00	2,577	100.00

Table 2: number of different 4-digit sectors of activity for bidders, targets and merged entities

N° of different 4-digit *sectors*	Bidders		Targets		Merged	
	Freq.	Perc.	Freq.	Perc.	Freq.	Perc.
1	1,596	61.93	2,052	79.63	725	28.13
2	457	17.73	348	13.50	924	35.86
3	298	11.56	130	5.04	414	16.07
4	133	5.16	36	1.40	244	9.47
5	48	1.86	7	0.27	130	5.04
6	28	1.09	4	0.16	70	2.72
7	14	0.54	.	.	47	1.82
8	.	.	.	.	16	0.62
9	2	0.08	.	.	5	0.19
10	1	0.04	.	.	1	0.04
11	.	.	.	.	1	0.04
Total	2,577	100.00	2,577	100.00	2,577	100.00

Table 3: *sectorial* and *industrial* overlap of merging bidders and targets

N° of different 4-digit *sectors*,	(a) N° of different 4-digit *sectors* common to bidders and targets				(b) N° of different 3-digit *industries* common to bidders and targets				(c) N° of different 2-digit *industries* common to bidders and targets				Total
Merged firms	0	1	2	3	0	1	2	3	0	1	2	3	
1	.	725	.	.	.	725	.	.	.	725	.	.	725
2	645	267	12	.	423	490	11	.	339	575	10	.	924
3	227	166	20	1	167	223	23	1	125	269	20	0	414
4	154	80	9	1	110	122	11	1	66	167	10	1	244
5	89	36	5	0	61	58	11	0	42	74	13	1	130
6	48	17	5	0	35	29	6	0	19	42	9	0	70
7	28	17	2	0	20	23	4	0	8	32	7	0	47
8	13	2	1	0	9	5	2	0	2	12	2	0	16
9	2	3	0	0	2	2	1	0	1	3	1	0	5
10	1	0	0	0	0	1	0	0	0	1	0	0	1
11	1	0	0	0	1	0	0	0	1	0	0	0	1
Total	1,208	1,313	54	2	828	1,678	69	2	603	1,900	72	2	2,577

Note: Missing values are reported in correspondence of values of common sectors between bidders and targets which are not compatible with the n° of sectors of the merged firms.

Table 4: Entropy measure characteristics, before and after the deal

(a) Whole sample

	Pre-deal		Post-deal	
	Freq	Perc	Freq	Perc
$E_{tot} = 0$	1,596	61.93	725	28.13
$E_{tot} > 0$	981	38.07	1,852	71,87
Total	2,577	100.00	2,577	100.00

(b) Observations with $E_{tot} > 0$, before and after the deal

	Pre-deal		Post-deal	
	Freq	Perc	Freq	Perc
- $E_A > 0$, $w.E_w = 0$	446	45.46	738	39.85
- $E_A = 0$, $w.E_w > 0$	237	24.16	505	27.27
- $E_A > 0$, $w.E_w > 0$	298	30.38	609	32.88
Total	981	100.00	1,852	100.00

Table 5: Change in Total Entropy after the announcement

(a) Whole sample

	Freq	Perc
$\Delta E_{tot} = 0$	725	28.13
$\Delta E_{tot} < 0$	676	26.23
$\Delta E_{tot} > 0$	1,176	45.63
Total	2,577	100.00

(b) $\Delta E_{tot} < 0$

	Freq	Perc
$\Delta E_A < 0, \Delta wE_W < 0$	133	19.67
$\Delta E_A < 0, \Delta wE_W = 0$	192	28.40
$\Delta E_A < 0, \Delta wE_W > 0$	144	21.30
$\Delta E_A = 0, \Delta wE_W < 0$	110	16.27
$\Delta E_A > 0, \Delta wE_W < 0$	97	14.35
Total	676	100.00

(c) $\Delta E_{tot} > 0$

	Freq	Perc
$\Delta E_A > 0, \Delta wE_W > 0$	101	8.59
$\Delta E_A > 0, \Delta wE_W = 0$	546	46.43
$\Delta E_A > 0, \Delta wE_W < 0$	50	4.25
$\Delta E_A = 0, \Delta wE_W > 0$	395	33.59
$\Delta E_A < 0, \Delta wE_W > 0$	84	7.14
Total	1,176	100.00

(c.1) $\Delta E_{tot} > 0$: $E_{tot}^{pre} = 0$

	Freq	Perc
$\Delta E_A > 0, \Delta wE_W > 0$	74	8.50
$\Delta E_A > 0, \Delta wE_W = 0$	444	50.98
$\Delta E_A > 0, \Delta wE_W < 0$	.	.
$\Delta E_A = 0, \Delta wE_W > 0$	353	40.53
$\Delta E_A < 0, \Delta wE_W > 0$	.	.
Total	871	100.00

(c.2) $\Delta E_{tot} > 0$: $E_{tot}^{pre} > 0$

	Freq	Perc
$\Delta E_A > 0, \Delta wE_w > 0$	27	8.85
$\Delta E_A > 0, \Delta wE_W = 0$	102	33.44
$\Delta E_A > 0, \Delta wE_W < 0$	50	16.39
$\Delta E_A = 0, \Delta wE_W > 0$	42	13.77
$\Delta E_A < 0, \Delta wE_W > 0$	84	27.54
Total	305	100.00

Note: Missing values are reported in correspondence of combinations of ΔE_A and ΔwE_W which are not compatible with the sign of ΔE_{tot}.

Table 6: Summary statistics on dependent and independent variables

	N	Mean	Median	Std. Dev.
CAR (120 days, mkt model)	2,577	-0.011	-.0068	0.0841
Bidder Size (log)	2,480	7.8466	7.7957	2.1476
Market-To-Book Ratio	2,573	0.0058	.0029	0.0556
Leverage	2,561	0.2243	.2023	0.1931
Cash-Flow	2,576	0.0857	.0967	0.1298
Sigma	2,577	0.0265	.022	0.017
Relative Deal Size	2,480	0.8815	.1877	18.5476
Only Cash (=1 yes)	2,577	0.447	0	0.4973
Stock (=1 yes)	2,577	0.534	1	0.4989
E_{tot}, Bidder, before deal	2,577	0.2657	0	0.3719
No Prior Diversification (=1)	2,577	0.6193	1	0.4856
ΔE_{tot}	2,577	0.1487	0	0.3261
ΔE_A	2,577	0.0749	0	0.2558
ΔwE_W	2,577	0.0738	0	0.2428

Table 7: pairwise correlations between independent variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Bidder Size	1												
(2) Market-To-Book Ratio	0.051**	1											
(3) Leverage	0.004	0.077***	1										
(4) Cash-Flow	0.387***	-0.019	-0.066***	1									
(5) Sigma	-0.471***	0.051***	-0.155***	-0.448***	1								
(6) Relative Deal Size	-0.143***	-0.002	-0.005	0.001	-0.011	1							
(7) Only Cash (=1 yes)	0.226***	0.002	-0.019	0.208***	-0.285***	0.008	1						
(8) Stock (=1 yes)	-0.234***	-0.026	0.015	-0.206***	0.293***	-0.007	-0.962***	1					
(9) E_{tot}, Bidder, before deal	0.231***	-0.023	0.102***	0.073***	-0.230***	-0.021	0.123***	-0.137***	1				
(10) No Prior Diversification (=1)	-0.239***	0.025	-0.126***	-0.076***	0.238***	0.022	-0.126***	0.142***	-0.912***	1			
(11) ΔE_{tot}	-0.304***	-0.026	-0.064***	-0.202***	0.253***	0.006	-0.166***	0.175***	-0.462***	0.457***	1		
(12) ΔE_A	-0.211***	-0.027	-0.036*	-0.129***	0.195***	-0.003	-0.110***	0.109***	-0.340***	0.331***	0.676***	1	
(13) ΔwE_W	-0.186***	-0.006	-0.048**	-0.135***	0.135***	0.011	-0.108***	0.121***	-0.263***	0.265***	0.631***	-0.145***	1

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

Table 8: bidders' cumulative abnormal returns following M&A announcement

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bidder Size (log)	-0.00190	-0.00256**	-0.00256**	-0.00250*	-0.00243*	-0.00250**	-0.00243*
	(0.00126)	(0.00127)	(0.00127)	(0.00127)	(0.00127)	(0.00127)	(0.00127)
Mkt-To-Book Ratio	0.00184	0.000427	0.000628	0.00359	0.00451	0.00387	0.00477
	(0.0117)	(0.0108)	(0.0109)	(0.0106)	(0.0105)	(0.0107)	(0.0106)
Leverage	0.0250**	0.0235**	0.0235**	0.0222**	0.0213**	0.0221**	0.0212**
	(0.0101)	(0.0101)	(0.0101)	(0.0101)	(0.0101)	(0.0101)	(0.0100)
Cash-Flow	-0.000296	-0.000327	-0.000329	-0.000408	-0.000482	-0.000412	-0.000485
	(0.000392)	(0.000392)	(0.000392)	(0.000390)	(0.000388)	(0.000390)	(0.000388)
Sigma	-0.00132	0.0618	0.0594	0.104	0.117	0.101	0.114
	(0.244)	(0.245)	(0.246)	(0.249)	(0.249)	(0.250)	(0.250)
Relative Deal Size	-0.0000561	-0.0000627	-0.0000625	-0.0000583	-0.0000570	-0.0000580	-0.0000567
	(0.0000557)	(0.0000521)	(0.0000517)	(0.0000523)	(0.0000523)	(0.0000518)	(0.0000518)
Only Cash (=1)	0.0134	0.0139	0.0140	0.0149	0.0154	0.0151	0.0156
	(0.0112)	(0.0113)	(0.0113)	(0.0113)	(0.0114)	(0.0114)	(0.0114)
Stock (=1)	-0.0259**	-0.0243**	-0.0241**	-0.0231**	-0.0226**	-0.0229**	-0.0224*
	(0.0113)	(0.0113)	(0.0114)	(0.0114)	(0.0115)	(0.0115)	(0.0115)
ΔE_{tot}		-0.0198***		-0.0146**	-0.0137**		
		(0.00623)		(0.00696)	(0.00693)		
ΔE_A			-0.0185**			-0.0128	-0.0120
			(0.00810)			(0.00875)	(0.00871)
ΔwE_W			-0.0213**			-0.0164*	-0.0154*
			(0.00825)			(0.00875)	(0.00874)
E_{tot}, Bidder, before deal				0.0114**		0.0114**	
				(0.00482)		(0.00482)	
No Prior Diversification (=1)					-0.0104***		-0.0105***
					(0.00400)		(0.00400)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.0131	0.0173	0.0173	0.0118	0.0207	0.0118	0.0207
	(0.0184)	(0.0185)	(0.0185)	(0.0190)	(0.0185)	(0.0190)	(0.0185)
R-squared	0.0737	0.0788	0.0789	0.0807	0.0814	0.0807	0.0814
N	2461	2461	2461	2461	2461	2461	2461

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01*

Table 9: bidders' cumulative abnormal returns following M&A announcement, excluding non-diversifying deals by single-sector Bidders and Targets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bidder Size (log)	-0.00192	-0.00344**	-0.00344**	-0.00340**	-0.00324**	-0.00340**	-0.00324**
	(0.00143)	(0.00146)	(0.00146)	(0.00148)	(0.00146)	(0.00148)	(0.00146)
Mkt-To-Book Ratio	-0.0140	-0.0254	-0.0246	-0.0248	-0.0237	-0.0240	-0.0228
	(0.0697)	(0.0588)	(0.0590)	(0.0587)	(0.0581)	(0.0589)	(0.0583)
Leverage	0.0229*	0.0177	0.0176	0.0176	0.0171	0.0176	0.0171
	(0.0129)	(0.0129)	(0.0129)	(0.0129)	(0.0128)	(0.0129)	(0.0128)
Cash-Flow	-0.000191	-0.000205	-0.000207	-0.000211	-0.000253	-0.000214	-0.000256
	(0.000416)	(0.000414)	(0.000414)	(0.000415)	(0.000412)	(0.000415)	(0.000412)
Sigma	0.0277	0.191	0.188	0.193	0.202	0.191	0.199
	(0.302)	(0.306)	(0.308)	(0.308)	(0.308)	(0.310)	(0.310)
Relative Deal Size	-0.000427***	-0.000418***	-0.000416***	-0.000416***	-0.000412***	-0.000414***	-0.000410***
	(0.0000892)	(0.0000864)	(0.0000868)	(0.0000866)	(0.0000871)	(0.0000871)	(0.0000876)
Only Cash (=1)	0.00751	0.00925	0.00936	0.00931	0.00958	0.00943	0.00970
	(0.0116)	(0.0116)	(0.0116)	(0.0117)	(0.0117)	(0.0117)	(0.0117)
Stock (=1)	-0.0281**	-0.0230*	-0.0228*	-0.0230*	-0.0231*	-0.0229*	-0.0229*
	(0.0117)	(0.0117)	(0.0118)	(0.0117)	(0.0118)	(0.0118)	(0.0119)
ΔE_{tot}		-0.0310***		-0.0298***	-0.0267***		
		(0.00689)		(0.00881)	(0.00889)		
ΔE_A			-0.0300***			-0.0287***	-0.0256**
			(0.00868)			(0.0104)	(0.0104)
ΔwE_W			-0.0320***			-0.0308***	-0.0277***
			(0.00873)			(0.0102)	(0.0103)
E_{tot}, Bidder, before deal				0.00150		0.00158	
				(0.00588)		(0.00588)	
No Prior Diversification (=1)					-0.00420		-0.00424
					(0.00513)		(0.00513)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.0264	0.0369*	0.0369*	0.0357	0.0365*	0.0356	0.0365*
	(0.0209)	(0.0211)	(0.0211)	(0.0221)	(0.0211)	(0.0221)	(0.0212)
R-squared	0.0719	0.0864	0.0865	0.0865	0.0867	0.0865	0.0867
N	1774	1774	1774	1774	1774	1774	1774

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01*

Table 10: bidders' cumulative abnormal returns following M&A announcement, by different degrees of Bidder-Target Industry and Sector Overlap (change in *Total* Entropy)

	(1) [a]	(2) [b]	(3) [c]	(4) [a]	(5) [b]	(6) [c]
Bidder Size (log)	-0.00205	-0.00322	-0.00480	-0.00193	-0.00324	-0.00435
	(0.00205)	(0.00213)	(0.00294)	(0.00205)	(0.00213)	(0.00280)
Mkt-To-Book Ratio	0.00462	-0.190	0.0281	0.00594	-0.191	0.0310
	(0.0124)	(0.150)	(0.0592)	(0.0125)	(0.150)	(0.0574)
Leverage	0.0286**	0.000928	0.0453*	0.0268**	0.000894	0.0438*
	(0.0135)	(0.0182)	(0.0236)	(0.0135)	(0.0181)	(0.0235)
Cash-Flow	-0.000950	-0.000744	0.000519	-0.000997	-0.000746	0.000495
	(0.000656)	(0.000588)	(0.000892)	(0.000658)	(0.000589)	(0.000877)
Sigma	0.0997	-0.636	0.801	0.114	-0.637	0.824
	(0.345)	(0.429)	(0.516)	(0.347)	(0.431)	(0.514)
Relative Deal Size	-0.00000326	-0.000394***	-0.00364	-0.00000265	-0.000395***	-0.00469
	(0.0000318)	(0.0000795)	(0.0112)	(0.0000319)	(0.0000797)	(0.0112)
Only Cash (=1)	0.0529***	0.00613	-0.00478	0.0534***	0.00610	-0.00419
	(0.0198)	(0.0178)	(0.0196)	(0.0199)	(0.0178)	(0.0200)
Stock (=1)	0.0104	-0.0256	-0.0379*	0.0107	-0.0256	-0.0383*
	(0.0199)	(0.0179)	(0.0199)	(0.0200)	(0.0179)	(0.0203)
ΔE_{tot}	-0.0445	-0.0224*	-0.0400**	-0.0484	-0.0231*	-0.0309*
	(0.0467)	(0.0124)	(0.0181)	(0.0453)	(0.0122)	(0.0171)
E_{tot}, Bidder, before deal	0.0198***	0.00183	-0.0129			
	(0.00731)	(0.00852)	(0.0116)			
No Prior Diversification (=1)				-0.0147**	-0.000802	0.00101
				(0.00581)	(0.00703)	(0.00959)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0366	0.0576*	0.0488	-0.0227	0.0590*	0.0373
	(0.0298)	(0.0322)	(0.0384)	(0.0298)	(0.0305)	(0.0367)
R-squared	0.0973	0.145	0.0959	0.0974	0.145	0.0945
N	1044	844	573	1044	844	573

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Note: [a] Full Overlap; [b]Partial Overlap; [c] No Overlap*

Table 11: bidders' cumulative abnormal returns following M&A announcement, by different degrees of Bidder-Target Industry and Sector Overlap (change in *Across* and *Within* Entropy)

	(1) [a]	(2) [b]	(3) [c]	(4) [a]	(5) [b]	(6) [c]
Bidder Size (log)	-0.00207	-0.00321	-0.00448	-0.00196	-0.00323	-0.00403
	(0.00205)	(0.00213)	(0.00294)	(0.00205)	(0.00213)	(0.00279)
Mkt-To-Book Ratio	0.00504	-0.188	0.0284	0.00632	-0.188	0.0306
	(0.0124)	(0.151)	(0.0591)	(0.0125)	(0.151)	(0.0577)
Leverage	0.0281**	0.000983	0.0442*	0.0263*	0.000982	0.0427*
	(0.0135)	(0.0182)	(0.0236)	(0.0134)	(0.0181)	(0.0235)
Cash-Flow	-0.000943	-0.000739	0.000470	-0.000991	-0.000738	0.000386
	(0.000657)	(0.000588)	(0.000927)	(0.000658)	(0.000590)	(0.000919)
Sigma	0.0918	-0.639	0.785	0.107	-0.640	0.801
	(0.344)	(0.429)	(0.495)	(0.346)	(0.431)	(0.491)
Relative Deal Size	-0.00000358	-0.000394***	-0.00427	-0.00000295	-0.000395***	-0.00526
	(0.0000318)	(0.0000791)	(0.0109)	(0.0000319)	(0.0000792)	(0.0108)
Only Cash (=1)	0.0528***	0.00596	-0.00638	0.0532***	0.00591	-0.00593
	(0.0198)	(0.0177)	(0.0196)	(0.0200)	(0.0178)	(0.0198)
Stock (=1)	0.0104	-0.0257	-0.0384*	0.0107	-0.0257	-0.0386*
	(0.0199)	(0.0178)	(0.0200)	(0.0200)	(0.0178)	(0.0201)
ΔE_A	-0.0302	-0.0272	-0.0395**	-0.0348	-0.0279	-0.0312*
	(0.0605)	(0.0184)	(0.0179)	(0.0589)	(0.0179)	(0.0169)
ΔwE_W	-0.0712	-0.0219*	0.0521	-0.0738	-0.0224*	0.0716*
	(0.0676)	(0.0126)	(0.0442)	(0.0665)	(0.0126)	(0.0427)
E_{tot}, Bidder, before deal	0.0197***	0.000948	-0.00173			
	(0.00731)	(0.00882)	(0.0126)			
No Prior Diversification (=1)				-0.0146**	-0.000229	-0.00773
				(0.00582)	(0.00723)	(0.0103)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0361	0.0580*	0.0452	-0.0223	0.0587*	0.0431
	(0.0298)	(0.0321)	(0.0387)	(0.0298)	(0.0306)	(0.0366)
R-squared	0.0975	0.146	0.103	0.0976	0.146	0.103
N	1044	844	573	1044	844	573

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Note: [a] Full Overlap; [b]Partial Overlap; [c] No Overlap*

Appendix

This Appendix provides results from our robustness analysis.

