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Family Firms and Input Procurement: Firm-Level Evidence from Italy

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Abstract: This paper empirically analyses input procurement using Italian firm-level data. Combining the international economics literature on global sourcing with the family business and international business literature on family firms (FFs)' internationalization, 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 large and stratified sample of Italian manufacturing firms, we address the relationship between global sourcing and firm-level features, such as family presence in ownership and control, productivity, and input specificity.
Our probit and multinomial probit estimates suggest that the FF status is negatively related to foreign sourcing, and it plays little role in orienting firms' ownership decision; moreover, firms' productivity fosters foreign sourcing, and reliance on specific inputs favours integration. 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' internationalization by taking a supply-side perspective and investigating sourcing through the interplay between location and ownership choices.

Keywords: productivity, input specificity, family firms, input procurement, sourcing.

JEL: F23, D23, C35, L24

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); in the EU, more than 14 million FFs contribute to approximately 50% of GDP and provide more than 60 million jobs in the private sector (European Family Businesses, 2021).

Global competition and worldwide integration 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, with increasing attention on the scale and scope of FFs' internationalisation, their geographic reach, and foreign market dependence (Benavides-Velasco et al., 2013; Pukall & Calabrò, 2014). The renovated interest in addressing unexplored internationalization modes leaves this stream of research open to further investigations (Debellis et al., 2021). In that regard, however, FFs' internationalisation has rarely been examined from the supply side (Maloni et al., 2017); we strive to address this gap by assessing global sourcing, that is, solutions 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; Antràs & Chor, 2013). This has reshaped firms' boundaries, producing various configurations in which some production tasks are internalised and others are externalised domestically or abroad (Feenstra, 1998).

In this context, sourcing has become a global phenomenon and a key factor in enhancing firms' competitiveness (Di Gregorio et al., 2009). However, there is limited evidence on the FF status as a potential driver of sourcing (Maloni et al., 2017); furthermore, researchers have mainly concentrated on foreign sourcing, overlooking local options as potential alternatives (Gerbl et al., 2015).

To fill these gaps, we consider global sourcing as shaped by both ownership and location decisions: final good producers decide whether to make inputs within their boundaries (integration) or to buy them from independent suppliers (outsourcing), either at home (domestic) or abroad (foreign).

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.

Data collection via survey interviews allowed our dataset to include specific and 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 and significantly explains foreign sourcing, with FFs being less prone to employ foreign inputs. Conversely, productivity is a positive and statistically significant driver of the location decision, as more productive firms are more likely to engage in foreign sourcing. Lastly, reliance on specific input is positive and statistically significant in orienting integration, shaping firms' ownership decisions.

Our evidence contributes to 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 FFs' foreign engagement by analysing supply-side internationalisation and defining sourcing through the interplay between location and ownership concerns.

The remainder of this study is structured as follows. Section 2 provides the conceptual framework. Section 3 discusses the data and methods. Section 4 presents the results. Section 5 introduces the robustness checks. Section 6 presents a discussion and comparison with previous studies. Section 7 concludes the paper.

2. Conceptual framework

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.[1]

[Figure 1]

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.

[1] Intermediate forms of governance, situated between arm's length markets and vertically integrated firms, are analysed in Gereffi et al. (2005).

When globalisation was not an issue, sourcing was a local phenomenon governed by ownership decisions alone and characterised by DI and DO being the only alternatives. As a local phenomenon, sourcing can be understood by relying on the incomplete-contracts theories of integration, such as the property rights theory of the firm. Assuming contract incompleteness, Grossman and Hart (1986) and Hart and Moore (1990) argue that, when manufacturing intermediate inputs require relation-specific investments,[2] the final good producer trades-off the benefits of maximal relation-specific investments (under DI) with the benefits of minimal production costs (under DO). Thus, input specificity drives the final good producer's ownership decision towards DI, settling