Table A1: robustness checks, bidders' cumulative abnormal returns following M&A announcement. CARs estimated with Fama-French model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bidder Size (log)	-0.00192	-0.00253**	-0.00253**	-0.00248**	-0.00242*	-0.00248**	-0.00242*
	(0.00125)	(0.00126)	(0.00126)	(0.00126)	(0.00126)	(0.00126)	(0.00126)
Mkt-To-Book Ratio	0.00414	0.00283	0.00299	0.00547	0.00622	0.00569	0.00643
	(0.0153)	(0.0142)	(0.0143)	(0.0140)	(0.0139)	(0.0141)	(0.0139)
Leverage	0.0229**	0.0216**	0.0215**	0.0205**	0.0197*	0.0204**	0.0196*
	(0.0103)	(0.0103)	(0.0103)	(0.0103)	(0.0102)	(0.0102)	(0.0102)
Cash-Flow	-0.000305	-0.000333	-0.000335	-0.000401	-0.000462	-0.000404	-0.000465
	(0.000392)	(0.000393)	(0.000393)	(0.000390)	(0.000389)	(0.000391)	(0.000389)
Sigma	-0.0454	0.0133	0.0114	0.0486	0.0589	0.0464	0.0567
	(0.240)	(0.241)	(0.242)	(0.245)	(0.245)	(0.246)	(0.246)
Relative Deal Size	-0.0000577	-0.0000639	-0.0000637	-0.0000602	-0.0000591	-0.0000599	-0.0000589
	(0.0000551)	(0.0000518)	(0.0000514)	(0.0000520)	(0.0000519)	(0.0000516)	(0.0000515)
Only Cash (=1)	0.0152	0.0156	0.0157	0.0165	0.0169	0.0166	0.0170
	(0.0113)	(0.0114)	(0.0114)	(0.0115)	(0.0115)	(0.0115)	(0.0116)
Stock (=1)	-0.0237**	-0.0222*	-0.0221*	-0.0213*	-0.0209*	-0.0211*	-0.0207*
	(0.0114)	(0.0115)	(0.0115)	(0.0116)	(0.0116)	(0.0116)	(0.0117)
ΔE_{tot}		-0.0184***		-0.0140**	-0.0133*		
		(0.00619)		(0.00691)	(0.00687)		
ΔE_A			-0.0174**			-0.0127	-0.0120
			(0.00810)			(0.00875)	(0.00870)
ΔwE_W			-0.0195**			-0.0154*	-0.0147*
			(0.00817)			(0.00865)	(0.00863)
E_{tot}, Bidder, before deal				0.00945**		0.00952**	
				(0.00475)		(0.00476)	
No Prior Diversification (=1)					-0.00865**		-0.00869**
					(0.00399)		(0.00399)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.0137	0.0177	0.0177	0.0131	0.0205	0.0131	0.0205
	(0.0183)	(0.0185)	(0.0185)	(0.0189)	(0.0184)	(0.0189)	(0.0184)
R-squared	0.0743	0.0788	0.0788	0.0801	0.0806	0.0801	0.0806
N	2461	2461	2461	2461	2461	2461	2461

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01*

Table A2: robustness checks bidders' cumulative abnormal returns following M&A announcement, excluding non-diversifying deals by single-sector Bidders and Targets. CARs estimated with Fama-French model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bidder Size (log)	-0.00176	-0.00315**	-0.00315**	-0.00313**	-0.00302**	-0.00313**	-0.00302**
	(0.00141)	(0.00144)	(0.00144)	(0.00146)	(0.00144)	(0.00146)	(0.00144)
Mkt-To-Book Ratio	0.0244	0.0139	0.0146	0.0141	0.0150	0.0148	0.0157
	(0.0643)	(0.0545)	(0.0546)	(0.0545)	(0.0541)	(0.0546)	(0.0542)
Leverage	0.0228*	0.0181	0.0180	0.0180	0.0177	0.0180	0.0176
	(0.0131)	(0.0130)	(0.0130)	(0.0130)	(0.0130)	(0.0130)	(0.0130)
Cash-Flow	-0.000197	-0.000209	-0.000211	-0.000212	-0.000240	-0.000214	-0.000243
	(0.000417)	(0.000416)	(0.000416)	(0.000417)	(0.000415)	(0.000417)	(0.000415)
Sigma	-0.00103	0.148	0.146	0.149	0.155	0.147	0.153
	(0.294)	(0.299)	(0.301)	(0.301)	(0.301)	(0.302)	(0.303)
Relative Deal Size	-0.000420***	-0.000412***	-0.000410***	-0.000411***	-0.000408***	-0.000409***	-0.000406***
	(0.0000922)	(0.0000895)	(0.0000900)	(0.0000897)	(0.0000900)	(0.0000902)	(0.0000905)
Only Cash (=1)	0.00873	0.0103	0.0104	0.0103	0.0105	0.0104	0.0106
	(0.0117)	(0.0119)	(0.0119)	(0.0119)	(0.0119)	(0.0119)	(0.0120)
Stock (=1)	-0.0264**	-0.0216*	-0.0215*	-0.0217*	-0.0217*	-0.0216*	-0.0216*
	(0.0119)	(0.0120)	(0.0120)	(0.0120)	(0.0120)	(0.0120)	(0.0121)
ΔE_{tot}		-0.0283***		-0.0279***	-0.0255***		
		(0.00686)		(0.00879)	(0.00877)		
ΔE_A			-0.0276***			-0.0271***	-0.0247**
			(0.00869)			(0.0104)	(0.0104)
ΔwE_W			-0.0291***			-0.0287***	-0.0264***
			(0.00866)			(0.0101)	(0.0101)
E_{tot}, Bidder, before deal				0.000533		0.000593	
				(0.00579)		(0.00580)	
No Prior Diversification (=1)					-0.00270		-0.00274
					(0.00506)		(0.00506)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.0252	0.0347*	0.0347*	0.0343	0.0345	0.0342	0.0345
	(0.0208)	(0.0210)	(0.0210)	(0.0219)	(0.0210)	(0.0219)	(0.0210)
R-squared	0.0707	0.0829	0.0830	0.0829	0.0831	0.0830	0.0831
N	1774	1774	1774	1774	1774	1774	1774

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01*

Table A3: robustness checks, bidders' cumulative abnormal returns following M&A announcement, by different degrees of Bidder-Target Industry and Sector Overlap (change in *Total* Entropy). CARs estimated with Fama-French model

	(1) [a]	(2) [b]	(3) [c]	(4) [a]	(5) [b]	(6) [c]
Bidder Size (log)	-0.00252	-0.00285	-0.00446	-0.00242	-0.00289	-0.00408
	(0.00204)	(0.00212)	(0.00296)	(0.00204)	(0.00212)	(0.00281)
Mkt-To-Book Ratio	0.00373	-0.209	0.0832*	0.00489	-0.210	0.0858*
	(0.0130)	(0.159)	(0.0496)	(0.0130)	(0.159)	(0.0485)
Leverage	0.0260*	0.00151	0.0454*	0.0244*	0.00151	0.0441*
	(0.0139)	(0.0186)	(0.0235)	(0.0138)	(0.0186)	(0.0234)
Cash-Flow	-0.000900	-0.000726	0.000490	-0.000942	-0.000722	0.000497
	(0.000644)	(0.000586)	(0.000917)	(0.000646)	(0.000589)	(0.000899)
Sigma	-0.00672	-0.579	0.677	0.00626	-0.582	0.698
	(0.348)	(0.414)	(0.512)	(0.350)	(0.417)	(0.510)
Relative Deal Size	-0.0000147	-0.000383***	-0.00271	-0.0000141	-0.000385***	-0.00361
	(0.0000319)	(0.0000814)	(0.0113)	(0.0000319)	(0.0000815)	(0.0113)
Only Cash (=1)	0.0570***	0.00823	-0.00746	0.0574***	0.00813	-0.00702
	(0.0215)	(0.0169)	(0.0189)	(0.0216)	(0.0169)	(0.0194)
Stock (=1)	0.0135	-0.0230	-0.0383**	0.0137	-0.0230	-0.0387*
	(0.0216)	(0.0170)	(0.0193)	(0.0217)	(0.0170)	(0.0197)
ΔE_{tot}	-0.0348	-0.0215*	-0.0394**	-0.0382	-0.0227*	-0.0316*
	(0.0482)	(0.0122)	(0.0181)	(0.0469)	(0.0120)	(0.0167)
E_{tot}, Bidder, before deal	0.0172**	0.00186	-0.0163			
	(0.00726)	(0.00830)	(0.0114)			
No Prior Diversification (=1)				-0.0128**	-0.000301	0.00494
				(0.00580)	(0.00697)	(0.00945)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0314	0.0498	0.0556	-0.0193	0.0512*	0.0418
	(0.0310)	(0.0313)	(0.0374)	(0.0310)	(0.0297)	(0.0358)
R-squared	0.102	0.139	0.0885	0.102	0.139	0.0866
N	1044	844	573	1044	844	573

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Note: [a] Full Overlap; [b]Partial Overlap; [c] No Overlap*

Table A4: robustness checks, bidders' cumulative abnormal returns following M&A announcement, by different degrees of Bidder-Target Industry and Sector Overlap (change in *Across* and *Within* Entropy). CARs estimated with Fama-French model

	(1) [a]	(2) [b]	(3) [c]	(4) [a]	(5) [b]	(6) [c]
Bidder Size (log)	-0.00254	-0.00284	-0.00415	-0.00244	-0.00288	-0.00378
	(0.00204)	(0.00212)	(0.00296)	(0.00204)	(0.00212)	(0.00280)
Mkt-To-Book Ratio	0.00405	-0.207	0.0834*	0.00517	-0.207	0.0854*
	(0.0130)	(0.160)	(0.0493)	(0.0130)	(0.160)	(0.0484)
Leverage	0.0256*	0.00157	0.0443*	0.0240*	0.00161	0.0431*
	(0.0138)	(0.0186)	(0.0235)	(0.0138)	(0.0186)	(0.0234)
Cash-Flow	-0.000895	-0.000721	0.000444	-0.000937	-0.000713	0.000393
	(0.000644)	(0.000586)	(0.000951)	(0.000647)	(0.000589)	(0.000939)
Sigma	-0.0127	-0.581	0.661	0.000439	-0.584	0.676
	(0.347)	(0.415)	(0.491)	(0.349)	(0.417)	(0.488)
Relative Deal Size	-0.0000149	-0.000384***	-0.00331	-0.0000144	-0.000385***	-0.00416
	(0.0000319)	(0.0000810)	(0.0110)	(0.0000319)	(0.0000811)	(0.0110)
Only Cash (=1)	0.0569***	0.00804	-0.00900	0.0573***	0.00792	-0.00867
	(0.0215)	(0.0168)	(0.0189)	(0.0216)	(0.0168)	(0.0191)
Stock (=1)	0.0135	-0.0231	-0.0388**	0.0137	-0.0231	-0.0390**
	(0.0216)	(0.0169)	(0.0194)	(0.0217)	(0.0169)	(0.0195)
ΔE_A	-0.0239	-0.0267	-0.0389**	-0.0280	-0.0281	-0.0319*
	(0.0623)	(0.0185)	(0.0179)	(0.0609)	(0.0181)	(0.0166)
ΔwE_W	-0.0551	-0.0210*	0.0490	-0.0573	-0.0219*	0.0660
	(0.0708)	(0.0125)	(0.0469)	(0.0697)	(0.0124)	(0.0457)
E_{tot}, Bidder, before deal	0.0172**	0.000905	-0.00559			
	(0.00726)	(0.00860)	(0.0123)			
No Prior Diversification (=1)				-0.0128**	0.000343	-0.00338
				(0.00581)	(0.00718)	(0.0102)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0310	0.0502	0.0522	-0.0190	0.0508*	0.0473
	(0.0310)	(0.0312)	(0.0378)	(0.0310)	(0.0298)	(0.0358)
R-squared	0.102	0.139	0.0949	0.102	0.139	0.0948
N	1044	844	573	1044	844	573

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Note: [a] Full Overlap; [b]Partial Overlap; [c] No Overlap*

Table A5: robustness checks, bidders' cumulative abnormal returns following M&A announcement. Alternative Entropy definitions (sectors: 4-digit SICs; industries: 3-digit SICs)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bidder Size (log)	-0.00190	-0.00256**	-0.00258**	-0.00250*	-0.00243*	-0.00252**	-0.00245*
	(0.00126)	(0.00127)	(0.00127)	(0.00127)	(0.00127)	(0.00127)	(0.00127)
Mkt-To-Book Ratio	0.00184	0.000427	0.00127	0.00359	0.00451	0.00458	0.00545
	(0.0117)	(0.0108)	(0.0108)	(0.0106)	(0.0105)	(0.0106)	(0.0105)
Leverage	0.0250**	0.0235**	0.0229**	0.0222**	0.0213**	0.0215**	0.0206**
	(0.0101)	(0.0101)	(0.0101)	(0.0101)	(0.0101)	(0.0101)	(0.0100)
Cash-Flow	-0.000296	-0.000327	-0.000338	-0.000408	-0.000482	-0.000423	-0.000495
	(0.000392)	(0.000392)	(0.000393)	(0.000390)	(0.000388)	(0.000391)	(0.000389)
Sigma	-0.00132	0.0618	0.0567	0.104	0.117	0.0997	0.112
	(0.244)	(0.245)	(0.245)	(0.249)	(0.249)	(0.248)	(0.249)
Relative Deal Size	-0.0000561	-0.0000627	-0.0000639	-0.0000583	-0.0000570	-0.0000595	-0.0000582
	(0.0000557)	(0.0000521)	(0.0000529)	(0.0000523)	(0.0000523)	(0.0000532)	(0.0000531)
Only Cash (=1)	0.0134	0.0139	0.0143	0.0149	0.0154	0.0155	0.0159
	(0.0112)	(0.0113)	(0.0113)	(0.0113)	(0.0114)	(0.0113)	(0.0114)
Stock (=1)	-0.0259**	-0.0243**	-0.0238**	-0.0231**	-0.0226**	-0.0225**	-0.0221*
	(0.0113)	(0.0113)	(0.0113)	(0.0114)	(0.0115)	(0.0114)	(0.0115)
ΔE_{tot}		-0.0198***		-0.0146**	-0.0137**		
		(0.00623)		(0.00696)	(0.00693)		
ΔE_A			-0.0166**			-0.0110	-0.0103
			(0.00700)			(0.00773)	(0.00768)
ΔwE_W			-0.0275***			-0.0227**	-0.0217**
			(0.0105)			(0.0108)	(0.0108)
E_{tot}, Bidder, before deal				0.0114**		0.0116**	
				(0.00482)		(0.00483)	
No Prior Diversification (=1)					-0.0104***		-0.0105***
					(0.00400)		(0.00401)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.0131	0.0173	0.0173	0.0118	0.0207	0.0116	0.0207
	(0.0184)	(0.0185)	(0.0185)	(0.0190)	(0.0185)	(0.0190)	(0.0185)
R-squared	0.0737	0.0788	0.0793	0.0807	0.0814	0.0812	0.0819
N	2461	2461	2461	2461	2461	2461	2461

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01*

Table A6: robustness checks, bidders' cumulative abnormal returns following M&A announcement, excluding non-diversifying deals by single-sector Bidders and Targets. Alternative Entropy definitions (sectors: 4-digit SICs; industries: 3-digit SICs)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bidder Size (log)	-0.00192	-0.00344**	-0.00348**	-0.00340**	-0.00324**	-0.00343**	-0.00328**
	(0.00143)	(0.00146)	(0.00145)	(0.00148)	(0.00146)	(0.00147)	(0.00146)
Mkt-To-Book Ratio	-0.0140	-0.0254	-0.0213	-0.0248	-0.0237	-0.0206	-0.0196
	(0.0697)	(0.0588)	(0.0579)	(0.0587)	(0.0581)	(0.0577)	(0.0571)
Leverage	0.0229*	0.0177	0.0168	0.0176	0.0171	0.0167	0.0162
	(0.0129)	(0.0129)	(0.0128)	(0.0129)	(0.0128)	(0.0128)	(0.0128)
Cash-Flow	-0.000191	-0.000205	-0.000219	-0.000211	-0.000253	-0.000227	-0.000268
	(0.000416)	(0.000414)	(0.000415)	(0.000415)	(0.000412)	(0.000416)	(0.000413)
Sigma	0.0277	0.191	0.183	0.193	0.202	0.186	0.195
	(0.302)	(0.306)	(0.306)	(0.308)	(0.308)	(0.307)	(0.307)
Relative Deal Size	-0.000427***	-0.000418***	-0.000426***	-0.000416***	-0.000412***	-0.000424***	-0.000420***
	(0.0000892)	(0.0000864)	(0.0000874)	(0.0000866)	(0.0000871)	(0.0000877)	(0.0000882)
Only Cash (=1)	0.00751	0.00925	0.00983	0.00931	0.00958	0.00991	0.0102
	(0.0116)	(0.0116)	(0.0116)	(0.0117)	(0.0117)	(0.0117)	(0.0117)
Stock (=1)	-0.0281**	-0.0230*	-0.0223*	-0.0230*	-0.0231*	-0.0223*	-0.0224*
	(0.0117)	(0.0117)	(0.0118)	(0.0117)	(0.0118)	(0.0118)	(0.0118)
ΔE_{tot}		-0.0310***		-0.0298***	-0.0267***		
		(0.00689)		(0.00881)	(0.00889)		
ΔE_A			-0.0275***			-0.0261***	-0.0232**
			(0.00752)			(0.00937)	(0.00943)
ΔwE_W			-0.0396***			-0.0382***	-0.0352***
			(0.0111)			(0.0123)	(0.0124)
E_{tot}, Bidder, before deal				0.00150		0.00177	
				(0.00588)		(0.00588)	
No Prior Diversification (=1)					-0.00420		-0.00425
					(0.00513)		(0.00513)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.0264	0.0369*	0.0370*	0.0357	0.0365*	0.0356	0.0366*
	(0.0209)	(0.0211)	(0.0210)	(0.0221)	(0.0211)	(0.0221)	(0.0211)
R-squared	0.0719	0.0864	0.0873	0.0865	0.0867	0.0873	0.0876
N	1774	1774	1774	1774	1774	1774	1774

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01*

Table A7: robustness checks, bidders' cumulative abnormal returns following M&A announcement, by different degrees of Bidder-Target Industry and Sector Overlap (change in *Total* Entropy). Alternative Entropy definitions (sectors: 4-digit SICs; industries: 3-digit SICs)

	(1) [a]	(2) [b]	(3) [c]	(4) [a]	(5) [b]	(6) [c]
Bidder Size (log)	-0.00205	-0.00504**	-0.00453*	-0.00193	-0.00508**	-0.00417*
	(0.00205)	(0.00222)	(0.00255)	(0.00205)	(0.00223)	(0.00244)
Mkt-To-Book Ratio	0.00462	-0.0673	0.0253	0.00594	-0.0687	0.0266
	(0.0124)	(0.153)	(0.0572)	(0.0125)	(0.153)	(0.0565)
Leverage	0.0286**	-0.00246	0.0406**	0.0268**	-0.00239	0.0397**
	(0.0135)	(0.0205)	(0.0183)	(0.0135)	(0.0205)	(0.0182)
Cash-Flow	-0.000950	-0.000787	0.000145	-0.000997	-0.000776	0.000106
	(0.000656)	(0.000695)	(0.000720)	(0.000658)	(0.000695)	(0.000713)
Sigma	0.0997	-0.974***	0.527	0.114	-0.976***	0.545
	(0.345)	(0.336)	(0.463)	(0.347)	(0.339)	(0.461)
Relative Deal Size	-0.00000326	-0.0209***	-0.000422***	-0.00000265	-0.0209***	-0.000413***
	(0.0000318)	(0.00757)	(0.0000770)	(0.0000319)	(0.00757)	(0.0000754)
Only Cash (=1)	0.0529***	0.0145	-0.0132	0.0534***	0.0144	-0.0126
	(0.0198)	(0.0217)	(0.0154)	(0.0199)	(0.0217)	(0.0155)
Stock (=1)	0.0104	-0.00903	-0.0428***	0.0107	-0.00899	-0.0429***
	(0.0199)	(0.0215)	(0.0158)	(0.0200)	(0.0215)	(0.0160)
ΔE_{tot}	-0.0445	-0.0254*	-0.0334**	-0.0484	-0.0265*	-0.0273**
	(0.0467)	(0.0144)	(0.0140)	(0.0453)	(0.0141)	(0.0135)
E_{tot}, Bidder, before deal	0.0198***	0.00106	-0.00435			
	(0.00731)	(0.00966)	(0.00976)			
No Prior Diversification (=1)				-0.0147**	0.000294	-0.00276
				(0.00581)	(0.00770)	(0.00811)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0366	0.0811**	0.0486	-0.0227	0.0817**	0.0433
	(0.0298)	(0.0339)	(0.0347)	(0.0298)	(0.0325)	(0.0319)
R-squared	0.0973	0.195	0.0814	0.0974	0.195	0.0814
N	1044	627	790	1044	627	790

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Note: [a] Full Overlap; [b]Partial Overlap; [c] No Overlap*

Table A8: robustness checks, bidders' cumulative abnormal returns following M&A announcement, by different degrees of Bidder-Target Industry and Sector Overlap (change in *Across* and *Within* Entropy). Alternative Entropy definitions (sectors: 4-digit SICs; industries: 3-digit SICs)

	(1) [a]	(2) [b]	(3) [c]	(4) [a]	(5) [b]	(6) [c]
Bidder Size (log)	-0.00202	-0.00514**	-0.00416	-0.00191	-0.00518**	-0.00381
	(0.00205)	(0.00222)	(0.00256)	(0.00205)	(0.00223)	(0.00244)
Mkt-To-Book Ratio	0.00462	-0.0645	0.0270	0.00586	-0.0668	0.0280
	(0.0124)	(0.151)	(0.0570)	(0.0125)	(0.151)	(0.0565)
Leverage	0.0289**	-0.00307	0.0384**	0.0271**	-0.00298	0.0374**
	(0.0135)	(0.0204)	(0.0183)	(0.0135)	(0.0204)	(0.0182)
Cash-Flow	-0.000915	-0.000814	0.000232	-0.000960	-0.000800	0.000162
	(0.000656)	(0.000701)	(0.000728)	(0.000658)	(0.000700)	(0.000721)
Sigma	0.0863	-0.959***	0.540	0.100	-0.963***	0.556
	(0.345)	(0.339)	(0.454)	(0.346)	(0.342)	(0.450)
Relative Deal Size	-0.00000258	-0.0223***	-0.000412***	-0.00000201	-0.0221***	-0.000403***
	(0.0000319)	(0.00820)	(0.0000776)	(0.0000319)	(0.00818)	(0.0000757)
Only Cash (=1)	0.0529***	0.0150	-0.0144	0.0534***	0.0148	-0.0137
	(0.0197)	(0.0218)	(0.0155)	(0.0199)	(0.0217)	(0.0157)
Stock (=1)	0.0106	-0.00841	-0.0430***	0.0108	-0.00844	-0.0429***
	(0.0198)	(0.0216)	(0.0160)	(0.0199)	(0.0216)	(0.0161)
ΔE_A	-0.0340	-0.0133	-0.0332**	-0.0380	-0.0162	-0.0275**
	(0.0471)	(0.0199)	(0.0140)	(0.0457)	(0.0191)	(0.0135)
ΔwE_W	-0.194	-0.0275*	0.0577	-0.195	-0.0290*	0.0686
	(0.131)	(0.0152)	(0.0473)	(0.132)	(0.0152)	(0.0463)
E_{tot}, Bidder, before deal	0.0190***	0.00416	0.00110			
	(0.00728)	(0.0102)	(0.0103)			
No Prior Diversification (=1)				-0.0141**	-0.00125	-0.00683
				(0.00581)	(0.00801)	(0.00845)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0368	0.0802**	0.0451	-0.0235	0.0829**	0.0443
	(0.0298)	(0.0340)	(0.0349)	(0.0298)	(0.0328)	(0.0318)
R-squared	0.0982	0.196	0.0868	0.0983	0.196	0.0874
N	1044	627	790	1044	627	790

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Note: [a] Full Overlap; [b]Partial Overlap; [c] No Overlap*

Table A9: robustness checks, bidders' cumulative abnormal returns following M&A announcement. Alternative prior diversification definitions (defined w.r.t. 2-digit SIC industries)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bidder Size (log)	-0.00190	-0.00256**	-0.00256**	-0.00243*	-0.00240*	-0.00243*	-0.00240*
	(0.00126)	(0.00127)	(0.00127)	(0.00127)	(0.00127)	(0.00127)	(0.00127)
Mkt-To-Book Ratio	0.00184	0.000427	0.000628	0.00281	0.00360	0.00348	0.00421
	(0.0117)	(0.0108)	(0.0109)	(0.0106)	(0.0105)	(0.0107)	(0.0106)
Leverage	0.0250**	0.0235**	0.0235**	0.0222**	0.0214**	0.0219**	0.0211**
	(0.0101)	(0.0101)	(0.0101)	(0.0101)	(0.01000)	(0.0100)	(0.00998)
Cash-Flow	-0.000296	-0.000327	-0.000329	-0.000343	-0.000505	-0.000350	-0.000519
	(0.000392)	(0.000392)	(0.000392)	(0.000391)	(0.000389)	(0.000391)	(0.000388)
Sigma	-0.00132	0.0618	0.0594	0.106	0.120	0.102	0.117
	(0.244)	(0.245)	(0.246)	(0.249)	(0.250)	(0.249)	(0.250)
Relative Deal Size	-0.0000561	-0.0000627	-0.0000625	-0.0000579	-0.0000569	-0.0000570	-0.0000561
	(0.0000557)	(0.0000521)	(0.0000517)	(0.0000520)	(0.0000519)	(0.0000510)	(0.0000509)
Only Cash (=1)	0.0134	0.0139	0.0140	0.0148	0.0154	0.0152	0.0158
	(0.0112)	(0.0113)	(0.0113)	(0.0113)	(0.0114)	(0.0114)	(0.0114)
Stock (=1)	-0.0259**	-0.0243**	-0.0241**	-0.0233**	-0.0227**	-0.0228**	-0.0223*
	(0.0113)	(0.0113)	(0.0114)	(0.0114)	(0.0115)	(0.0115)	(0.0115)
ΔE_{tot}		-0.0198***		-0.0156**	-0.0151**		
		(0.00623)		(0.00663)	(0.00659)		
ΔE_A			-0.0185**			-0.0120	-0.0118
			(0.00810)			(0.00885)	(0.00868)
ΔwE_W			-0.0213**			-0.0190**	-0.0183**
			(0.00825)			(0.00832)	(0.00834)
E_{tot}, Bidder, before deal				0.0142**		0.0152**	
				(0.00571)		(0.00590)	
No Prior Diversification (=1)					-0.0111***		-0.0115***
					(0.00398)		(0.00406)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.0131	0.0173	0.0173	0.0122	0.0217	0.0118	0.0218
	(0.0184)	(0.0185)	(0.0185)	(0.0188)	(0.0185)	(0.0188)	(0.0185)
R-squared	0.0737	0.0788	0.0789	0.0809	0.0817	0.0811	0.0819
N	2461	2461	2461	2461	2461	2461	2461

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01*

Table A10: robustness checks, bidders' cumulative abnormal returns following M&A announcement, excluding non-diversifying deals by single-sector Bidders and Targets. Alternative prior diversification definitions (defined w.r.t. 2-digit SIC industries)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bidder Size (log)	-0.00192	-0.00344**	-0.00344**	-0.00327**	-0.00316**	-0.00326**	-0.00315**
	(0.00143)	(0.00146)	(0.00146)	(0.00146)	(0.00145)	(0.00146)	(0.00145)
Mkt-To-Book Ratio	-0.0140	-0.0254	-0.0246	-0.0245	-0.0240	-0.0228	-0.0222
	(0.0697)	(0.0588)	(0.0590)	(0.0586)	(0.0581)	(0.0588)	(0.0583)
Leverage	0.0229*	0.0177	0.0176	0.0174	0.0167	0.0172	0.0165
	(0.0129)	(0.0129)	(0.0129)	(0.0128)	(0.0128)	(0.0128)	(0.0127)
Cash-Flow	-0.000191	-0.000205	-0.000207	-0.000202	-0.000305	-0.000206	-0.000315
	(0.000416)	(0.000414)	(0.000414)	(0.000414)	(0.000412)	(0.000414)	(0.000411)
Sigma	0.0277	0.191	0.188	0.204	0.217	0.200	0.214
	(0.302)	(0.306)	(0.308)	(0.309)	(0.309)	(0.310)	(0.311)
Relative Deal Size	-0.000427***	-0.000418***	-0.000416***	-0.000412***	-0.000408***	-0.000407***	-0.000403***
	(0.0000892)	(0.0000864)	(0.0000868)	(0.0000863)	(0.0000867)	(0.0000870)	(0.0000874)
Only Cash (=1)	0.00751	0.00925	0.00936	0.00947	0.00994	0.00971	0.0102
	(0.0116)	(0.0116)	(0.0116)	(0.0117)	(0.0117)	(0.0117)	(0.0118)
Stock (=1)	-0.0281**	-0.0230*	-0.0228*	-0.0231*	-0.0228*	-0.0228*	-0.0226*
	(0.0117)	(0.0117)	(0.0118)	(0.0118)	(0.0119)	(0.0118)	(0.0119)
ΔE_{tot}		-0.0310***		-0.0278***	-0.0258***		
		(0.00689)		(0.00761)	(0.00753)		
ΔE_A			-0.0300***			-0.0256**	-0.0234**
			(0.00868)			(0.00995)	(0.00968)
ΔwE_W			-0.0320***			-0.0295***	-0.0277***
			(0.00873)			(0.00891)	(0.00893)
E_{tot}, Bidder, before deal				0.00622		0.00693	
				(0.00615)		(0.00641)	
No Prior Diversification (=1)					-0.00693		-0.00735
					(0.00440)		(0.00450)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.0264	0.0369*	0.0369*	0.0332	0.0372*	0.0329	0.0372*
	(0.0209)	(0.0211)	(0.0211)	(0.0216)	(0.0211)	(0.0216)	(0.0211)
R-squared	0.0719	0.0864	0.0865	0.0869	0.0876	0.0870	0.0877
N	1774	1774	1774	1774	1774	1774	1774

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01*

Table A11: robustness checks, bidders' cumulative abnormal returns following M&A announcement, by different degrees of Bidder-Target Industry and Sector Overlap (change in *Total* Entropy). Alternative prior diversification definitions (defined w.r.t. 2-digit SIC industries)

	(1) [a]	(2) [b]	(3) [c]	(4) [a]	(5) [b]	(6) [c]
Bidder Size (log)	-0.00191	-0.00303	-0.00437	-0.00187	-0.00310	-0.00386
	(0.00205)	(0.00211)	(0.00289)	(0.00205)	(0.00211)	(0.00279)
Mkt-To-Book Ratio	0.00277	-0.187	0.0310	0.00348	-0.188	0.0330
	(0.0124)	(0.150)	(0.0576)	(0.0124)	(0.150)	(0.0563)
Leverage	0.0294**	0.000361	0.0438*	0.0283**	0.000416	0.0422*
	(0.0136)	(0.0181)	(0.0236)	(0.0135)	(0.0181)	(0.0235)
Cash-Flow	-0.000747	-0.000730	0.000490	-0.000921	-0.000820	0.000406
	(0.000653)	(0.000587)	(0.000891)	(0.000654)	(0.000590)	(0.000890)
Sigma	0.0786	-0.618	0.824	0.0956	-0.621	0.841
	(0.346)	(0.430)	(0.516)	(0.348)	(0.433)	(0.515)
Relative Deal Size	-0.00000362	-0.000388***	-0.00473	-0.00000290	-0.000390***	-0.00529
	(0.0000318)	(0.0000797)	(0.0112)	(0.0000319)	(0.0000800)	(0.0112)
Only Cash (=1)	0.0523***	0.00640	-0.00413	0.0528***	0.00657	-0.00392
	(0.0201)	(0.0177)	(0.0200)	(0.0202)	(0.0178)	(0.0202)
Stock (=1)	0.00902	-0.0257	-0.0382*	0.00930	-0.0254	-0.0386*
	(0.0202)	(0.0179)	(0.0203)	(0.0203)	(0.0180)	(0.0205)
ΔE_{tot}	-0.0531	-0.0192*	-0.0308**	-0.0594	-0.0206*	-0.0238
	(0.0475)	(0.0111)	(0.0153)	(0.0465)	(0.0108)	(0.0149)
E_{tot}, Bidder, before deal	0.0196**	0.00907	-0.00176			
	(0.00962)	(0.00917)	(0.0119)			
No Prior Diversification (=1)				-0.0123**	-0.00455	-0.00770
				(0.00620)	(0.00658)	(0.00849)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0366	0.0811**	0.0486	-0.0227	0.0817**	0.0433
	(0.0298)	(0.0339)	(0.0347)	(0.0298)	(0.0325)	(0.0319)
R-squared	0.0973	0.195	0.0814	0.0974	0.195	0.0814
N	1044	627	790	1044	627	790

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Note: [a] Full Overlap; [b]Partial Overlap; [c] No Overlap*

Table A12: robustness checks, bidders' cumulative abnormal returns following M&A announcement,by different degrees of Bidder-Target Industry and Sector Overlap (change in *Across* and *Within* Entropy). Alternative prior diversification definitions (defined w.r.t. 2-digit SIC industries)

	(1) [a]	(2) [b]	(3) [c]	(4) [a]	(5) [b]	(6) [c]
Bidder Size (log)	-0.00197	-0.00303	-0.00503*	-0.00193	-0.00310	-0.00435
	(0.00205)	(0.00211)	(0.00290)	(0.00205)	(0.00211)	(0.00279)
Mkt-To-Book Ratio	0.00374	-0.188	0.0263	0.00444	-0.187	0.0290
	(0.0124)	(0.151)	(0.0605)	(0.0124)	(0.151)	(0.0590)
Leverage	0.0283**	0.000301	0.0456*	0.0272**	0.000474	0.0438*
	(0.0135)	(0.0181)	(0.0236)	(0.0134)	(0.0181)	(0.0234)
Cash-Flow	-0.000739	-0.000730	0.000502	-0.000926	-0.000813	0.000454
	(0.000654)	(0.000587)	(0.000920)	(0.000654)	(0.000593)	(0.000922)
Sigma	0.0703	-0.616	0.759	0.0883	-0.623	0.790
	(0.344)	(0.431)	(0.486)	(0.347)	(0.434)	(0.488)
Relative Deal Size	-0.00000418	-0.000387***	-0.00368	-0.00000339	-0.000390***	-0.00449
	(0.0000318)	(0.0000801)	(0.0109)	(0.0000318)	(0.0000801)	(0.0110)
Only Cash (=1)	0.0522***	0.00647	-0.00679	0.0526***	0.00649	-0.00628
	(0.0201)	(0.0178)	(0.0192)	(0.0202)	(0.0178)	(0.0197)
Stock (=1)	0.00925	-0.0257	-0.0377*	0.00953	-0.0254	-0.0385*
	(0.0202)	(0.0179)	(0.0196)	(0.0203)	(0.0180)	(0.0200)
ΔE_A	-0.0261	-0.0173	-0.0477**	-0.0338	-0.0224	-0.0373**
	(0.0614)	(0.0200)	(0.0191)	(0.0594)	(0.0184)	(0.0181)
ΔwE_W	-0.1000	-0.0193*	0.0602	-0.105	-0.0204*	0.0548
	(0.0738)	(0.0112)	(0.0374)	(0.0749)	(0.0112)	(0.0366)
E_{tot}, Bidder, before deal	0.0212**	0.00973	-0.0152			
	(0.00988)	(0.0108)	(0.0137)			
No Prior Diversification (=1)				-0.0132**	-0.00420	-0.00109
				(0.00630)	(0.00731)	(0.00915)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0342	0.0537*	0.0556	-0.0223	0.0593*	0.0437
	(0.0300)	(0.0316)	(0.0370)	(0.0301)	(0.0306)	(0.0365)
R-squared	0.0960	0.146	0.104	0.0961	0.146	0.103
N	1044	844	573	1044	844	573

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Note: [a] Full Overlap; [b]Partial Overlap; [c] No Overlap*

Table A13: robustness checks, bidders' cumulative abnormal returns following M&A announcement. Sub-sample of full target acquisitions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bidder Size (log)	-0.00281**	-0.00348**	-0.00348**	-0.00347**	-0.00341**	-0.00347**	-0.00341**
	(0.00135)	(0.00137)	(0.00137)	(0.00137)	(0.00137)	(0.00137)	(0.00137)
Mkt-To-Book Ratio	0.00174	-0.000302	0.000509	0.00293	0.00369	0.00390	0.00464
	(0.0149)	(0.0136)	(0.0137)	(0.0134)	(0.0134)	(0.0135)	(0.0135)
Leverage	0.0241**	0.0224**	0.0223**	0.0212**	0.0204*	0.0210*	0.0202*
	(0.0108)	(0.0108)	(0.0108)	(0.0108)	(0.0107)	(0.0107)	(0.0107)
Cash-Flow	-0.000214	-0.000249	-0.000253	-0.000336	-0.000395	-0.000343	-0.000401
	(0.000400)	(0.000400)	(0.000400)	(0.000398)	(0.000396)	(0.000398)	(0.000396)
Sigma	-0.112	-0.0480	-0.0526	-0.00995	-0.000546	-0.0144	-0.00507
	(0.258)	(0.258)	(0.259)	(0.262)	(0.262)	(0.262)	(0.263)
Relative Deal Size	-0.000444***	-0.000425***	-0.000419***	-0.000423***	-0.000422***	-0.000415***	-0.000415***
	(0.0000945)	(0.0000919)	(0.0000928)	(0.0000923)	(0.0000936)	(0.0000933)	(0.0000946)
Only Cash (=1)	0.0236*	0.0243*	0.0245**	0.0256**	0.0262**	0.0260**	0.0265**
	(0.0124)	(0.0124)	(0.0125)	(0.0125)	(0.0126)	(0.0125)	(0.0126)
Stock (=1)	-0.0185	-0.0170	-0.0167	-0.0153	-0.0148	-0.0149	-0.0145
	(0.0124)	(0.0125)	(0.0125)	(0.0125)	(0.0126)	(0.0126)	(0.0126)
ΔE_{tot}		-0.0196***		-0.0148**	-0.0141**		
		(0.00629)		(0.00704)	(0.00700)		
ΔE_A			-0.0165**			-0.0112	-0.0105
			(0.00790)			(0.00858)	(0.00855)
ΔwE_W			-0.0231***			-0.0185**	-0.0178**
			(0.00849)			(0.00898)	(0.00896)
E_{tot}, Bidder, before deal				0.0108**		0.0110**	
				(0.00518)		(0.00519)	
No Prior Diversification (=1)					-0.00968**		-0.00980**
					(0.00429)		(0.00429)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.0138	0.0182	0.0182	0.0129	0.0212	0.0127	0.0212
	(0.0195)	(0.0197)	(0.0197)	(0.0201)	(0.0196)	(0.0201)	(0.0196)
R-squared	0.0845	0.0897	0.0899	0.0912	0.0918	0.0915	0.0921
N	2230	2230	2230	2230	2230	2230	2230

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01*

Table A14: robustness checks bidders' cumulative abnormal returns following M&A announcement, excluding non-diversifying deals by single-sector Bidders and Targets. Sub-sample of full target acquisitions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bidder Size (log)	-0.00316**	-0.00473***	-0.00474***	-0.00474***	-0.00464***	-0.00474***	-0.00465***
	(0.00152)	(0.00158)	(0.00158)	(0.00160)	(0.00158)	(0.00159)	(0.00158)
Mkt-To-Book Ratio	-0.0160	-0.0277	-0.0249	-0.0278	-0.0271	-0.0249	-0.0243
	(0.0612)	(0.0492)	(0.0494)	(0.0493)	(0.0492)	(0.0495)	(0.0493)
Leverage	0.0233*	0.0176	0.0174	0.0176	0.0173	0.0174	0.0171
	(0.0140)	(0.0140)	(0.0139)	(0.0140)	(0.0139)	(0.0139)	(0.0139)
Cash-Flow	-0.0000163	-0.0000488	-0.0000533	-0.0000473	-0.0000714	-0.0000531	-0.0000779
	(0.000422)	(0.000420)	(0.000420)	(0.000422)	(0.000420)	(0.000421)	(0.000420)
Sigma	-0.155	0.0132	0.00715	0.0128	0.0167	0.00709	0.0109
	(0.326)	(0.330)	(0.331)	(0.331)	(0.331)	(0.332)	(0.332)
Relative Deal Size	-0.000466***	-0.000459***	-0.000452***	-0.000459***	-0.000456***	-0.000452***	-0.000449***
	(0.0000892)	(0.0000868)	(0.0000876)	(0.0000870)	(0.0000870)	(0.0000878)	(0.0000878)
Only Cash (=1)	0.0180	0.0202	0.0205	0.0202	0.0205	0.0205	0.0209
	(0.0128)	(0.0129)	(0.0130)	(0.0129)	(0.0130)	(0.0130)	(0.0131)
Stock (=1)	-0.0202	-0.0152	-0.0148	-0.0152	-0.0150	-0.0148	-0.0147
	(0.0129)	(0.0130)	(0.0130)	(0.0130)	(0.0130)	(0.0131)	(0.0131)
ΔE_{tot}		-0.0308***		-0.0311***	-0.0286***		
		(0.00711)		(0.00933)	(0.00944)		
ΔE_A			-0.0278***			-0.0278***	-0.0253**
			(0.00862)			(0.0106)	(0.0107)
ΔwE_W			-0.0341***			-0.0342***	-0.0318***
			(0.00908)			(0.0108)	(0.0109)
E_{tot}, Bidder, before deal				-0.000332		-0.0000531	
				(0.00649)		(0.00649)	
No Prior Diversification (=1)					-0.00217		-0.00235
					(0.00563)		(0.00563)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.0307	0.0414*	0.0415*	0.0416*	0.0411*	0.0415*	0.0412*
	(0.0222)	(0.0224)	(0.0224)	(0.0235)	(0.0224)	(0.0235)	(0.0224)
R-squared	0.0868	0.101	0.102	0.101	0.102	0.102	0.102
N	1583	1583	1583	1583	1583	1583	1583

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01*

Table A15: robustness checks, bidders' cumulative abnormal returns following M&A announcement, by different degrees of Bidder-Target Industry and Sector Overlap (change in *Total* Entropy). Sub-sample of full target acquisitions

	(1) [a]	(2) [b]	(3) [c]	(4) [a]	(5) [b]	(6) [c]
Bidder Size (log)	-0.00257	-0.00264	-0.00937***	-0.00252	-0.00268	-0.00887***
	(0.00226)	(0.00236)	(0.00341)	(0.00226)	(0.00236)	(0.00324)
Mkt-To-Book Ratio	0.00947	-0.173	0.0216	0.0104	-0.174	0.0223
	(0.0178)	(0.156)	(0.0422)	(0.0178)	(0.155)	(0.0418)
Leverage	0.0287**	0.00220	0.0430*	0.0273*	0.00230	0.0416
	(0.0144)	(0.0200)	(0.0259)	(0.0143)	(0.0199)	(0.0259)
Cash-Flow	-0.000951	-0.000849	0.00134	-0.000974	-0.000837	0.00132
	(0.000703)	(0.000618)	(0.000928)	(0.000703)	(0.000621)	(0.000904)
Sigma	0.138	-0.633	0.436	0.150	-0.636	0.464
	(0.356)	(0.449)	(0.577)	(0.358)	(0.451)	(0.573)
Relative Deal Size	-0.00440	-0.000392***	-0.00143	-0.00484	-0.000393***	-0.00257
	(0.00459)	(0.0000807)	(0.0121)	(0.00456)	(0.0000809)	(0.0121)
Only Cash (=1)	0.0556***	0.0130	0.0252	0.0558***	0.0127	0.0261
	(0.0213)	(0.0173)	(0.0274)	(0.0214)	(0.0174)	(0.0282)
Stock (=1)	0.0106	-0.0205	-0.0157	0.0107	-0.0207	-0.0155
	(0.0213)	(0.0174)	(0.0274)	(0.0214)	(0.0174)	(0.0281)
ΔE_{tot}	-0.0467	-0.0235*	-0.0472**	-0.0516	-0.0247*	-0.0372**
	(0.0478)	(0.0135)	(0.0193)	(0.0462)	(0.0132)	(0.0183)
E_{tot}, Bidder, before deal	0.0201***	-0.000135	-0.0188			
	(0.00773)	(0.00965)	(0.0123)			
No Prior Diversification (=1)				-0.0148**	0.00129	0.00480
				(0.00610)	(0.00783)	(0.00996)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0326	0.0487	0.0685	-0.0179	0.0488	0.0516
	(0.0320)	(0.0335)	(0.0449)	(0.0319)	(0.0318)	(0.0427)
R-squared	0.103	0.154	0.131	0.103	0.154	0.128
N	979	760	491	979	760	491

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Note: [a] Full Overlap; [b]Partial Overlap; [c] No Overlap*

Table A16: robustness checks, bidders' cumulative abnormal returns following M&A announcement, by different degrees of Bidder-Target Industry and Sector Overlap (change in *Across* and *Within* Entropy). Sub-sample of full target acquisitions

	(1) [a]	(2) [b]	(3) [c]	(4) [a]	(5) [b]	(6) [c]
Bidder Size (log)	-0.00257	-0.00263	-0.00914***	-0.00252	-0.00267	-0.00870***
	(0.00226)	(0.00236)	(0.00341)	(0.00226)	(0.00237)	(0.00323)
Mkt-To-Book Ratio	0.00984	-0.171	0.0214	0.0107	-0.172	0.0221
	(0.0178)	(0.157)	(0.0421)	(0.0178)	(0.156)	(0.0417)
Leverage	0.0282**	0.00225	0.0421	0.0268*	0.00236	0.0407
	(0.0143)	(0.0200)	(0.0260)	(0.0143)	(0.0199)	(0.0260)
Cash-Flow	-0.000951	-0.000848	0.00124	-0.000973	-0.000834	0.00117
	(0.000704)	(0.000618)	(0.000971)	(0.000704)	(0.000621)	(0.000955)
Sigma	0.133	-0.635	0.413	0.146	-0.637	0.428
	(0.355)	(0.449)	(0.547)	(0.357)	(0.451)	(0.541)
Relative Deal Size	-0.00432	-0.000392***	-0.00253	-0.00476	-0.000393***	-0.00366
	(0.00460)	(0.0000805)	(0.0117)	(0.00458)	(0.0000807)	(0.0116)
Only Cash (=1)	0.0555***	0.0129	0.0243	0.0557***	0.0126	0.0251
	(0.0213)	(0.0173)	(0.0271)	(0.0214)	(0.0174)	(0.0276)
Stock (=1)	0.0106	-0.0205	-0.0152	0.0107	-0.0207	-0.0148
	(0.0213)	(0.0174)	(0.0272)	(0.0214)	(0.0174)	(0.0276)
ΔE_A	-0.0367	-0.0259	-0.0458**	-0.0428	-0.0273	-0.0368**
	(0.0616)	(0.0193)	(0.0190)	(0.0597)	(0.0187)	(0.0180)
ΔwE_W	-0.0654	-0.0233*	0.0536	-0.0678	-0.0243*	0.0740
	(0.0693)	(0.0137)	(0.0547)	(0.0682)	(0.0136)	(0.0515)
E_{tot}, Bidder, before deal	0.0201***	-0.000592	-0.00720			
	(0.00774)	(0.00995)	(0.0134)			
No Prior Diversification (=1)				-0.0148**	0.00160	-0.00392
				(0.00611)	(0.00799)	(0.0105)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0324	0.0489	0.0644	-0.0178	0.0485	0.0575
	(0.0320)	(0.0334)	(0.0450)	(0.0319)	(0.0320)	(0.0422)
R-squared	0.103	0.154	0.138	0.103	0.154	0.138
N	979	760	491	979	760	491

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Note: [a] Full Overlap; [b]Partial Overlap; [c] No Overlap*

Table A17: robustness checks, bidders' cumulative abnormal returns following M&A announcement, with liquidity controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bidder Size (log)	-0.00179	-0.00174	-0.00181	-0.00175	-0.00231*	-0.00224*	-0.00231*	-0.00224*
	(0.00188)	(0.00187)	(0.00188)	(0.00188)	(0.00133)	(0.00133)	(0.00133)	(0.00133)
Mkt-To-Book Ratio	0.00470	0.00568	0.00492	0.00589	0.00382	0.00474	0.00412	0.00503
	(0.0108)	(0.0107)	(0.0108)	(0.0107)	(0.0106)	(0.0105)	(0.0106)	(0.0105)
Leverage	0.0219**	0.0209**	0.0218**	0.0208**	0.0216**	0.0207**	0.0215**	0.0206**
	(0.0104)	(0.0104)	(0.0104)	(0.0104)	(0.0102)	(0.0101)	(0.0102)	(0.0101)
Cash-Flow	-0.000615	-0.000687	-0.000616	-0.000688	-0.000264	-0.000334	-0.000265	-0.000335
	(0.000471)	(0.000468)	(0.000472)	(0.000468)	(0.000407)	(0.000407)	(0.000408)	(0.000408)
Sigma	0.0903	0.103	0.0884	0.101	0.114	0.126	0.111	0.124
	(0.247)	(0.247)	(0.248)	(0.249)	(0.252)	(0.253)	(0.253)	(0.254)
Relative Deal Size	-0.0000472	-0.0000460	-0.0000471	-0.0000459	-0.0000556	-0.0000543	-0.0000552	-0.0000539
	(0.0000558)	(0.0000557)	(0.0000554)	(0.0000554)	(0.0000523)	(0.0000522)	(0.0000518)	(0.0000517)
Only Cash (=1)	0.0150	0.0155	0.0152	0.0157	0.0150	0.0155	0.0152	0.0157
	(0.0113)	(0.0114)	(0.0114)	(0.0114)	(0.0113)	(0.0114)	(0.0114)	(0.0114)
Stock (=1)	-0.0226**	-0.0221*	-0.0224*	-0.0220*	-0.0230**	-0.0226**	-0.0228**	-0.0224*
	(0.0115)	(0.0115)	(0.0115)	(0.0116)	(0.0114)	(0.0115)	(0.0115)	(0.0115)
ΔE_{tot}	-0.0142**	-0.0133*			-0.0144**	-0.0135*		
	(0.00696)	(0.00693)			(0.00698)	(0.00695)		
ΔE_A			-0.0128	-0.0119			-0.0125	-0.0117
			(0.00860)	(0.00858)			(0.00878)	(0.00873)
ΔwE_W			-0.0157*	-0.0148*			-0.0163*	-0.0154*
			(0.00881)	(0.00880)			(0.00876)	(0.00875)
E_{tot}, Bidder, before deal	0.0114**		0.0115**		0.0115**		0.0116**	
	(0.00490)		(0.00490)		(0.00489)		(0.00489)	
No Prior Diversification (=1)		-0.0106***		-0.0106***		-0.0105***		-0.0106***
		(0.00407)		(0.00407)		(0.00405)		(0.00406)
Bid-Ask Spread (-40, -10)	0.147	0.145	0.145	0.143				
	(0.406)	(0.405)	(0.406)	(0.405)				
Trade Volume					-0.000206	-0.000211	-0.000210	-0.000215
					(0.000245)	(0.000247)	(0.000245)	(0.000247)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.00364	0.0128	0.00369	0.0129	0.0104	0.0194	0.0103	0.0194
	(0.0263)	(0.0263)	(0.0263)	(0.0264)	(0.0192)	(0.0189)	(0.0192)	(0.0189)
R-squared	0.0817	0.0825	0.0817	0.0825	0.0811	0.0818	0.0812	0.0819
N	2424	2424	2424	2424	2448	2448	2448	2448

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Compared to Table 8, we report the results for full specification models, only.*

Table A18: robustness checks, bidders' cumulative abnormal returns following M&A announcement, with liquidity controls, excluding non-diversifying deals by single-sector Bidders and Targets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bidder Size (log)	-0.00326	-0.00311	-0.00327	-0.00312	-0.00308**	-0.00294*	-0.00308**	-0.00294*
	(0.00205)	(0.00203)	(0.00206)	(0.00203)	(0.00153)	(0.00152)	(0.00153)	(0.00152)
Mkt-To-Book Ratio	-0.0251	-0.0239	-0.0242	-0.0230	-0.0239	-0.0228	-0.0229	-0.0218
	(0.0592)	(0.0586)	(0.0594)	(0.0588)	(0.0581)	(0.0576)	(0.0583)	(0.0577)
Leverage	0.0187	0.0182	0.0186	0.0181	0.0172	0.0168	0.0171	0.0167
	(0.0132)	(0.0132)	(0.0132)	(0.0132)	(0.0130)	(0.0130)	(0.0130)	(0.0130)
Cash-Flow	-0.000242	-0.000282	-0.000243	-0.000284	0.0000498	-0.00000225	0.0000491	-0.00000287
	(0.000480)	(0.000474)	(0.000480)	(0.000475)	(0.000432)	(0.000430)	(0.000432)	(0.000430)
Sigma	0.189	0.198	0.187	0.196	0.214	0.222	0.212	0.219
	(0.305)	(0.305)	(0.307)	(0.307)	(0.312)	(0.312)	(0.314)	(0.314)
Relative Deal Size	-0.000411***	-0.000408***	-0.000409***	-0.000405***	-0.000409***	-0.000405***	-0.000406***	-0.000403***
	(0.0000935)	(0.0000939)	(0.0000938)	(0.0000941)	(0.0000874)	(0.0000879)	(0.0000878)	(0.0000884)
Only Cash (=1)	0.00921	0.00949	0.00933	0.00961	0.00945	0.00970	0.00958	0.00984
	(0.0117)	(0.0118)	(0.0117)	(0.0118)	(0.0117)	(0.0117)	(0.0117)	(0.0118)
Stock (=1)	-0.0224*	-0.0225*	-0.0223*	-0.0224*	-0.0228*	-0.0229*	-0.0226*	-0.0227*
	(0.0119)	(0.0119)	(0.0119)	(0.0120)	(0.0118)	(0.0118)	(0.0118)	(0.0119)
ΔE_{tot}	-0.0298***	-0.0265***			-0.0300***	-0.0268***		
	(0.00886)	(0.00896)			(0.00885)	(0.00892)		
ΔE_A			-0.0287***	-0.0254**			-0.0288***	-0.0256**
			(0.0104)	(0.0104)			(0.0104)	(0.0105)
ΔwE_W			-0.0309***	-0.0277***			-0.0312***	-0.0280***
			(0.0103)	(0.0104)			(0.0102)	(0.0103)
E_{tot}, Bidder, before deal	0.00155		0.00163		0.00127		0.00136	
	(0.00602)		(0.00602)		(0.00594)		(0.00595)	
No Prior Diversification (=1)		-0.00438		-0.00443		-0.00410		-0.00415
		(0.00528)		(0.00529)		(0.00518)		(0.00519)
Bid-Ask Spread (-40, -10)	0.0165	0.0134	0.0143	0.0111				
	(0.479)	(0.478)	(0.480)	(0.479)				
Trade Volume					-0.000319	-0.000305	-0.000322	-0.000309
					(0.000273)	(0.000274)	(0.000273)	(0.000274)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.0339	0.0349	0.0339	0.0350	0.0331	0.0339	0.0331	0.0339
	(0.0302)	(0.0301)	(0.0302)	(0.0301)	(0.0223)	(0.0215)	(0.0223)	(0.0215)
R-squared	0.0851	0.0854	0.0852	0.0854	0.0863	0.0866	0.0864	0.0866
N	1747	1747	1747	1747	1766	1766	1766	1766

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Compared to Table 9, we report the results for full specification models, only.*

Table A19: robustness checks, bidders' cumulative abnormal returns following M&A announcement, by different degrees of Bidder-Target Industry and Sector Overlap (change in *Total* Entropy), with liquidity controls

	(1) [a]	(2) [b]	(3) [c]	(4) [a]	(5) [b]	(6) [c]
Bidder Size (log)	-0.000432	-0.00256	-0.00514	-0.00214	-0.00294	-0.00441
	(0.00210)	(0.00256)	(0.00334)	(0.00216)	(0.00216)	(0.00314)
Mkt-To-Book Ratio	0.00784	-0.194	0.0283	0.00508	-0.190	0.0292
	(0.0126)	(0.152)	(0.0597)	(0.0125)	(0.150)	(0.0583)
Leverage	0.0264*	0.00181	0.0450*	0.0276**	0.000858	0.0442*
	(0.0135)	(0.0184)	(0.0243)	(0.0136)	(0.0182)	(0.0247)
Cash-Flow	-0.00145**	-0.000899	0.000639	-0.00107	-0.000521	0.000890
	(0.000660)	(0.000614)	(0.000921)	(0.000713)	(0.000657)	(0.000873)
Sigma	0.0740	-0.623	0.829	0.0934	-0.617	0.821
	(0.351)	(0.428)	(0.549)	(0.352)	(0.432)	(0.524)
Relative Deal Size	0.0000195	-0.000380***	-0.00318	-0.00000492	-0.000388***	-0.00335
	(0.0000321)	(0.0000875)	(0.0110)	(0.0000331)	(0.0000805)	(0.0114)
Only Cash (=1)	0.0517***	0.00701	-0.00544	0.0530***	0.00639	-0.00421
	(0.0197)	(0.0179)	(0.0198)	(0.0198)	(0.0178)	(0.0197)
Stock (=1)	0.0102	-0.0246	-0.0384*	0.0101	-0.0254	-0.0372*
	(0.0197)	(0.0181)	(0.0205)	(0.0199)	(0.0179)	(0.0200)
ΔE_{tot}	-0.0501	-0.0215*	-0.0397**	-0.0438	-0.0227*	-0.0404**
	(0.0484)	(0.0125)	(0.0184)	(0.0469)	(0.0124)	(0.0183)
E_{tot}, Bidder, before deal	0.0190**	0.00281	-0.0121	0.0203***	0.00202	-0.0136
	(0.00754)	(0.00864)	(0.0119)	(0.00742)	(0.00860)	(0.0120)
Bid-Ask Spread (-40, -10)	0.367	0.0831	-0.0752			
	(0.236)	(0.392)	(0.587)			
Trade Volume				-0.00000102	-0.000283	-0.000400
				(0.000451)	(0.000336)	(0.000568)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0536*	0.0492	0.0526	-0.0354	0.0551*	0.0456
	(0.0301)	(0.0362)	(0.0472)	(0.0304)	(0.0324)	(0.0393)
R-squared	0.101	0.146	0.0952	0.0992	0.146	0.0960
N	1027	830	567	1038	840	570

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Note: [a] Full Overlap; [b]Partial Overlap; [c] No Overlap. Compared to Table 10, we report the results with one measure of prior diversification (i.e. the value of E_{tot} for the Bidder, before the Deal). Results with the alternative measure of prior diversification (i.e. the indicator variable equal to one for no diversification) are in line with the results presented, and available upon request.*

Table A20: robustness checks, bidders' cumulative abnormal returns following M&A announcement, by different degrees of Bidder-Target Industry and Sector Overlap (change in *Across* and *Within* Entropy), with liquidity controls

	(1) [a]	(2) [b]	(3) [c]	(4) [a]	(5) [b]	(6) [c]
Bidder Size (log)	-0.000459	-0.00254	-0.00489	-0.00216	-0.00293	-0.00423
	(0.00210)	(0.00255)	(0.00331)	(0.00216)	(0.00216)	(0.00313)
Mkt-To-Book Ratio	0.00835	-0.191	0.0285	0.00552	-0.188	0.0295
	(0.0126)	(0.153)	(0.0598)	(0.0125)	(0.151)	(0.0585)
Leverage	0.0258*	0.00186	0.0440*	0.0270**	0.000911	0.0437*
	(0.0135)	(0.0185)	(0.0243)	(0.0135)	(0.0182)	(0.0247)
Cash-Flow	-0.00145**	-0.000898	0.000606	-0.00106	-0.000516	0.000749
	(0.000660)	(0.000614)	(0.000955)	(0.000714)	(0.000657)	(0.000906)
Sigma	0.0639	-0.626	0.819	0.0852	-0.620	0.798
	(0.350)	(0.428)	(0.534)	(0.351)	(0.432)	(0.502)
Relative Deal Size	0.0000192	-0.000380***	-0.00368	-0.00000522	-0.000388***	-0.00409
	(0.0000321)	(0.0000871)	(0.0108)	(0.0000331)	(0.0000802)	(0.0111)
Only Cash (=1)	0.0515***	0.00685	-0.00711	0.0528***	0.00623	-0.00600
	(0.0197)	(0.0178)	(0.0198)	(0.0198)	(0.0178)	(0.0197)
Stock (=1)	0.0102	-0.0247	-0.0390*	0.0102	-0.0255	-0.0378*
	(0.0197)	(0.0180)	(0.0206)	(0.0199)	(0.0179)	(0.0200)
ΔE_A	-0.0330	-0.0263	-0.0392**	-0.0285	-0.0272	-0.0396**
	(0.0625)	(0.0185)	(0.0182)	(0.0608)	(0.0184)	(0.0180)
ΔwE_W	-0.0815	-0.0211*	0.0541	-0.0721	-0.0223*	0.0505
	(0.0706)	(0.0127)	(0.0439)	(0.0677)	(0.0127)	(0.0442)
E_{tot}, Bidder, before deal	0.0190**	0.00191	-0.000639	0.0202***	0.00119	-0.00218
	(0.00754)	(0.00893)	(0.0127)	(0.00742)	(0.00892)	(0.0130)
Bid-Ask Spread (-40, -10)	0.369	0.0883	-0.0950			
	(0.236)	(0.389)	(0.570)			
Trade Volume				-0.00000327	-0.000283	-0.000286
				(0.000452)	(0.000336)	(0.000556)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0531*	0.0493	0.0498	-0.0349	0.0554*	0.0429
	(0.0302)	(0.0362)	(0.0468)	(0.0304)	(0.0322)	(0.0395)
R-squared	0.101	0.146	0.102	0.0994	0.146	0.103
N	1027	830	567	1038	840	570

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Note: [a] Full Overlap; [b]Partial Overlap; [c] No Overlap. Compared to Table 11, we report the results with one measure of prior diversification (i.e. the value of E_{tot} for the Bidder, before the Deal). Results with the alternative measure of prior diversification (i.e. the indicator variable equal to one for no diversification) are in line with the results presented, and available upon request.*

Table A21: robustness checks, bidders' cumulative abnormal returns following M&A announcement, with a control for the price run-up before the announcement

	(1)	(2)	(3)	(4)
Bidder Size (log)	-0.00248*	-0.00242*	-0.00249*	-0.00242*
	(0.00129)	(0.00129)	(0.00129)	(0.00129)
Mkt-To-Book Ratio	0.00427	0.00530	0.00446	0.00547
	(0.0104)	(0.0103)	(0.0105)	(0.0103)
Leverage	0.0207**	0.0197*	0.0206**	0.0197*
	(0.0102)	(0.0101)	(0.0102)	(0.0101)
Cash-Flow	-0.000443	-0.000519	-0.000446	-0.000521
	(0.000392)	(0.000390)	(0.000392)	(0.000390)
Sigma	0.0990	0.112	0.0972	0.110
	(0.254)	(0.254)	(0.255)	(0.255)
Relative Deal Size	-0.0000591	-0.0000577	-0.0000589	-0.0000576
	(0.0000517)	(0.0000516)	(0.0000513)	(0.0000513)
Only Cash (=1)	0.0152	0.0157	0.0153	0.0158
	(0.0113)	(0.0114)	(0.0114)	(0.0114)
Stock (=1)	-0.0242**	-0.0237**	-0.0241**	-0.0236**
	(0.0114)	(0.0115)	(0.0115)	(0.0115)
ΔE_{tot}	-0.0147**	-0.0137*		
	(0.00707)	(0.00705)		
ΔE_A			-0.0136	-0.0126
			(0.00886)	(0.00883)
ΔwE_W			-0.0159*	-0.0148*
			(0.00888)	(0.00887)
E_{tot}, Bidder, before deal	0.0113**		0.0114**	
	(0.00489)		(0.00489)	
No Prior Diversification (=1)		-0.0106***		-0.0106***
		(0.00408)		(0.00408)
Price Run-Up (-40, -10)	-0.00000827	-0.00000830	-0.00000816	-0.00000819
	(0.0000265)	(0.0000263)	(0.0000264)	(0.0000262)
Year fixed effects	Yes	Yes	Yes	Yes
Constant	0.0132	0.0221	0.0131	0.0221
	(0.0192)	(0.0186)	(0.0192)	(0.0187)
R-squared	0.0847	0.0855	0.0847	0.0856
N	2396	2396	2396	2396

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Compared to Table 8, we report the results for full specification models, only.*

Table A22: robustness checks, bidders' cumulative abnormal returns following M&A announcement, with a control for the price run-up before the announcement, excluding non-diversifying deals by single-sector Bidders and Targets

	(1)	(2)	(3)	(4)
Bidder Size (log)	-0.00313**	-0.00296**	-0.00313**	-0.00296**
	(0.00148)	(0.00146)	(0.00148)	(0.00146)
Mkt-To-Book Ratio	-0.0240	-0.0227	-0.0236	-0.0223
	(0.0585)	(0.0579)	(0.0586)	(0.0580)
Leverage	0.0189	0.0184	0.0189	0.0184
	(0.0131)	(0.0130)	(0.0131)	(0.0130)
Cash-Flow	-0.000265	-0.000309	-0.000266	-0.000310
	(0.000417)	(0.000414)	(0.000417)	(0.000414)
Sigma	0.203	0.212	0.202	0.211
	(0.316)	(0.316)	(0.318)	(0.318)
Relative Deal Size	-0.000411***	-0.000407***	-0.000410***	-0.000406***
	(0.0000877)	(0.0000882)	(0.0000881)	(0.0000886)
Only Cash (=1)	0.00954	0.00982	0.00959	0.00988
	(0.0117)	(0.0117)	(0.0117)	(0.0118)
Stock (=1)	-0.0241**	-0.0242**	-0.0241**	-0.0241**
	(0.0118)	(0.0118)	(0.0118)	(0.0119)
ΔE_{tot}	-0.0299***	-0.0264***		
	(0.00892)	(0.00902)		
ΔE_A			-0.0294***	-0.0259**
			(0.0105)	(0.0106)
ΔwE_W			-0.0303***	-0.0269**
			(0.0104)	(0.0105)
E_{tot}, Bidder, before deal	0.00120		0.00123	
	(0.00594)		(0.00594)	
No Prior Diversification (=1)		-0.00430		-0.00432
		(0.00520)		(0.00521)
Price Run-Up (-40, -10)	0.00000681	0.00000672	0.00000685	0.00000676
	(0.0000298)	(0.0000299)	(0.0000298)	(0.0000298)
Year fixed effects	Yes	Yes	Yes	Yes
Constant	0.0341	0.0347	0.0341	0.0347
	(0.0223)	(0.0213)	(0.0223)	(0.0213)
R-squared	0.0896	0.0899	0.0896	0.0899
N	1738	1738	1738	1738

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Compared to Table 9, we report the results for full specification models, only.*

Table A23: robustness checks, bidders' cumulative abnormal returns following M&A announcement, by different degrees of Bidder-Target Industry and Sector Overlap (change in *Total* Entropy), with a control for the price run-up before the announcement

	(1) [a]	(2) [b]	(3) [c]	(4) [a]	(5) [b]	(6) [c]
Bidder Size (log)	-0.00250	-0.00288	-0.00454	-0.00238	-0.00286	-0.00409
	(0.00209)	(0.00213)	(0.00298)	(0.00209)	(0.00213)	(0.00283)
Mkt-To-Book Ratio	0.00823	-0.190	0.0328	0.00968	-0.189	0.0357
	(0.0124)	(0.150)	(0.0599)	(0.0125)	(0.150)	(0.0582)
Leverage	0.0222	-0.000302	0.0534**	0.0202	-0.000341	0.0521**
	(0.0136)	(0.0181)	(0.0244)	(0.0136)	(0.0181)	(0.0242)
Cash-Flow	-0.000977	-0.000747	0.000458	-0.00103	-0.000752	0.000429
	(0.000661)	(0.000588)	(0.000896)	(0.000662)	(0.000589)	(0.000880)
Sigma	0.0872	-0.636	0.845	0.102	-0.634	0.869
	(0.348)	(0.432)	(0.541)	(0.350)	(0.434)	(0.538)
Relative Deal Size	-0.0000115	-0.000386***	-0.00457	-0.0000109	-0.000386***	-0.00562
	(0.0000326)	(0.0000804)	(0.0113)	(0.0000327)	(0.0000805)	(0.0113)
Only Cash (=1)	0.0529***	0.00687	-0.00434	0.0534***	0.00694	-0.00375
	(0.0198)	(0.0178)	(0.0198)	(0.0199)	(0.0178)	(0.0202)
Stock (=1)	0.00919	-0.0262	-0.0399**	0.00946	-0.0262	-0.0403**
	(0.0199)	(0.0179)	(0.0201)	(0.0200)	(0.0179)	(0.0205)
ΔE_{tot}	-0.0568	-0.0226*	-0.0391**	-0.0598	-0.0221*	-0.0300*
	(0.0515)	(0.0125)	(0.0184)	(0.0503)	(0.0123)	(0.0173)
E_{tot}, Bidder, before deal	0.0214***	0.00000515	-0.0118			
	(0.00745)	(0.00862)	(0.0118)			
No Prior Diversification (=1)				-0.0160***	-0.000511	0.000228
				(0.00596)	(0.00713)	(0.00973)
Price Run-Up (-40, -10)	-0.0000144	-0.0000112	0.0000188	-0.0000130	-0.0000111	0.0000191
	(0.000242)	(0.0000700)	(0.0000293)	(0.000238)	(0.0000700)	(0.0000294)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0308	0.0565*	0.0461	-0.0157	0.0565*	0.0353
	(0.0302)	(0.0326)	(0.0390)	(0.0302)	(0.0308)	(0.0372)
R-squared	0.104	0.149	0.102	0.104	0.149	0.101
N	1012	826	558	1012	826	558

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Note: [a] Full Overlap; [b]Partial Overlap; [c] No Overlap*

Table A24: robustness checks, bidders' cumulative abnormal returns following M&A announcement, by different degrees of Bidder-Target Industry and Sector Overlap (change in *Across* and *Within* Entropy), with a control for the price run-up before the announcement

	(1) [a]	(2) [b]	(3) [c]	(4) [a]	(5) [b]	(6) [c]
Bidder Size (log)	-0.00252	-0.00287	-0.00419	-0.00241	-0.00284	-0.00374
	(0.00209)	(0.00214)	(0.00298)	(0.00209)	(0.00213)	(0.00282)
Mkt-To-Book Ratio	0.00847	-0.186	0.0328	0.00991	-0.186	0.0350
	(0.0124)	(0.151)	(0.0597)	(0.0125)	(0.151)	(0.0583)
Leverage	0.0219	-0.000249	0.0516**	0.0199	-0.000251	0.0502**
	(0.0135)	(0.0181)	(0.0244)	(0.0135)	(0.0181)	(0.0243)
Cash-Flow	-0.000973	-0.000739	0.000404	-0.00103	-0.000742	0.000315
	(0.000661)	(0.000587)	(0.000928)	(0.000662)	(0.000589)	(0.000919)
Sigma	0.0820	-0.639	0.825	0.0969	-0.637	0.841
	(0.347)	(0.432)	(0.518)	(0.349)	(0.433)	(0.513)
Relative Deal Size	-0.0000118	-0.000387***	-0.00509	-0.0000112	-0.000386***	-0.00607
	(0.0000326)	(0.0000798)	(0.0110)	(0.0000327)	(0.0000799)	(0.0109)
Only Cash (=1)	0.0528***	0.00663	-0.00597	0.0533***	0.00670	-0.00553
	(0.0198)	(0.0177)	(0.0198)	(0.0200)	(0.0178)	(0.0199)
Stock (=1)	0.00921	-0.0263	-0.0405**	0.00948	-0.0263	-0.0407**
	(0.0199)	(0.0178)	(0.0202)	(0.0200)	(0.0178)	(0.0203)
ΔE_A	-0.0470	-0.0298	-0.0384**	-0.0503	-0.0287	-0.0302*
	(0.0713)	(0.0184)	(0.0181)	(0.0698)	(0.0180)	(0.0171)
ΔwE_W	-0.0724	-0.0219*	0.0526	-0.0750	-0.0212*	0.0719*
	(0.0679)	(0.0128)	(0.0451)	(0.0668)	(0.0127)	(0.0434)
E_{tot}, Bidder, before deal	0.0214***	-0.00131	-0.000680			
	(0.00746)	(0.00888)	(0.0128)			
No Prior Diversification (=1)				-0.0160***	0.000233	-0.00852
				(0.00597)	(0.00731)	(0.0105)
Price Run-Up (-40, -10)	-0.0000171	-0.00000731	0.0000166	-0.0000157	-0.00000702	0.0000162
	(0.000245)	(0.0000711)	(0.0000274)	(0.000241)	(0.0000712)	(0.0000274)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0305	0.0569*	0.0425	-0.0154	0.0560*	0.0412
	(0.0302)	(0.0324)	(0.0393)	(0.0303)	(0.0309)	(0.0371)
R-squared	0.104	0.149	0.109	0.104	0.149	0.110
N	1012	826	558	1012	826	558

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Note: [a] Full Overlap; [b]Partial Overlap; [c] No Overlap*

Table A25: robustness checks, bidders' cumulative abnormal returns following M&A announcement, with clustered standard errors at the year level

	(1)	(2)	(3)	(4)
Bidder Size (log)	-0.00250**	-0.00243**	-0.00250**	-0.00243**
	(0.000954)	(0.000943)	(0.000954)	(0.000943)
Mkt-To-Book Ratio	0.00359	0.00451	0.00387	0.00477
	(0.00727)	(0.00721)	(0.00723)	(0.00717)
Leverage	0.0222*	0.0213*	0.0221*	0.0212*
	(0.0122)	(0.0122)	(0.0122)	(0.0123)
Cash-Flow	-0.000408	-0.000482	-0.000412	-0.000485
	(0.000357)	(0.000344)	(0.000358)	(0.000346)
Sigma	0.104	0.117	0.101	0.114
	(0.245)	(0.243)	(0.246)	(0.244)
Relative Deal Size	-0.0000583	-0.0000570	-0.0000580	-0.0000567
	(0.0000499)	(0.0000496)	(0.0000493)	(0.0000490)
Only Cash (=1)	0.0149	0.0154	0.0151	0.0156
	(0.0131)	(0.0132)	(0.0131)	(0.0131)
Stock (=1)	-0.0231	-0.0226	-0.0229	-0.0224
	(0.0144)	(0.0145)	(0.0144)	(0.0144)
ΔE_{tot}	-0.0146*	-0.0137*		
	(0.00739)	(0.00777)		
ΔE_A			-0.0128	-0.0120
			(0.00873)	(0.00909)
ΔwE_W			-0.0164**	-0.0154*
			(0.00753)	(0.00783)
E_{tot}, Bidder, before deal	0.0114***		0.0114***	
	(0.00350)		(0.00352)	
No Prior Diversification (=1)		-0.0104***		-0.0105***
		(0.00281)		(0.00282)
Year fixed effects	Yes	Yes	Yes	Yes
Constant	0.0118	0.0207	0.0118	0.0207
	(0.0160)	(0.0157)	(0.0160)	(0.0157)
R-squared	0.0807	0.0814	0.0807	0.0814
N	2461	2461	2461	2461

*Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Compared to Table 8, we report the results for full specification models, only.*

Table A26: robustness checks, bidders' cumulative abnormal returns following M&A announcement, with clustered standard errors at the year level, excluding non-diversifying deals by single-sector Bidders and Targets

	(1)	(2)	(3)	(4)
Bidder Size (log)	-0.00340**	-0.00324**	-0.00340**	-0.00324**
	(0.00125)	(0.00124)	(0.00125)	(0.00124)
Mkt-To-Book Ratio	-0.0248	-0.0237	-0.0240	-0.0228
	(0.0401)	(0.0397)	(0.0404)	(0.0400)
Leverage	0.0176	0.0171	0.0176	0.0171
	(0.0149)	(0.0150)	(0.0150)	(0.0152)
Cash-Flow	-0.000211	-0.000253	-0.000214	-0.000256
	(0.000379)	(0.000369)	(0.000381)	(0.000371)
Sigma	0.193	0.202	0.191	0.199
	(0.374)	(0.371)	(0.376)	(0.374)
Relative Deal Size	-0.000416***	-0.000412***	-0.000414***	-0.000410***
	(0.0000576)	(0.0000598)	(0.0000591)	(0.0000613)
Only Cash (=1)	0.00931	0.00958	0.00943	0.00970
	(0.0140)	(0.0141)	(0.0140)	(0.0141)
Stock (=1)	-0.0230	-0.0231	-0.0229	-0.0229
	(0.0154)	(0.0156)	(0.0154)	(0.0155)
ΔE_{tot}	-0.0298***	-0.0267**		
	(0.00908)	(0.0109)		
ΔE_A			-0.0287***	-0.0256**
			(0.00996)	(0.0116)
ΔwE_W			-0.0308***	-0.0277**
			(0.00953)	(0.0113)
E_{tot}, Bidder, before deal	0.00150		0.00158	
	(0.00527)		(0.00523)	
No Prior Diversification (=1)		-0.00420		-0.00424
		(0.00501)		(0.00499)
Year fixed effects	Yes	Yes	Yes	Yes
Constant	0.0357**	0.0365**	0.0356**	0.0365**
	(0.0171)	(0.0172)	(0.0171)	(0.0173)
R-squared	0.0865	0.0867	0.0865	0.0867
N	1774	1774	1774	1774

*Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Compared to Table 9, we report the results for full specification models, only.*

Table A27: robustness checks, bidders' cumulative abnormal returns following M&A announcement, by different degrees of Bidder-Target Industry and Sector Overlap (change in *Total* Entropy), with clustered standard errors at the year level

	(1) [a]	(2) [b]	(3) [c]	(4) [a]	(5) [b]	(6) [c]
Bidder Size (log)	-0.00205	-0.00322*	-0.00480	-0.00193	-0.00324*	-0.00435
	(0.00147)	(0.00176)	(0.00321)	(0.00147)	(0.00169)	(0.00313)
Mkt-To-Book Ratio	0.00462	-0.190	0.0281	0.00594	-0.191	0.0310
	(0.00759)	(0.143)	(0.0369)	(0.00726)	(0.143)	(0.0347)
Leverage	0.0286**	0.000928	0.0453*	0.0268*	0.000894	0.0438*
	(0.0132)	(0.0229)	(0.0225)	(0.0131)	(0.0231)	(0.0226)
Cash-Flow	-0.000950	-0.000744	0.000519	-0.000997*	-0.000746	0.000495
	(0.000588)	(0.000566)	(0.000912)	(0.000569)	(0.000558)	(0.000871)
Sigma	0.0997	-0.636	0.801	0.114	-0.637	0.824
	(0.237)	(0.439)	(0.508)	(0.244)	(0.439)	(0.505)
Relative Deal Size	-0.00000326	-0.000394***	-0.00364	-0.00000265	-0.000395***	-0.00469
	(0.0000183)	(0.0000418)	(0.0102)	(0.0000182)	(0.0000434)	(0.0101)
Only Cash (=1)	0.0529***	0.00613	-0.00478	0.0534***	0.00610	-0.00419
	(0.0185)	(0.0237)	(0.0187)	(0.0183)	(0.0237)	(0.0195)
Stock (=1)	0.0104	-0.0256	-0.0379	0.0107	-0.0256	-0.0383
	(0.0200)	(0.0248)	(0.0263)	(0.0199)	(0.0249)	(0.0267)
ΔE_{tot}	-0.0445	-0.0224*	-0.0400*	-0.0484	-0.0231*	-0.0309
	(0.0399)	(0.0120)	(0.0198)	(0.0404)	(0.0128)	(0.0186)
E_{tot}, Bidder, before deal	0.0198***	0.00183	-0.0129			
	(0.00519)	(0.00766)	(0.00844)			
No Prior Diversification (=1)				-0.0147**	-0.000802	0.00101
				(0.00574)	(0.00747)	(0.00876)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0366	0.0576**	0.0488	-0.0227	0.0590**	0.0373
	(0.0249)	(0.0278)	(0.0310)	(0.0242)	(0.0261)	(0.0338)
R-squared	0.0973	0.145	0.0959	0.0974	0.145	0.0945
N	1044	844	573	1044	844	573

*Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Note: [a] Full Overlap; [b]Partial Overlap; [c] No Overlap*

Table A28: robustness checks, bidders' cumulative abnormal returns following M&A announcement, by different degrees of Bidder-Target Industry and Sector Overlap (change in *Across* and *Within* Entropy), with clustered standard errors at the year level

	(1) [a]	(2) [b]	(3) [c]	(4) [a]	(5) [b]	(6) [c]
Bidder Size (log)	-0.00207	-0.00321*	-0.00448	-0.00196	-0.00323*	-0.00403
	(0.00147)	(0.00178)	(0.00324)	(0.00146)	(0.00172)	(0.00314)
Mkt-To-Book Ratio	0.00504	-0.188	0.0284	0.00632	-0.188	0.0306
	(0.00736)	(0.143)	(0.0385)	(0.00709)	(0.143)	(0.0364)
Leverage	0.0281**	0.000983	0.0442*	0.0263*	0.000982	0.0427*
	(0.0131)	(0.0229)	(0.0219)	(0.0130)	(0.0232)	(0.0220)
Cash-Flow	-0.000943	-0.000739	0.000470	-0.000991*	-0.000738	0.000386
	(0.000592)	(0.000566)	(0.000890)	(0.000573)	(0.000557)	(0.000864)
Sigma	0.0918	-0.639	0.785	0.107	-0.640	0.801
	(0.229)	(0.441)	(0.485)	(0.235)	(0.441)	(0.482)
Relative Deal Size	-0.00000358	-0.000394***	-0.00427	-0.00000295	-0.000395***	-0.00526
	(0.0000182)	(0.0000415)	(0.0101)	(0.0000182)	(0.0000431)	(0.00984)
Only Cash (=1)	0.0528***	0.00596	-0.00638	0.0532***	0.00591	-0.00593
	(0.0183)	(0.0236)	(0.0178)	(0.0181)	(0.0236)	(0.0180)
Stock (=1)	0.0104	-0.0257	-0.0384	0.0107	-0.0257	-0.0386
	(0.0200)	(0.0247)	(0.0246)	(0.0198)	(0.0248)	(0.0245)
ΔE_A	-0.0302	-0.0272	-0.0395*	-0.0348	-0.0279	-0.0312*
	(0.0481)	(0.0204)	(0.0195)	(0.0484)	(0.0222)	(0.0180)
ΔwE_W	-0.0712	-0.0219*	0.0521	-0.0738	-0.0224*	0.0716*
	(0.0676)	(0.0124)	(0.0437)	(0.0657)	(0.0129)	(0.0396)
E_{tot}, Bidder, before deal	0.0197***	0.000948	-0.00173			
	(0.00522)	(0.00896)	(0.00882)			
No Prior Diversification (=1)				-0.0146**	-0.000229	-0.00773
				(0.00572)	(0.00859)	(0.00902)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0361	0.0580**	0.0452	-0.0223	0.0587**	0.0431
	(0.0245)	(0.0276)	(0.0317)	(0.0240)	(0.0266)	(0.0323)
R-squared	0.0975	0.146	0.103	0.0976	0.146	0.103
N	1044	844	573	1044	844	573

*Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01. Note: [a] Full Overlap; [b]Partial Overlap; [c] No Overlap*

Table A29: variables description

Variable	Description and operationalisation
Dependent variable	
Bidder's Cumulative Abnormal Returns (*CARs*)	Continuous variable. It captures the cumulative abnormal return of the acquiring firm, estimated with the event study methodo logy over a (-1, +1) event window around the announcement date. They are measured as the excess returns with respect to those predicted by a standard market model, whose benchmark is the CRSP value-weighted index. The model parameters are estimated over the (-140, -20) period preceding the announcement.
Main independent variables	
Change in bidder's Total Entropy index of corporate diversification, resulting from the acquisition (ΔE_{tot})	Continuous variable in the interval [-1, 1]. Based on Jacquemin & Berry (1979)'s Entropy measure, it denotes the variation in the acquirer's normalized Total Entropy index of corporate diversification, that would be entailed by the acquisition should it reach its closing. First, we compute the Total Entropy measure of corporate diversification (E_{tot}) for the standalone bidder before the announcement, using the bidder's segment information on its industries and sectors of activity (defined as 2- and 4-digit SIC codes, respectively). Second, we estimate the same index for the consolidated entity, that would result from the merger between each bidder-target couple (thus, active both bidder's and target's sectors and with sales equal to the sum of their sales, weighted by the percentage of target shares acquired by the bidder). Third, we calculate ΔE_{tot} as the difference between the diversification indexes after and before the announcement. A detailed illustration of the functioning and derivation of ΔE_{tot} is provided in Section 1.4.2.
Change in bidder's Across Entropy index of corporate diversification, resulting from the acquisition (ΔE_A)	Continuous variable in the interval [-1, 1]. It is one of the additive components of ΔE_{tot} (alongside with (ΔwE_W). It measures the variation in the acquirer's normalized Entropy index of corporate diversification *across* the bidder's industries of activity (defined as 2-digit SIC codes), that would be entailed by the acquisition should it reach its closing. A detailed illustration of the funct ioning and derivation of ΔE_A is provided in Section 1.4.2.
Change in bidder's Within Entropy index of corporate diversification, resulting from the acquisition (ΔwE_W)	Continuous variable in the interval [-1, 1]. It is one of the additive components of ΔE_{tot} (alongside with (ΔE_A). It measures the variation in the acquirer's normalized Entropy index of corporate diversification *within* the bidder's industries of activity (defined as 2-digit SIC codes) and across different sectors (defined as 4-digit SIC codes), that would be entailed by the acquisition should it reach its closing. A detailed illustration of the functioning and derivation of ΔwE_W is provided in Section 1.4.2.
Bidder's diversification as a standalone, before the announcement, alternative 1 (E_{tot})	Continuous variable in the interval [0, 1]. It measures the Total Entropy measure of corporate diversification (E_{tot}) for the standalone bidder before the announcement, using the bidder's segment information on its industries and sectors of activity (defined as 2- and 4-digit SIC codes, respectively).
Bidder's diversification as a standalone, before the announcement, alternative 2 (*No Prior Diversification*)	Binary variable, taking value 1 if the bidder is not diversified as a standalone (i.e. if it is active in a single 4-digit SIC code), and 0 otherwise.
Bidder-specific controls	
Bidder Size (in log)	Continuous variable. It is measured as the log of bidder's market value, four weeks prior to the announcement
Market-To-Book Ratio	Continuous variable. It is measured as the ratio between the bidder's market value and its common equity, for the latest fiscal year prior of the acquisition announcement.
Leverage	Continuous variable. It measured as the sum of long- and short-term debt as a fraction of total assets, for the latest fiscal year prior of the acquisition announcement.

Sigma	Continuous variable. It is defined as the standard deviation of market-adjusted returns for the bidder's stock, computed over a 120-day window before the announcement (-130, -11).
Bidder-specific controls	
Relative Deal Size	Continuous variables. It is measured as the value of the deal, divided by the bidder's market value four weeks prior to the announcement.
Use of stock as a means of payment (*Stock*)	Binary variable, taking value 1 if equity is said to be employed in the transaction as a means of payment, and 0 otherwise.
Use of stock as the only means of payment (*Only Cash*)	Binary variable, taking value 1 if the transaction is paid entirely with cash, and 0 otherwise.

Chapter 2

Family Presence, Productivity and Specificity in Input Procurement: Firm-level Evidence from Italy

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Abstract

This paper provides an empirical assessment of Italian firms' sourcing. Combining the international economics literature on global sourcing with the family business and international business literature on family firms (FFs)' internationalisation, we build a comprehensive framework in which sourcing is shaped by location (domestic versus foreign sourcing) and ownership (integration versus outsourcing) decisions.

Relying on a new firm-level, cross-sectional dataset on a stratified sample of Italian manufacturing firms, we address the relationship between sourcing and various firm-level features. Our probit and multinomial probit estimates highlight family presence in ownership and control, total factor productivity and reliance on specific inputs as the main drivers of sourcing. While playing little role in shaping the ownership decision, both FF status and total factor productivity affect location choices, fostering domestic and foreign sourcing, respectively. Conversely, reliance on specific inputs is key in orienting the ownership decision, promoting integration over outsourcing.

Our study contributes to the international economics literature on global sourcing by studying factors other than productivity and input specificity that affect input procurement; moreover, it contributes to the family business and international business literature on FFs' internationalisation by taking a supply-side perspective and investigating sourcing through the interplay between location and ownership choices.

Keywords: productivity, input specificity, family firms, sourcing, internationalisation

JEL: F23, D23, C35, L24

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2.1) Introduction

Over the last few decades, family firms (FFs) have featured prominently on the global economic stage. Currently, two out of three companies are FFs, and responsible for at least 70% of the annual GDP worldwide (Debellis et al., 2021). FFs account for more than 50% of publicly traded companies in the US and about 85% of private companies in China (Maloni et al., 2017), and provide an active contribution to the economic growth of Asia, Latin America and Africa (Eddleston et al., 2019; Eddleston et al., 2020). In the EU, there are more than 14 million FFs, which are responsible for approximately 50% of GDP and provide more than 60 million jobs in the private sector (European Family Businesses, 2021).

Increased global competition, worldwide integration and technological advancements have pushed firms towards international diversification, aiming to exploit lower input costs, achieve economies of scale and scope, and grant access to local know-how and innovation opportunities (De Massis et al., 2018). Consequently, the family business (FB) and international business (IB) debate about FFs' internationalisation has grown rapidly, exploring several dimensions of FFs' foreign engagement (for comprehensive surveys, see Arregle et al., 2017; Benavides-Velasco et al., 2013; Debellis et al., 2021; Kontinen & Ojala, 2010; Pukall & Calabrò, 2014).

Growing attention has been devoted to measuring the scale and scope of FFs' internationalisation, and to studying the extent to which their activities depend on foreign markets and their geographic reach (Arregle et al., 2012). As far as internationalisation modes are concerned, the existing literature has focused on exports the most, with a few attempts at analysing alliances, joint ventures, and foreign direct investments (see Boellis et al., 2016; Carney et al., 2017; Liang et al., 2014; Pinho, 2007; Zapkau et al., 2014 to mention just a few). In light of the renovated interest in addressing internationalisation modes different from export, this stream of research is still open to further investigations (Debellis et al., 2021). In that regard, FFs' internationalisation has rarely been assessed from the supply side (Maloni et al., 2017). This is the challenge we seize in the present paper by analysing family firms and global sourcing, that is solution to input procurement issues.

The combination of integration of world markets and disintegration of production processes in global value chains (GVCs) has fostered firms' integration backward (as intermediate inputs' purchasers), forward (as suppliers), or both (Antràs, 2020). This has reshaped firms' boundaries, producing various configurations in which some production tasks are internalised and others are externalised domestically or abroad (Feenstra & Hanson, 1996; Feenstra, 1998).

In this context, sourcing has become a global phenomenon and proved to be a key factor in enhancing the firm's competitiveness (Di Gregorio et al., 2009). However, literature accounting for the FF status

as a potential driver of sourcing is still recent and rather limited (Maloni et al., 2017; Smith et al., 2014; Stanley & McDowell, 2014). To the best of our knowledge, researchers have mainly concentrated on foreign integration versus foreign outsourcing, the former entailing input manufacturing within wholly-owned foreign subsidiaries and the latter implying input purchasing from independent foreign suppliers (Pongelli et al., 2019).[28] In doing so, scholars have overlooked local options as potential alternatives, which calls for further investigation (Gerbl, et al., 2015; Schmeisser, 2013).

Aiming to challenge these gaps, in this paper, we consider global sourcing as shaped by both ownership and location decisions: on one hand, final good producers decide whether to manufacture inputs within their boundaries (make) or to buy them from independent suppliers (buy); on the other hand, final good producers decide whether to employ domestic inputs (domestic) or foreign inputs (foreign). Following Antràs & Helpman (2004, 2008), ownership and location decisions can be combined giving rise to four sourcing strategies (domestic integration, domestic outsourcing, foreign integration and foreign outsourcing), at the intersection between firms' make-or-buy and domestic-or-foreign choices.

Our conceptual framework lays at the crossroad between the international economics (IE) literature on global sourcing and the family business (FB) and international business (IB) literatures on family firms' internationalisation. Seminal theoretical works from the IE literature shed light on the importance of productivity and input specificity in explaining firms' sourcing strategies (Antràs & Helpman, 2004; Grossman & Helpman, 2005; Helpman et al., 2004). They argue that more productive firms are more likely to engage in foreign sourcing, and that reliance on specific inputs tends to favour integration (Antràs & Helpman, 2004). While the role of productivity in shaping global sourcing has received wide support from empirical analyses, firms' reliance on specific inputs is still to be tested due to the lack of suitable data at the firm level (for comprehensive surveys, see López, 2005; Singh, 2010; Hayakawa, Kimura & Machikita, 2012; Wagner, 2007, 2012, 2016).

Merging the main insights from the international economics (IE) literature on global sourcing and the FB and IB literature on FFs' internationalisation, we explore the relationship between global sourcing and firm-level features such as FF status, productivity, and input specificity.

We address this issue by exploiting a new firm-level, cross-sectional dataset on a large and stratified sample of 650 Italian manufacturing firms headquartered in Lombardy—one of the most developed regions in Europe.

[28] Pongelli, Calabrò & Basco (2019) refer to "captive offshoring" and "offshore outsourcing", instead. We alternatively refer to "foreign integration" and "foreign outsourcing" for consistency with the theoretical models mentioned afterwards.

Data collection via survey interviews allowed our dataset to include granular information at the firm level (such as reliance on specific inputs) that were absent from previous empirical analyses on related topics.

Our results suggest that FF status negatively explains foreign sourcing, with FFs being less prone to employ foreign inputs. Conversely, productivity is a positive driver of the location decision, as more productive firms are more likely to engage in foreign sourcing. Lastly, reliance on specific input fosters integration, shaping firms' ownership decisions. Our results are robust to different econometric models, such as probit and multinomial probit, and alternative specifications including firm, industry and geographical controls. Moreover, they survive a number of robustness checks along several dimensions, ranging from the econometric model to survey estimation methods, from productivity measures to lagged and winsorized independent variables.

Our results are highly consistent with the theoretical expectations and the testable predictions inspired by previous literature. Moreover, they convey a few novelties compared with the existing contributions. In particular, our evidence contributes to previous IE literature on global sourcing by identifying factors other than productivity and input specificity that affect firms' location and ownership decisions. Moreover, our approach contributes to previous FB and IB literature on family firms' internationalisation by analyzing supply-side internationalisation and defining sourcing through the interplay between location and ownership concerns. These departures from previous studies allow us providing a more comprehensive taxonomy of sourcing strategies and an encompassing framework to account for multiple factors affecting input procurement choices.

The remainder of this study is structured as follows. Section 2.2 provides the conceptual framework. Section 2.3 discusses the data and methods. Section 2.4 presents the results. Section 2.5 introduces the robustness checks. Section 2.6 presents a discussion and comparison with previous studies. Section 2.7 concludes the paper.

2.2) Conceptual framework

2.2.1) Global sourcing in international economics

In a stylised framework where final good production requires intermediate inputs, final good producers make two decisions about sourcing: whether to make inputs by themselves (integration) or buy from an independent supplier (outsourcing); and whether to do so in the home country (domestic) or abroad (foreign). We refer to the make-or-buy choice as the ownership decision, and the domestic-

or-foreign choice as the location decision. This intersection results in four possible sourcing strategies: domestic outsourcing (DO), domestic integration (DI), foreign outsourcing (FO), and foreign integration (FI). As summarised in Figure 1, studying sourcing addresses input procurement issues at the crossroads between ownership and location considerations.[29]

[Figure 1 approximately here]

In the last two decades, sourcing has been analysed from various perspectives (Kano et al., 2020). Our conceptual framework is grounded in the incomplete contracts theory and international economics studies.

In the past, when globalisation was not an issue, sourcing was a mere local phenomenon, governed by the ownership decision alone. Final good producers simply decided whether to make or buy the needed inputs in the domestic country, committing to domestic integration (DI) in the former case, and domestic outsourcing (DO) in the latter. Put another way, DI and DO were the only instances of sourcing because the location dimension of input procurement was completely ignored (Figure 1).

As a local phenomenon, sourcing could be understood by relying on the incomplete contracts theories of integration, such as the property rights theory of the firm.

Ideally, the relationship between a final good producer and an input supplier would be easily governed by a complete contract, that specifies all the contingencies that may affect the contractual relationship. However, real world contracts are incomplete, because of unforeseen contingencies and the prohibitively high costs of contract writing and enforcing. Contract incompleteness becomes of major concern when manufacturing intermediate inputs requires relation-specific investments, i.e. prior investments that pay off more inside the final good producer-input supplier relationship than outside it. Loosely speaking, relation-specific investments bound the input supplier and the final good producer together, preventing them from switching freely to alternative partners in case of disagreement. The combination of contract incompleteness and relation-specific investments makes the input supplier underinvest because it fears to be held-up, i.e. to be denied the due payment by the final good producer claiming that some contingencies, uncovered by the contract, have occurred. This undermines final good production in turn, because the final good producer can only manufacture a suboptimal amount of final good relying on insufficient intermediate inputs. Anticipating this, the final good producer may decide to make the intermediate inputs by itself, to avoid hold-up concerns. However, engaging in DI entails higher production costs because the final good producer is less efficient than an independent input supplier, being less familiar with input manufacturing. Therefore,

[29] Intermediate forms of governance are analysed in Gereffi et al. (2005).

in taking its ownership decision, the final good producer trades off the benefits of maximal relation-specific investments (under DI) with the benefits of minimal production costs (under DO). A key prediction of the property rights theory of the firm, in this simple framework, is that relation-specificity drives the final good producer's ownership decision toward domestic insourcing: the more relation-specific investment is needed to manufacture the intermediate inputs, the more likely the DI option to secure against hold-up induced underinvestment. Put another way, when globalisation is not an issue, a theory of integration settles the debate about input procurement.

As a result of globalisation, sourcing is currently a global phenomenon, governed by the interplay between ownership and location decisions. Studies at the crossroads between the incomplete contracts theory and IE analyse the relative attractiveness of DI, DO, FI, and FO by extending the property rights theory of the firm to the international context (Antràs, 2014; Gattai, 2006; Spencer, 2005). While most theoretical models address two sourcing instances simultaneously (McLaren, 2000; Grossman & Helpman, 2002; Antràs, 2003; Ottaviano & Turrini, 2007), Antràs & Helpman (2004) jointly analysed ownership and location concerns. Assuming firms' heterogeneity à la Melitz (2003), they show that integration never occurs in low-tech sectors: lower-productivity firms engage in DO, and higher-productivity firms engage in FO. In high-tech sectors, all sourcing strategies may be implemented: lower-productivity firms rely on domestic inputs, and higher-productivity firms rely on foreign inputs; among firms that source in the same country, the most productive integrate, and the least productive outsource.[30] In this model, the ownership decision is sensitive to input specificity: final good producers trade-off the benefits of maximal relation-specific investments under integration, with the benefits of minimal production costs under outsourcing. The location decision depends on productivity: final good producers trade off the benefits of minimal fixed costs domestically with the benefits of minimal variable costs abroad.

Antràs and Helpman (2004)'s framework has been extended to account for FFs. In Horgos (2013), regardless of the sector, FFs engage less in foreign sourcing than non-FFs. In low-tech sectors, higher-productivity FFs opt for FO over DO, yet the fraction of FFs engaged in FO is lower than that in Antràs & Helpman (2004); in high-tech sectors, although the sourcing strategies ordering follows Antràs & Helpman (2004), the share of FFs engaged in FI is lower.

In the last decade, burgeoning empirical literature has tested the main predictions of Antràs & Helpman (2004) about the relative attractiveness of different sourcing strategies (Corcos et al., 2013; Defever & Toubal, 2013; Tomiura, 2007, 2009; Ito et al., 2011). To the best of our knowledge, few

[30] Antràs & Helpman (2008) allow for different degrees of contract incompleteness, under the partial contracting framework of Acemoglu et al. (2007).

studies have considered all sourcing instances within a joint empirical framework (Federico, 2010; Kohler & Smolka, 2011; Gattai & Trovato, 2016). Available evidence confirms that firms committed to foreign sourcing are, on average, more productive than firms committed to domestic sourcing; moreover, integrating firms are, on average, more productive than outsourcers. The lack of suitable firm-level data has thus far prevented the testing of the role of input specificity in shaping global sourcing.

2.2.2) Family firms' internationalisation in family business and international business

As far as FFs internationalisation modes are concerned, FB and IB scholars have mainly concentrated on exports, alliances, joint ventures, and foreign direct investments (Debellis et al., 2021). To the best of our knowledge, studies on FFs' sourcing are still scanty, and mainly focus on the international ownership decision alone, that is, FI versus FO: the former is deemed suitable when organisational relocation abroad is straightforward, as well as in the presence of resource advantages overseas and low incentives towards externalisation; the latter proves to be appealing when local suppliers are competitive on the cost side, and endowed with market-specific skills and a relational capital facilitating the construction of a trustworthy relationship with local players (Pongelli et al., 2019).
Given the diverse economic and non-economic forces affecting their decisions (Basco, 2017; Gómez-Mejía et al., 2011), FFs might differ from non-FFs in terms of sourcing behaviour.
Considering the domestic-or-foreign choice, mixed results emerge from the rich stream of FB and IB literature.
Following a stewardship and social capital perspective, elements such as the identification of family owners and managers with the firm, the long-term orientation in strategic decisions, the strong social capital among family members, and the ability of building solid relationships with internal and external stakeholders could facilitate FFs' international engagement (Marin et al., 2017; Sciascia et al., 2012; Zahra, 2003). Conversely, the agency, resource dependence, and transaction cost theories highlight FFs' features which discourage internationalisation, such as risk aversion, limited competence in management, constrained financial resources, reticence towards external non-family presence in ownership, management or assets, and the prior need to maintain firm control and preserve the family's socio-emotional wealth (SEW)[31] (Fernández & Nieto, 2006; Gómez-Mejía et al., 2007).
Family presence in ownership and management allows family members to shape both strategic decisions and day-to-day operations; such pervasive family influence affects the firm's identity and

[31] 'The non-financial aspects of the firm that meet the family's affective needs, such as identity, the ability to exercise family influence, and the perpetuation of the family dynasty' (Gómez-Mejía et al., 2007, p. 106).

its objectives, which are consequently more likely to be family-centred (Arregle et al., 2017). On one hand, this allows benefiting from the aforementioned facilitative factors, potentially fostering internationalisation. On the other hand, elements against international engagement might be exaggerated. The need of additional financial, managerial and knowledge resources to afford internationalisation and the related risks are likely to collide with the FFs' principles of caution, SEW preservation and preference toward family-related assets (Arregle et al., 2012; Verbeke & Kano, 2012); furthermore, simultaneous ownership and control could incentivise the use of resources to maximise the family goals rather than the firms', including passing up international engagement opportunities (Singla, Veliyath & George, 2014).

Empirical studies are highly heterogeneous regarding the definitions, features, and strategies of FFs, measures of international engagement, and institutional and geographical effects; however, when the FF status is defined with respect to both ownership and management, evidence suggests that FFs internationalise significantly less than non-FFs (Arregle et al., 2017).

As for the make-or-buy choice, depending on the prioritised SEW dimensions (Berrone et al., 2012), FFs may find incentives in either integration or outsourcing. The fear of losing control and the strong identification of the family with the firm might steer FFs towards the former to preserve autonomy and reputation (Kraus et al., 2016). Similarly, the renewal of family bonds through dynastic succession might foster establishing foreign entities under the owning family's control and whose long-term benefits could be enjoyed by future generations (Calabrò et al., 2016). Conversely, the importance of building social ties and the emotional attachment of family members to the firm and its social links (including the outward ones) may lead FFs to establish long-lasting, trustworthy, family-like relationships with suppliers, resulting in preferences towards international outsourcing (Miller & Le Breton-Miller, 2014). In addition, issues such as limited financial resources and managerial expertise might favour outsourcing over integration.

The SEW dimensions that FFs prioritise in their sourcing choices are not obvious. Not only may different FFs prioritise different SEW characteristics (Pongelli et al., 2019), a given SEW factor may entail both incentives and hindrances towards the same sourcing strategy. For instance, the fear of losing control and the identification of the business as an extension of the family might translate into aversion for non-family members, thus limiting the FFs' capacity in equity-based investments (Boellis et al., 2016).

2.2.3) Testable predictions and intended contributions

Combing the main insights from the aforementioned strands of literature, in this paper, we explore the role of family firms, productivity and input specificity in shaping sourcing. To this aim, we set

our empirical framework drawing on the IE literature on global sourcing, and complement it with the FB and IB definition of family firms. The resulting empirical model provides a comprehensive framework for analysing the family firm status concurring with productivity and input specificity in designing firms' solution to input procurement issues.

Our previous discussion suggests two sets testable predictions:

Hypothesis 1: *Determinants of the location decision.* From the IE literature on global sourcing, productivity is a major driver of the final good producer's location decision: the more productive the firm, the more likely the foreign solution. Therefore, we expect more productive firms to engage in foreign sourcing, rather than in domestic sourcing. From the FB and IB literature on FFs' internationalisation, the family firm status seems to be associated with a lower propensity to engage in foreign activities when family presence regards both ownership and management. Hence, we expect FFs to engage more in domestic sourcing, than in foreign sourcing.

Hypothesis 2: *Determinants of the ownership decision.* From the IE literature on global sourcing, relation-specific investments are major drivers of the final good producer's ownership decision: the more specific the intermediate inputs, the more likely the make solution. Therefore, we expect firms relying more on specific inputs to engage in integration rather than in outsourcing. From the FB and IB literature on FFs' internationalisation, conflicting forces are at play, making it complex to identify a strong a priori on the role of FFs.

Our intended contributions are twofold. First, by adding the FF status to an otherwise standard empirical framework à la Antràs and Helpman (2004), we contribute to the IE literature on global sourcing by identifying factors other than productivity and input specificity that might affect firms' location and ownership decisions. Second, we contribute to the FB and IB literature on family firms' internationalisation by analysing supply-side internationalisation and defining sourcing through the interplay between location and ownership concerns, thus providing a more comprehensive taxonomy of sourcing strategies and an encompassing econometric model to account for input procurement.

2.3) Data, variables and methods

2.3.1) Data

The present study draws on an original survey of a representative sample of Italian manufacturing firms headquartered in Lombardy.

Located in northern Italy, Lombardy is one of the most developed and open regions in Europe, hosting 20% of Italian active enterprises (Eurostat, 2021). Its GDP per capita exceeds the national (EU) average by 31% (26%), and its volume of trade over value added (73%) is 30% greater than the national average. Lombardy's participation in GVCs is also significant: more than 50% of its gross exports towards other regions originate from participation in GVCs, and its share of value added from foreign sources is the highest among Italian regions, witness to the importance of the region's international backward linkages (Iammarino et al., 2019). In order to address input procurement consistently with Antràs and Helpman (2004), our sample needs to include a reasonable share of firms committed to foreign sourcing. Thus, Lombardy is a natural locus for our study, since 6.5% of Lombard firms engage in foreign sourcing, in line with firms from German regions (Assolombarda, 2019).

Our target sample of 1,000 firms is drawn from the last national firm census and stratified according to geographical location, manufacturing activity, and firm size. Geographical location stratification is based on four macro areas that group neighbouring provinces according to their productive specialisation: northwest, northeast, southwest, and southeast.[32] The manufacturing activity stratification follows the taxonomy of Pavitt (1984), which groups industries into four macro categories according to the source of technology and technical change; they are designated as supplier dominated, specialised suppliers, science-based and scale intensive.[33] Firm size stratification reflects the number of employees, and it is based on three main cells: firms with fewer than 10 employees, firms with 10-49 employees, and firms with more than 50 employees.

The number of firms in each stratum of the target sample was obtained to ensure proportionality to the total number of firms in the same stratum of the population.

All firms were contacted by phone and a multiple-choice questionnaire was emailed to senior managers and CEOs between April and July 2020, relatively to firms' sourcing behaviour in 2019.

This study included 718 enterprises with a response rate of 70%. After dropping those firms that miss the relevant variable values, our sample consists of 650 firms, and it is highly representative of the entire population (Table 1).

[Table 1 approximately here]

[32] Northwest includes Como, Lecco, Varese; Northeast includes Bergamo, Brescia, Sondrio; Southwest includes Lodi, Milano, Monza e Brianza, Pavia; Southeast includes Cremona, Mantova.

[33] According to Pavitt (1984), supplier-dominated industries include firms from traditional segments, such as textiles and agriculture, which rely on sources of innovation external to the firm. Scale-intensive industries, such as the automotive sector, comprise large firms producing basic materials and consumer durables; in this case, innovation can be both internal and external to the firm with a medium level of appropriability. Specialised suppliers denote smaller and more specialised firms producing specialised machineries and high-tech instruments; for this type of firms, there is a high level of appropriability due to the tacit nature of knowledge. Science-based industries, such as pharmaceuticals and electronics, include high-tech firms relying on R&D from both internal and external sources; science-based firms typically develop new products and processes in a context of high-level appropriability from patents and tacit knowledge.

Concerning the geographical location, the majority of our firms are from the southwest of the region (about 39%), followed by the northeast (29%), the northwest (24%), and the southeast (8%).

For the manufacturing activity, supplier dominated operations prove to be the main economic activity, involving 42% of the sampled firms. They are followed by the scale intensive (23%) and the specialised suppliers (20%) industries, whereas the science-based (15%) activities represent the smallest segment. These data confirm that the industrial texture of the region is highly diversified, with multiple specialisations leading to a balanced mixture of traditional and high-tech activities.

Finally, with respect to firm size, our sample is characterised by the sharp prevalence of small enterprises (about 54%) with fewer than 10 employees. On the contrary, medium and large firms account for a limited 31% and 15% of the total, respectively: this suggests that a mass of small and medium enterprises, rather than a handful of huge conglomerates, is responsible for remarkable shares of the national value added, GDP, export and import.

Our survey data have been complemented with balance sheet information downloaded from AIDA, a comprehensive database of Italian enterprises administered by Bureau van Dijk.

2.3.2) Variables

Dependent variables

To assess sourcing, we consider multiple dependent variables in line with previous studies (Kohler & Smolka, 2011; Federico, 2010).

Regarding the location decision, the binary variable $Location_i$ is coded to capture firm i's domestic-or-foreign choice: it is equal to 0 for firms engaged exclusively in domestic sourcing (i.e., DO, DI, or both), and to 1 for firms engaged in foreign sourcing (i.e., FO, FI, or both), regardless of their domestic strategies.[34]

Regarding the ownership decision, the binary variable $Ownership_i$ is defined to capture firm i's make-or-buy choice: it is equal to 0 for firms engaged exclusively in outsourcing (i.e., DO, FO, or both), and to 1 for firms engaged in integration (i.e., DI, FI, or both), regardless of their outsourcing strategies.[35]

Additionally, we define the categorical variable $SourcingStrat_i$ to account for all possible combinations of ownership and location considerations. The characterisation of $SourcingStrat_i$ draws on Antràs & Helpman (2004), in that the four instances of global sourcing are independent

[34] For instance, a company engaged in DI and FO is coded value 1.
[35] For instance, a company engaged in DI and FO is coded value 1.

alternatives, and do not follow an ordering of any kind. In such spirit, $SourcingStrat_i$ is coded 0 if firms are engaged exclusively in DO; 1 for firms engaged in DI; 2 for firms engaged in FO; and 3 for firms engaged in FI. If a firm is simultaneously engaged in more than one strategy, we assign the value 1 in presence of DI absent any foreign alternative, and 2 in presence of FO absent FI (Engel & Procher, 2012).

Core independent variables

As discussed in Section 2, the FF status is a potential determinant of global sourcing. Based on firms' ownership and management configuration, we define family-controlled firms as FFs, that is, characterised by substantial family involvement in both ownership and decision-making processes (Arregle et al., 2017). We categorise as FFs those firms in which the majority of shares or voting rights are held by a family, and with family presence in significant management or board positions (D'Angelo et al., 2016). To this end, we processed information from our survey and from the AIDA database. To check the consistency of our attributions and resolve unclear categorisations, we analysed firms' websites, social media channels, and references to local or specialised press. In light of our hypotheses, we expect the dummy $FamFirm_i$ to be negatively significant in favouring foreign sourcing.

As argued in Section 2, productivity is a key driver of global sourcing, from both theoretical and empirical perspectives. Following Engel & Procher (2012) and Giovannetti et al. (2015), we measure total factor productivity (TFP_lp_i) according to the semi-parametric estimation-based approach due to Levinsohn & Petrin (2003) to address the simultaneity and selection bias. We measure the firm's output in terms of value added, the input labour as the number of employees, the intermediate input as material costs, and the capital stock as tangible fixed assets. In light of our hypotheses, we expect TFP_lp_i to be positively significant in favouring foreign sourcing.

Theoretically, firms' reliance on specific inputs could be relevant in discriminating among sourcing strategies (Antràs & Helpman, 2004); empirically, the lack of firm-level data on the nature of inputs has so far prevented proper econometric analyses. In this regard, we asked firms to define the extent to which they rely on inputs that are fully-tailored to a particular final good, according to a 1–5 Likert scale. Accordingly, our binary variable $RelSpecInputs_i$ is coded 1 for high reliance on fully-tailored inputs (i.e., values 4 or 5 on the aforementioned scale), and 0 otherwise. In light of our hypotheses, we expect $RelSpecInputs_i$ to be positively significant in explaining integration.

Additional controls

Drawing on existing literature, we consider a series of additional controls.

The dummy variable $Group_i$ is equal to 1 for firms belonging to a business group, and 0 otherwise (Cerrato & Piva, 2012).

Age_i and $Size_i$ capture the firm's age (years since foundation) and size (number of employees), respectively (Cerrato & Piva, 2012; D'Angelo et al., 2016) and $EBITDA_i$ denotes earnings before interest, taxes, depreciation, and amortisation to control for the firm's financial performance.
To account for industrial and spatial heterogeneity, we alternatively employ raw categories of manufacturing activity and geographical location[36] and sharper categories based on NACE 2-digit industries and provinces (Giovannetti et al., 2013).

2.3.3) Methods

Descriptive statistics and mean comparison tests

Tables 2 and 3 provide descriptive statistics of the categorical and continuous variables, respectively.[37]

[Tables 2 and 3 approximately here]

Regarding the dependent variables, Table 2 displays the distribution of our sampled firms by ownership decision, location decision, and sourcing strategy. In terms of ownership, 70% of the respondents buy their inputs from independent suppliers, against 30% that manufacture the needed components by themselves. In terms of location, 75% of our firms employ 'made in Italy' components, whereas 25% rely on foreign inputs. Combining ownership and location decisions, DO appears pervasive, accounting for 46% of the respondents; DI, FO, and FI follow with shares equal to 29%, 19%, and 6%, respectively. These results are consistent with the ranking of fixed costs from Antràs & Helpman (2004).
Regarding the independent variables, the percentage of FFs is remarkably high, amounting to 86% (Table 2).[38] Total factor productivity is, on average, 2.92 (Table 3), and most firms (62%) regard fully-tailored components as vital in their production processes.
Table 4 provides comparative descriptive statistics and mean comparison tests by location (Panel *a*) and ownership (Panel *b*) decisions. In line with our testable predictions, firms engaged in domestic sourcing show a higher percentage of FFs and lower productivity than firms engaged in foreign sourcing. Moreover, firms engaged in integration display a higher percentage of FFs, higher productivity, and greater reliance on specific inputs than firms engaged in outsourcing.

[36] The same used for stratification purposes.
[37] Lagged explanatory variables are employed in our empirical specifications (see section 3.3.2). Hence, to preserve consistency, our descriptive statistics refer to 2016.
[38] This share of FFs is consistent with previous studies about Italy (Cucculelli & Storai, 2015).

[Table 4 approximately here]

Econometric models

Our econometric approach is threefold.

First, we estimate the sampled firms' location decision, according to Hypothesis 1:

$$Location_i = \alpha + \beta FamFirm_i + \gamma TFP\_lp_i + \delta RelSpecInputs_i + \eta Controls_i + \varepsilon_i \quad (1)$$

with the variables defined in Subsection 3.2. Our baseline probit specification regresses $Location_i$ only on the core independent variables measuring the FF status, productivity, and input specificity. We then estimate the full model, including additional regressors regarding group membership, age, size, financial performance, and industrial and geographic controls.

Second, we estimate the sampled firms' ownership decision, according to Hypothesis 2:

$$Ownership_i = \alpha + \beta FamFirm_i + \gamma TFP\_lp_i + \delta RelSpecInputs_i + \eta Controls_i + \varepsilon_i \quad (2)$$

Equation (2) is estimated in a probit framework, using the same regressors and specifications as those in Equation (1).

Third, we combine location and ownership decisions and estimate the categorical variable $SourcingStrat_i$ in a multinomial probit framework, employing the same regressors and specifications as in Equations (1) and (2):

$$SourcingStrat_i = \alpha + \beta FamFirm_i + \gamma TFP\_lp_i + \delta RelSpecInputs_i + \eta Controls_i + \varepsilon_i \quad (3)$$

Being the most represented sourcing strategy in the sample and in accordance to Antràs and Helpman (2004), DO is used as a baseline category.

Table 5 presents the correlation matrix of the main explanatory variables. As an additional multicollinearity check, variance inflation factors are calculated: all values are below the critical cut-offs, confirming that multicollinearity is not an issue with our data (Hair et al., 2010).[39]

[Table 5 approximately here]

On a general note, the cross-sectional nature of our data limits the empirical methods we could employ, as well as the ability of our estimates to grasp causal relationships. Nevertheless, the different models estimated, the adoption of empirical corrective actions and the various robustness checks allow identifying recurring regularities across results, providing significant insights on the relationship of interest. In that regard, aiming to reduce the simultaneity bias which may affect the

[39] Results are available upon request.

estimates, all explanatory variables are three-year lagged across all specifications (D'Angelo et al., 2016).[40]

2.4) Results

Table 6 reports our probit estimates for Equations (1) and (2).

[Table 6 approximately here]

Concerning the location decision (Panel *a*), the estimated coefficient of $FamFirm_i$ is negative and statistically significant throughout all specifications. In line with Hypothesis 1, FFs are less likely to engage in foreign sourcing than non-FFs. Moreover, productivity (TFP_lp_i) is positive and statistically significant, suggesting that more productive the firm, the more likely it is to opt for foreign sourcing. Our results are consistent when switching from the baseline to the full model specifications. Conversely, as $RelSpecInputs_i$ is not significant, firms' reliance on specific inputs seems to be unrelated to $Location_i$; the same holds true for firms' age, size, group membership, and financial performance.

Concerning the ownership decision (Panel *b*), the estimated coefficient of $FamFirm_i$ tends to be negative and rather small. More importantly, it becomes insignificant as additional regressors are accounted for, suggesting that the FF status is not relevant in explaining $Ownership_i$, in line with Hypothesis 2. Regarding productivity, the results are aligned because the coefficient of TFP_lp_i is negligible in size and insignificant. Conversely, the ownership decision is positively correlated with firms' reliance on specific inputs, consistently with Hypothesis 2. Regarding additional controls, only group membership is positively related with the probability of integration.

Table 7 reports our multinomial probit estimates of Equation (3).

[Table 7 approximately here]

Findings are fully consistent across Tables 6 and 7. Regarding domestic integration, the estimates in Columns (1a) and (1b) of Table 7 show that $RelSpecInputs_i$ is positively related to the choice of DI over DO, in line with Hypothesis 2. Conversely, $FamFirm_i$ and TFP_lp_i do not play any role, once

[40] Results are robust to different lags and available upon request.

controls are accounted for. Focussing on foreign outsourcing, from Columns (2a) and (2b) the choice of FO over DO is driven by $FamFirm_i$ and TFP_lp_i, significant at the 5% level and in line with Hypothesis 1. Results are consistent with regards to foreign integration, as $FamFirm_i$ and TFP_lp_i in Columns (3a) and (3b) are characterised by negative and positive coefficients, respectively, with notable levels of statistical significance. Remarkably, $RelSpecInputs_i$ is insignificant, which is coherent with evidence reported in Table 6, as reliance on specific inputs is significant for the make-or-buy, but not for the domestic-or-foreign decision.

As far as additional controls are concerned, the coefficients of $Size_i$ are positive and significant when it comes to the choices of foreign alternatives over DO, in Columns (2b) and (3b).

2.5) Robustness checks

To verify the consistency of our findings, we introduce several robustness checks, available in the Appendix.

First, we re-run the regressions using the logit and multinomial logit models. Results are highly consistent with those displayed in Tables 6 and 7 (Tables A1 and A2).

Second, we replicate our probit and multinomial probit estimates using survey estimation methods to reduce the potential bias from the uneven survey response rate. We weigh each observation by the inverse of the probability of being sampled using, for every stratum, location- and industry-specific information on the total number of firms in the population and the sample (Gattai & Trovato, 2016). Our findings are consistent with previous results, testifying to the appropriateness of our stratification and the satisfactory balance of survey responses (Tables A3 and A4).

Third, we repeat our estimations using an alternative measure of productivity, denoted as TFP_w_i and computed according to the estimation-based approach due to Wooldridge (2009). Such method overcomes collinearity issues in the input choice, that might depend on the simultaneous selection of materials and labour, as well as assuming no frictions in the labour market (Gal, 2013). Results are robust and fully aligned with those of Section 4 (Tables A5 and A6).

Fourth, we winsorize the main variables of interest at the 1th and 99th percentiles, to rule out the possibility that results are driven by outlying values (Anginer et al., 2014); estimates are consistent with those presented above (Tables A7 and A8).

2.6) Discussion

Our probit analysis suggests that factors affecting firms' domestic-or-foreign choice do not necessarily coincide with factors influencing firms' make-or-buy choice.

Regarding location, FFs in our sample are less inclined to engage in foreign sourcing than non-FFs. This result supports Hypothesis 1, in that FFs are more likely to opt for domestic rather than foreign sourcing. Previous evidence from FB and IB literature argues FFs are characterised by elements fostering their international engagement, as well as others hindering it (Fernández & Nieto, 2006). Among the former are the motivation of family members to exploit international opportunities as a consequence of their strong identification with the firm, the long-haul orientation of strategic decisions, the proactive organisational culture built on the strong social capital among family members; among the latter are the inadequate financial and managerial resources, the interest in firmly maintaining control of the enterprise, the protection of its family traits at the cost of limiting the use of external resources (Arregle et al., 2017). As far as the location decision is concerned, our results suggest that factors hindering international engagement of FFs prevail over those fostering it. This is a novel contribution of this study, addressing FFs internationalisation from the perspective of input procurement, an entry mode that has not been comprehensively covered yet (Arregle et al., 2021; Maloni et al., 2017). However, our results highlight that FFs alone are insufficient in explaining firms' domestic-or-foreign choice. In fact, firms' productivity appears to be relevant in assessing their preference for foreign sourcing, consistent with Hypothesis 1. Previous evidence from the IE literature recognises productivity as the main driver of international sourcing, with higher productivity firms being more prone to employ foreign inputs (Kohler & Smolka, 2011). Our results are consistent with those studies.

Regarding ownership, our estimates suggest no significant difference between FFs and non-FFs. From a SEW perspective, the preservation of family control and influence over the firm, the enhancement of family image and reputation and the renewal of family bonds through dynastic successions may foster the adoption of integration over outsourcing (Pongelli et al., 2019). Since there is no clear propensity of FFs for either integration or outsourcing, it seems that these facilitative factors balance out with other FFs' features which could incentivise outsourcing, such as the ability of building social ties and strong and trustworthy relationships with their suppliers. Likewise, other FFs' traits such as limited financial resources and managerial abilities also seem not to hinder their engagement in integration compared with non-FFs. To some extent, our result differs from previous FB and IB studies, which argue that FFs are more prone to choose FI over FO (Pongelli et al., 2019) or that FFs outsource and integrate abroad less than non-FFs (Maloni et al., 2017). However, the

aforementioned studies focus exclusively on foreign sourcing (the former) or provide no empirical analysis (the latter). Based on these perspectives, our evidence is original and complementary to the existing studies. Consistent with Hypothesis 2, we highlight potential drivers of the make-or-buy choice other than the FF status. Models from the IE literature recognise specific inputs as potential drivers of integration, in that firms relying on fully-tailored components are more likely to make inputs within their boundaries. Our consistent evidence is a major contribution of the present study: to the best of our knowledge, ours is the first attempt at building a firm-level measure of input specificity, which allows investigating the role of this variable in explaining the ownership decision.

To summarise, previous contributions argue that the FFs' SEW dimensions are essential reference points for both location and ownership decisions (Evert et al., 2018; Pongelli et al., 2019). In contrast, our probit estimates suggest that the SEW-related non-financial goals take second place when the ownership decision is concerned, for it appears to be driven by other factors such as reliance on specific inputs.

Noteworthy considerations emerge also from our multinomial probit analysis encompassing all sourcing strategies. Sticking to the domestic side of sourcing, the choice of DI over DO is positively correlated with our firms' reliance on specific inputs and group membership. On the contrary, neither the FF status nor the firms' productivity proves to be statistically significant. Thus, the choice of DI over DO is shaped by the same factors that affect the ownership decision from our probit estimates. Regarding the foreign side of sourcing, the choice of FO over DO is negatively (positively) correlated with the FF status (productivity). This means that the choice of FO over DO is influenced by the same factors that affect the location decision from our probit estimates. Similar arguments hold when comparing FI with DO, with the FF status and productivity explaining the choice of foreign integration versus domestic outsourcing. Although comparison between FI and DO involves opposite choices in terms of location and ownership, the leading factors are those fuelling the location decision.

To conclude, our multinomial probit analysis allows studying input procurement as the outcome of both location and ownership decisions. Concerning the FB and IB literature on FFs' internationalisation, this adds to the existing contributions by accounting for both dimensions of sourcing, simultaneously. Concerning the IE literature on global sourcing, this contributes to previous studies by including family presence in ownership and management as a potential additional driver of sourcing choices.

2.7) Conclusion

This paper provides an empirical assessment of Italian firms' sourcing, at the crossroads between research trajectories that have so far developed independently from one another. Combining the IE definition of sourcing with the FB and IB notions of FFs, we build a comprehensive framework in which input procurement results from location and ownership decisions fuelled by firm-level features such as the FF status, productivity, and input specificity.

For empirical purposes, we employ a new firm-level, cross-sectional dataset on a large and stratified sample of Italian manufacturing firms headquartered in Lombardy. We perform probit and multinomial probit estimates, considering different specifications and robustness checks.

Concerning the location decision, our probit estimates reveal that FFs are significantly less prone to engage in foreign sourcing than non-FFs; furthermore, productivity emerges as a key factor in orienting the domestic-or-foreign choice, fostering international engagement. Regarding the ownership decision, no significant difference emerges between FFs and non-FFs. Conversely, firms' reliance on fully-tailored components and group membership increase the probability of integration over outsourcing. Multinomial probit estimates confirm these results: keeping DO as the baseline category, DI is driven by determinants of the ownership decision (i.e., input specificity and group membership), whereas foreign sourcing is favoured by determinants of the location decision (i.e., FF and productivity).

Our contribution is twofold. Compared to the FB literature on FFs' internationalisation, we contribute to the discussion by taking a supply-side perspective on foreign engagement, that is, by focussing on sourcing. Moreover, considering both location and ownership decisions, we account for domestic solutions to input procurement, which are often overshadowed by foreign strategies. Additionally, our focus on sourcing allows reconciling the interest for FFs with a topic that is more widely investigated in the context of IB. Compared to the IE literature on global sourcing, we contribute to the discussion by introducing a new type of firm-level heterogeneity, that is, family involvement in ownership and control, whose impact on global sourcing has not been analysed before.

We believe a few implications for corporate practice and policy making could be derived from our empirical findings. Our results highlight productivity as the main driver of firms' international engagement. Therefore, should internationalisation be a strategic corporate goal, improvements in firm-level productivity might be key to pursue such an objective (Borin & Mancini, 2016; Baiardi et al., 2021). At the same time, our probit and multinomial probit estimates find firms' reliance on specific inputs to be crucial in fostering integration. This suggests that an in-depth assessment of the firm's dependence on specific input types might be critical in guiding its sourcing behaviour.

From a policy making standpoint, the differences between FFs and non-FFs in the domestic-or-foreign decision suggest that policies fostering international engagement should be designed to match the needs and features typical of the two groups (Pongelli et al., 2019). On the contrary, the insignificant effect of the FF status on the integration-or-outsourcing decision does not support the design of targeted policies for FFs versus non-FFs for ownership matters.

In conclusion, we comment on the limitations and potential developments. First, the cross-sectional nature of our dataset does not allow exploiting additional dimensions (such as time) to design more sophisticated identification strategies. Second, although the sample size and representativeness seem quite satisfactory, larger samples of firms from multiple home regions/countries would be more convenient to improve the external validity of our results.

Third, in this paper, we focus on the drivers of input procurement, suggesting that *ex-ante* firm-level features shape sourcing; analysing the *ex-post* features of firms engaged in a particular sourcing strategy might be interesting to shed light on the causal effect of the ownership and location decisions (Borin & Mancini, 2016; Baiardi et al., 2021).

Fourth, this study relies on the distinction between FFs and non-FFs. Following recent developments, heterogeneity in sourcing decisions might be driven by heterogeneity in the FFs status, as defined with regards to governance structure (presence of non-family shareholders or composition of the management team), family structure (nuclear versus extended families), and family members' characteristics (educational attainment and professional experience) (Arregle et al., 2019; Pongelli et al., 2016). We are working to extend our dataset with more detailed information on these FF dimensions (among the others, the fraction of shares owned by the family, involvement of successive generations in the company's life, share of family members in the Board of Directors, and so on). To that aim, we have administered a second wave of the survey and we are currently in the process of collecting and elaborating replies.

We leave these suggestions to future research.

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Figures and tables

Figure 1: Sourcing as shaped by firms' ownership and location decisions

		Ownership decision	
		Make	Buy
Location decision	Domestic	Domestic Integration (DI)	Domestic Outsourcing (DO)
	Foreign	Foreign Integration (FI)	Foreign Outsourcing (FO)

Source: Elaborations from Antràs and Helpman (2004, 2008)

Table 1: Population and sample of Lombard enterprises, by geographical location, manufacturing activity, and firm size

		Population		Sample	
		Freq	Perc	Freq	Perc
Geographic location	North-West	17,400	20.54	154	23.69
	North-East	24,695	29.15	191	29.38
	South-West	36,064	42.57	252	38.77
	South-East	6,553	7.74	53	8.15
	Total	84,712	100.00	650	100.00
Manufacturing activity	Supplier-dominated	36,730	43.36	275	42.31
	Science-based	9,297	10.98	98	15.08
	Scale-intensive	19,748	23.31	148	22.77
	Specialised-suppliers	18,937	22.35	129	19.85
	Total	84,712	100.00	650	100.00
Firm size	0-9	65,630	77.47	348	53.54
	10-49	16,037	18.93	203	31.23
	≥ 50	3,045	3.59	99	15.23
	Total	84,712	100.00	650	100

Table 2: Descriptive statistics of categorical variables

		Freq	Perc
$Location_i$	Domestic (DO, DI)	490	75.38
	Foreign (FO, FI)	160	24.62
$Ownership_i$	Outsourcing (DO, FO)	458	70.46
	Integration (DI, FI)	192	29.54
$SourcingStrat_i$	DO	299	46.00
	DI	191	29.38
	FO	122	18.77
	FI	38	5.85
$FamFirm_i$	0 = No	94	14.46
	1 = Yes	556	85.54
$RelSpecInputs_i$	0 = No	246	37.85
	1 = Yes	404	62.15
$Group_i$	0 = No	564	86.77
	1 = Yes	86	13.23
Manufacturing activity	Supplier-dominated	275	42.31
Pavitt's sectors	Science-based	98	15.08
	Scale-intensive	148	22.77
	Specialised-suppliers	129	19.85
Geographic location	NW	154	23.69
	NE	191	29.38
	SW	252	38.87
	SE	53	8.15

Table 3: Descriptive statistics of continuous variables

	Freq	Mean	Median	St Dev
TFP_lp_i	600	2.92	2.90	0.67
Age_i	628	38.16	33.50	31.41
$Size_i$	650	52.15	9.00	243.61
$EBITDA_i$	625	1.65	0.16	8.67

Table 4: Comparative descriptive statistics and mean comparison tests

(a) Domestic versus foreign firms

	Dom	Foreign	Mean, dom	Mean, foreign	Diff	St Err	t-value	p-value
$FamFirm_i$	490	160	.888	.757	.132	.032	4.15	0
TFP_lp_i	448	152	2.857	3.091	-.235	.063	-3.75	0
$RelSpecInputs_i$	490	160	.633	.588	.045	.044	1	.308
Age_i	473	155	37.40	40.484	-3.085	2.907	-1.05	.289
$Group_i$	490	160	.106	.212	-.107	.03	-3.45	.001
$Size_i$	468	157	36.166	99.79	-63.623	22.341	-2.85	.005
$EBITDA_i$	468	157	1.385	2.461	-1.076	.799	-1.35	.178

(b) Buy versus make firms

	Buy	Make	Mean, buy	Mean, make	Diff	St Err	t-value	p-value
$FamFirm_i$	458	192	.871	.818	.053	.03	1.75	.077
TFP_lp_i	427	173	2.873	3.021	-.147	.06	-2.45	.016
$RelSpecInputs_i$	458	192	.577	.729	-.153	.042	-3.70	0
Age_i	445	183	37.133	40.661	-3.529	2.757	-1.30	.201
$Group_i$	458	192	.105	.198	-.093	.029	-3.20	.002
$Size_i$	443	182	45.129	69.237	-24.108	21.444	-1.10	.262
$EBITDA_i$	443	182	1.178	2.816	-1.639	.762	-2.15	.032

Table 5: Pairwise correlation between independent variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) $FamFirm_i$	1						
(2) TFP_lp_i	-0.240***	1					
(3) $RelSpecInputs_i$	0.004	0.049	1				
(4) Age_i	0.077*	0.133***	-0.020	1			
(5) $Group_i$	-0.356***	0.347***	-0.023	0.081**	1		
(6) $Size_i$	-0.229***	0.258***	-0.048	0.202***	0.327***	1	
(7) $EBITDA_i$	-0.223***	0.367***	-0.023	0.121***	0.257***	0.256***	1

* $p < .1$, ** $p < .05$, *** $p < .01$

Table 6: Probit estimates of Equations (1) and (2)

	(a) Location decision: domestic-or-foreign			(b) Ownership decision: make-or-buy		
	(1a)	(2a)	(3a)	(1b)	(2b)	(3b)
$FamFirm_i$	-0.435***	-0.404**	-0.533***	-0.258*	-0.202	-0.132
	(0.153)	(0.170)	(0.184)	(0.156)	(0.172)	(0.179)
	[-0.148]	[-0.133]	[-0.161]	[-0.0890]	[-0.0667]	[-0.0415]
TFP_lp_i (log)	0.250***	0.260**	0.335***	0.140	0.0633	0.00769
	(0.0913)	(0.104)	(0.116)	(0.0878)	(0.103)	(0.108)
	[0.0772]	[0.0778]	[0.0910]	[0.0462]	[0.0201]	[0.00235]
$RelSpecInputs_i$	-0.117	-0.0670	-0.0724	0.469***	0.547***	0.563***
	(0.117)	(0.119)	(0.128)	(0.117)	(0.123)	(0.127)
	[-0.0364]	[-0.0202]	[-0.0198]	[0.151]	[0.168]	[0.167]
Age_i		0.00132	0.00312		0.00261	0.00212
		(0.00183)	(0.00199)		(0.00188)	(0.00195)
		[0.000396]	[0.000849]		[0.000828]	[0.000648]
$Group_i$		0.141	0.0475		0.355*	0.403**
		(0.188)	(0.203)		(0.183)	(0.196)
		[0.0437]	[0.0131]		[0.121]	[0.133]
$Size_i$ (th. employees)		0.488	0.575		-0.0812	-0.169
		(0.519)	(0.653)		(0.198)	(0.216)
		[0.146]	[0.156]		[-0.0258]	[-0.0515]
$EBITDA_i$ (mil. €)		-0.0102	-0.0115		0.00671	0.00625
		(0.00983)	(0.0101)		(0.00652)	(0.00659)
		[-0.00307]	[-0.00314]		[0.00213]	[0.00191]
Industry controls:						
- Pavitt's sectors	No	Yes	No	No	Yes	No
- NACE 2-digit	No	No	Yes	No	No	Yes
Location controls:						
- Macro-areas	No	Yes	No	No	Yes	No
- Provinces	No	No	Yes	No	No	Yes
Constant	-0.970***	-1.330***	-1.264***	-1.063***	-1.242***	-0.790
	(0.334)	(0.391)	(0.486)	(0.334)	(0.399)	(0.484)
Pseudo R-squared	0.0334	0.0599	0.146	0.0337	0.0574	0.0914
Obs.	600	586	579	600	586	584

Standard errors in round parentheses. Marginal effects in square parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$

Table 7: Multinomial probit estimates of Equation (3)

	DI vs DO	FO vs DO	FI vs DO	DI vs DO	FO vs DO	FI vs DO
	(1a)	(2a)	(3a)	(1b)	(2b)	(3b)
$FamFirm_i$	-0.357	-0.658***	-0.721**	-0.170	-0.512**	-0.642*
	(0.235)	(0.235)	(0.295)	(0.260)	(0.257)	(0.336)
	[-0.00791]	[-0.101]	[-0.0465]	[0.0225]	[-0.0840]	[-0.0431]
TFP_lp_i (log)	0.429***	0.424***	0.698***	0.231	0.323**	0.663***
	(0.125)	(0.132)	(0.191)	(0.150)	(0.153)	(0.192)
	[0.0561]	[0.0389]	[0.0418]	[0.0139]	[0.0339]	[0.0412]
$RelSpecInputs_i$	0.547***	0.0401	0.198	0.626***	0.106	0.390
	(0.166)	(0.172)	(0.232)	(0.172)	(0.176)	(0.251)
	[0.130]	[-0.0388]	[0.00111]	[0.136]	[-0.0354]	[0.0127]
Age_i				0.00275	0.00256	0.00154
				(0.00286)	(0.00290)	(0.00352)
				[0.000451]	[0.000283]	[-0.000011]
$Group_i$				0.464	0.263	0.492
				(0.286)	(0.291)	(0.364)
				[0.0856]	[0.00333]	[0.0235]
$Size_i$ (th. employees)				1.729	2.106*	2.078*
				(1.168)	(1.182)	(1.188)
				[0.212]	[0.255]	[0.0745]
$EBITDA_i$ (mil. €)				0.01000	-0.00557	0.000605
				(0.0107)	(0.0141)	(0.0132)
				[0.00296]	[-0.00197]	[-0.000107]
Industry controls (Pavitt's sectors)	No	No	No	Yes	Yes	Yes
Location controls (Macro-areas)	No	No	No	Yes	Yes	Yes
Constant	-1.669***	-1.364***	-2.987***	-1.866***	-1.840***	-3.664***
	(0.473)	(0.482)	(0.721)	(0.563)	(0.572)	(0.763)
Obs.	600			586		

Standard errors in round parentheses. Marginal effects in square parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$

Appendix

This Appendix provides results from our robustness analysis.

Table A1: Robustness check 1, logit estimates of Equation (1) and Equation (2)

	(a) Location decision: domestic-or-foreign			(b) Ownership decision: make-or-buy		
	(1a)	(2a)	(3a)	(1b)	(2b)	(3b)
$FamFirm_i$	-0.712***	-0.660**	-0.891***	-0.410	-0.319	-0.191
	(0.251)	(0.282)	(0.314)	(0.257)	(0.287)	(0.301)
	[-0.145]	[-0.129]	[-0.159]	[-0.0854]	[-0.0629]	[-0.0353]
TFP_lp_i (log)	0.433***	0.445**	0.572***	0.252*	0.126	0.0267
	(0.157)	(0.179)	(0.209)	(0.151)	(0.176)	(0.190)
	[0.0785]	[0.0780]	[0.0908]	[0.0496]	[0.0237]	[0.00481]
$RelSpecInputs_i$	-0.193	-0.115	-0.103	0.793***	0.932***	0.975***
	(0.199)	(0.204)	(0.227)	(0.202)	(0.215)	(0.224)
	[-0.0355]	[-0.0203]	[-0.0164]	[0.151]	[0.168]	[0.168]
Age_i		0.00215	0.00529		0.00419	0.00349
		(0.00305)	(0.00340)		(0.00326)	(0.00344)
		[0.000377]	[0.000839]		[0.000789]	[0.000628]
$Group_i$		0.229	0.0782		0.578*	0.658*
		(0.313)	(0.348)		(0.304)	(0.338)
		[0.0419]	[0.0126]		[0.118]	[0.129]
$Size_i$ (th. employees)		0.834	0.966		-0.109	-0.267
		(0.922)	(1.142)		(0.333)	(0.361)
		[0.146]	[0.153]		[-0.0206]	[-0.0480]
$EBITDA_i$ (mil. €)		-0.0176	-0.0191		0.0105	0.00998
		(0.0181)	(0.0158)		(0.0107)	(0.0106)
		[-0.00309]	[-0.00303]		[0.00198]	[0.00180]
Industry controls:						
- Pavitt's sectors	No	Yes	No	No	Yes	No
- NACE 2-digit	No	No	Yes	No	No	Yes
Location controls:						
- Macro-areas	No	Yes	No	No	Yes	No
- Provinces	No	No	Yes	No	No	Yes
Constant	-1.657***	-2.252***	-2.100**	-1.831***	-2.167***	-1.394*
	(0.570)	(0.674)	(0.847)	(0.577)	(0.696)	(0.837)
Pseudo R-squared	0.0335	0.0598	0.145	0.0339	0.0575	0.0925
Obs.	600	586	579	600	586	584

Standard errors in round parentheses. Marginal effects in square parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$

Table A2: Robustness check 1, multinomial logit estimates of Equation (3)

	DI vs. DO	FO vs. DO	FI vs. DO	DI vs. DO	FO vs. DO	FI vs. DO
	(1a)	(2a)	(3a)	(1b)	(2b)	(3b)
$FamFirm_i$	-0.436	-0.866***	-1.027**	-0.212	-0.683**	-0.954*
	(0.309)	(0.310)	(0.467)	(0.346)	(0.340)	(0.538)
	[-0.00722]	[-0.103]	[-0.0437]	[0.0216]	[-0.0855]	[-0.0419]
TFP_lp_i (log)	0.535***	0.535***	1.034***	0.268	0.389*	0.987***
	(0.165)	(0.181)	(0.299)	(0.198)	(0.206)	(0.303)
	[0.0572]	[0.0382]	[0.0409]	[0.0127]	[0.0306]	[0.0404]
$RelSpecInputs_i$	0.701***	0.0106	0.282	0.795***	0.0905	0.616
	(0.215)	(0.231)	(0.385)	(0.224)	(0.235)	(0.444)
	[0.129]	[-0.0396]	[0.00346]	[0.134]	[-0.0373]	[0.0166]
Age_i				0.00357	0.00360	0.00230
				(0.00383)	(0.00395)	(0.00569)
				[0.000450]	[0.000315]	[0.0000052]
$Group_i$				0.606	0.372	0.758
				(0.375)	(0.391)	(0.575)
				[0.0860]	[0.00823]	[0.0250]
$Size_i$ (th. employees)				2.688	3.175*	3.181*
				(1.770)	(1.827)	(1.838)
				[0.288]	[0.287]	[0.0718]
$EBITDA_i$ (mil. €)				0.0111	-0.00896	-0.00268
				(0.0164)	(0.0249)	(0.0230)
				[0.00269]	[-0.00193]	[-0.000214]
Industry controls (Pavitt's sectors)	No	No	No	Yes	Yes	Yes
Location controls (Macro-areas)	No	No	No	Yes	Yes	Yes
Constant	-2.104***	-1.695***	-4.452***	-2.287***	-2.265***	-5.448***
	(0.626)	(0.646)	(1.148)	(0.745)	(0.773)	(1.245)
Obs.	600			586		

Standard errors in round parentheses. Marginal effects in square parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$

Table A3: Robustness check 2, probit estimates of Equation (1) and Equation (2), with survey estimation methods

	(a) Location decision: domestic-or-foreign			(b) Ownership decision: make-or-buy		
	(1a)	(2a)	(3a)	(1b)	(2b)	(3b)
$FamFirm_i$	-0.430***	-0.413**	-0.536***	-0.291*	-0.236	-0.171
	(0.155)	(0.172)	(0.188)	(0.157)	(0.174)	(0.183)
	[-0.145]	[-0.134]	[-0.160]	[-0.101]	[-0.0783]	[-0.0538]
TFP_lp_i (log)	0.260***	0.289***	0.367***	0.107	0.0202	-0.0356
	(0.0925)	(0.105)	(0.118)	(0.0895)	(0.105)	(0.111)
	[0.0796]	[0.0852]	[0.0983]	[0.0352]	[0.00639]	[-0.0108]
$RelSpecInputs_i$	-0.132	-0.0804	-0.0976	0.474***	0.555***	0.566***
	(0.118)	(0.121)	(0.130)	(0.119)	(0.124)	(0.129)
	[-0.0409]	[-0.0239]	[-0.0263]	[0.153]	[0.170]	[0.167]
Age_i		0.00125	0.00298		0.00260	0.00204
		(0.00184)	(0.00202)		(0.00192)	(0.00196)
		[0.000368]	[0.000798]		[0.000824]	[0.000622]
$Group_i$		0.114	0.0246		0.371**	0.408**
		(0.193)	(0.207)		(0.185)	(0.198)
		[0.0348]	[0.00662]		[0.127]	[0.134]
$Size_i$ (th. employees)		0.643	0.760		-0.108	-0.194
		(0.663)	(0.662)		(0.204)	(0.217)
		[0.190]	[0.203]		[-0.0343]	[-0.0592]
$EBITDA_i$ (mil. €)		-0.0141	-0.0153		0.00818	0.00704
		(0.0119)	(0.0108)		(0.00646)	(0.00648)
		[-0.00415]	[-0.00409]		[0.00260]	[0.00215]
Industry controls:						
- Pavitt's sectors	No	Yes	No	No	Yes	No
- NACE 2-digit	No	No	Yes	No	No	Yes
Location controls:						
- Macro-areas	No	Yes	No	No	Yes	No
- Provinces	No	No	Yes	No	No	Yes
Constant	-1.007***	-1.399***	-1.389***	-0.937***	-1.059***	-0.568
	(0.338)	(0.396)	(0.497)	(0.341)	(0.402)	(0.494)
Pseudo R-squared	0.0350	0.0641	0.152	0.0331	0.0588	0.0941
Obs.	600	586	579	600	586	584

Standard errors in round parentheses. Marginal effects in square parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$

Table A4: Robustness check 2, multinomial probit estimates of Equation (3), with survey estimation methods

	DI vs. DO	FO vs. DO	FI vs. DO	DI vs. DO	FO vs. DO	FI vs. DO
	(1a)	(2a)	(3a)	(1b)	(2b)	(3b)
$FamFirm_i$	-0.384	-0.639***	-0.783***	-0.202	-0.511*	-0.721**
	(0.238)	(0.238)	(0.294)	(0.265)	(0.261)	(0.338)
	[-0.0156]	[-0.0894]	[-0.0545]	[0.0163]	[-0.0768]	[-0.0508]
TFP_lp_i (log)	0.388***	0.426***	0.663***	0.177	0.336**	0.663***
	(0.128)	(0.132)	(0.201)	(0.153)	(0.152)	(0.194)
	[0.0472]	[0.0431]	[0.0397]	[0.0000034]	[0.0402]	[0.0421]
$RelSpecInputs_i$	0.567***	0.0462	0.138	0.652***	0.118	0.326
	(0.168)	(0.175)	(0.235)	(0.174)	(0.178)	(0.256)
	[0.137]	[-0.0370]	[-0.00528]	[0.144]	[-0.0326]	[0.00664]
Age_i				0.00290	0.00272	0.00114
				(0.00292)	(0.00292)	(0.00362)
				[0.000491]	[0.000310]	[-0.000051]
$Group_i$				0.480*	0.239	0.484
				(0.289)	(0.294)	(0.371)
				[0.0933]	[-0.00314]	[0.0227]
$Size_i$ (th. employees)				1.749	2.297*	2.223*
				(1.236)	(1.243)	(1.246)
				[0.202]	[0.287]	[0.0811]
$EBITDA_i$ (mil. €)				0.00983	-0.0101	-0.00445
				(0.0104)	(0.0148)	(0.0135)
				[0.00340]	[-0.00274]	[-0.000413]
Industry controls (Pavitt's sectors)	No	No	No	Yes	Yes	Yes
Location controls (Macro-areas)	No	No	No	Yes	Yes	Yes
Constant	-1.543***	-1.414***	-2.801***	-1.669***	-1.892***	-3.495***
	(0.485)	(0.484)	(0.753)	(0.571)	(0.578)	(0.759)
Obs.		600			586	

Standard errors in round parentheses. Marginal effects in square parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$

Table A5: Robustness check 3, probit estimates of Equation (1) and Equation (2), with total factor productivity *à la* Wooldridge (2009)

	(a) Location decision: domestic-or-foreign			(b) Ownership decision: make-or-buy		
	(1a)	(2a)	(3a)	(1b)	(2b)	(3b)
$FamFirm_i$	-0.435***	-0.407**	-0.537***	-0.256*	-0.202	-0.133
	(0.153)	(0.170)	(0.184)	(0.155)	(0.172)	(0.178)
	[-0.148]	[-0.134]	[-0.163]	[-0.0884]	[-0.0668]	[-0.0416]
TFP_w_i (log)	0.247***	0.253**	0.324***	0.143*	0.0642	0.00630
	(0.0888)	(0.102)	(0.113)	(0.0859)	(0.101)	(0.107)
	[0.0764]	[0.0758]	[0.0880]	[0.0470]	[0.0204]	[0.00192]
$RelSpecInputs_i$	-0.117	-0.0674	-0.0730	0.469***	0.547***	0.563***
	(0.117)	(0.119)	(0.128)	(0.118)	(0.123)	(0.127)
	[-0.0364]	[-0.0203]	[-0.0200]	[0.151]	[0.168]	[0.167]
Age_i		0.00127	0.00307		0.00259	0.00212
		(0.00183)	(0.00199)		(0.00189)	(0.00195)
		[0.000381]	[0.000836]		[0.000822]	[0.000648]
$Group_i$		0.138	0.0457		0.353*	0.404**
		(0.188)	(0.203)		(0.183)	(0.197)
		[0.0428]	[0.0126]		[0.120]	[0.133]
$Size_i$ (th. employees)		0.485	0.569		-0.0821	-0.169
		(0.516)	(0.651)		(0.198)	(0.216)
		[0.145]	[0.155]		[-0.0261]	[-0.0515]
$EBITDA_i$ (mil. €)		-0.0103	-0.0116		0.00664	0.00627
		(0.00980)	(0.0101)		(0.00654)	(0.00660)
		[-0.00308]	[-0.00314]		[0.00211]	[0.00192]
Industry controls:						
- Pavitt's sectors	No	Yes	No	No	Yes	No
- NACE 2-digit	No	No	Yes	No	No	Yes
Location controls:						
- Macro-areas	No	Yes	No	No	Yes	No
- Provinces	No	No	Yes	No	No	Yes
Constant	-0.978***	-1.322***	-1.254**	-1.081***	-1.248***	-0.786
	(0.333)	(0.390)	(0.487)	(0.334)	(0.398)	(0.486)
Pseudo R-squared	0.0337	0.0597	0.146	0.0341	0.0574	0.0914
Obs.	600	586	579	600	586	584

Standard errors in round parentheses. Marginal effects in square parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$

Table A6: Robustness check 3, multinomial probit estimates of Equation (3), with total factor productivity *à la* Wooldridge (2009)

	DI vs. DO	FO vs. DO	FI vs. DO	DI vs. DO	FO vs. DO	FI vs. DO
	(1a)	(2a)	(3a)	(1b)	(2b)	(3b)
$FamFirm_i$	-0.356	-0.659***	-0.721**	-0.172	-0.516**	-0.647*
	(0.235)	(0.235)	(0.296)	(0.260)	(0.257)	(0.336)
	[-0.00773]	[-0.101]	[-0.0463]	[0.0226]	[-0.0847]	[-0.0434]
TFP_lp_i (log)	0.425***	0.417***	0.695***	0.221	0.308**	0.654***
	(0.123)	(0.129)	(0.187)	(0.147)	(0.150)	(0.190)
	[0.0557]	[0.0380]	[0.0417]	[0.0130]	[0.0316]	[0.0410]
$RelSpecInputs_i$	0.547***	0.0399	0.197	0.626***	0.105	0.389
	(0.166)	(0.172)	(0.232)	(0.172)	(0.175)	(0.251)
	[0.130]	[-0.0389]	[0.00105]	[0.136]	[-0.0354]	0.0126
Age_i				0.00271	0.00250	[0.00139]
				(0.00286)	(0.00291)	(0.00354)
				[0.000449]	[0.000278]	[-0.000021]
$Group_i$				0.463	0.263	0.482
				(0.286)	(0.292)	(0.364)
				[0.0858]	[0.00358]	[0.0225]
$Size_i$ (th. employees)				1.710	2.089*	2.057*
				(1.164)	(1.178)	(1.183)
				[0.209]	[0.254]	[0.0736]
$EBITDA_i$ (mil. €)				0.0101	-0.00538	0.000425
				(0.0108)	(0.0142)	(0.0133)
				[0.00299]	[-0.00194]	[-0.000131]
Industry controls (Pavitt's sectors)	No	No	No	Yes	Yes	Yes
Location controls (Macro-areas)	No	No	No	Yes	Yes	Yes
Constant	-1.686***	-1.372***	-3.027***	-1.849***	-1.808***	-3.668***
	(0.473)	(0.480)	(0.725)	(0.562)	(0.571)	(0.764)
Obs.		600			586	

Standard errors in round parentheses. Marginal effects in square parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$

Table A7: Robustness check 4, probit estimates of Equation (1) and Equation (2), with the main variables of interest winsorized at the 1th and 99th percentiles

	(a) Location decision: domestic-or-foreign			(b) Ownership decision: make-or-buy		
	(1a)	(2a)	(3a)	(1b)	(2b)	(3b)
$FamFirm_i$	-0.430***	-0.400**	-0.521***	-0.257*	-0.216	-0.140
	(0.153)	(0.171)	(0.185)	(0.156)	(0.171)	(0.178)
	[-0.146]	[-0.130]	[-0.157]	[-0.0887]	[-0.0715]	[-0.0439]
TFP_lp_i (log)	0.267***	0.284**	0.365***	0.145	0.0521	-0.0106
	(0.0930)	(0.113)	(0.121)	(0.0901)	(0.111)	(0.116)
	[0.0824]	[0.0842]	[0.0986]	[0.0478]	[0.0165]	[-0.00324]
$RelSpecInputs_i$	-0.118	-0.0668	-0.0753	0.468***	0.547***	0.566***
	(0.117)	(0.119)	(0.128)	(0.117)	(0.122)	(0.126)
	[-0.0368]	[-0.0200]	[-0.0204]	[0.150]	[0.168]	[0.167]
Age_i		0.00115	0.00290		0.00341	0.00285
		(0.00218)	(0.00233)		(0.00212)	(0.00220)
		[0.000343]	[0.000784]		[0.00108]	[0.000870]
$Group_i$		0.0349	-0.0314		0.388**	0.422**
		(0.198)	(0.209)		(0.195)	(0.207)
		[0.0105]	[-0.00842]		[0.133]	[0.139]
$Size_i$ (th. employees)		2.074***	1.798**		-0.752	-0.665
		(0.787)	(0.875)		(0.786)	(0.803)
		[0.616]	[0.485]		[-0.238]	[-0.203]
$EBITDA_i$ (mil. €)		-0.0400**	-0.0341		0.0230	0.0194
		(0.0201)	(0.0211)		(0.0193)	(0.0193)
		[-0.0119]	[-0.00920]		[0.00728]	[0.00591]
Industry controls:						
- Pavitt's sectors	No	Yes	No	No	Yes	No
- NACE 2-digit	No	No	Yes	No	No	Yes
Location controls:						
- Macro-areas	No	Yes	No	No	Yes	No
- Provinces	No	No	Yes	No	No	Yes
Constant	-1.023***	-1.406***	-1.388***	-1.077***	-1.226***	-0.755
	(0.339)	(0.409)	(0.497)	(0.340)	(0.418)	(0.501)
Pseudo R-squared	0.0343	0.0597	0.148	0.0338	0.0573	0.0917
Obs.	600	586	579	600	586	584

Standard errors in round parentheses. Marginal effects in square parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$

Table A8: Robustness check 4, multinomial probit estimates of Equation (3), with the main variables of interest winsorized at the 1th and 99th percentiles

	DI vs. DO	FO vs. DO	FI vs. DO	DI vs. DO	FO vs. DO	FI vs. DO
	(1a)	(2a)	(3a)	(1b)	(2b)	(3b)
$FamFirm_i$	-0.355	-0.654***	-0.714**	-0.197	-0.544**	-0.590*
	(0.235)	(0.235)	(0.296)	(0.259)	(0.258)	(0.347)
	[-0.00808]	[-0.0998]	[-0.0458]	[0.0165]	[-0.0913]	[-0.0344]
TFP_lp_i (log)	0.444***	0.443***	0.732***	0.240	0.376**	0.690***
	(0.127)	(0.134)	(0.201)	(0.159)	(0.165)	(0.219)
	[0.0573]	[0.0411]	[0.0439]	[0.0118]	[0.0433]	[0.0413]
$RelSpecInputs_i$	0.546***	0.0384	0.196	0.628***	0.114	0.379
	(0.166)	(0.173)	(0.232)	(0.171)	(0.176)	(0.250)
	[0.130]	[-0.0391]	[0.000985]	[0.136]	[-0.0334]	[0.0116]
Age_i				0.00403	0.00379	0.0000577
				(0.00309)	(0.00330)	(0.00410)
				[0.000720]	[0.000473]	[-0.000198]
$Group_i$				0.527*	0.257	0.314
				(0.288)	(0.299)	(0.393)
				[0.110]	[0.000742]	[0.00441]
$Size_i$ (th. employees)				0.940	2.796*	3.884***
				(1.371)	(1.428)	(1.407)
				[-0.0920]	[0.419]	[0.228]
$EBITDA_i$ (mil. €)				0.0209	-0.0353	-0.0253
				(0.0305)	(0.0356)	(0.0361)
				[0.00878]	[-0.00843]	[-0.00184]
Industry controls (Pavitt's sectors)	No	No	No	Yes	Yes	Yes
Location controls (Macro-areas)	No	No	No	Yes	Yes	Yes
Constant	-1.713***	-1.425***	-3.092***	-1.908***	-2.007***	-3.767***
	(0.478)	(0.485)	(0.753)	(0.583)	(0.596)	(0.837)
Obs.		600			586	

Standard errors in round parentheses. Marginal effects in square parentheses. * $p < .1$, ** $p < .05$, *** $p < .0$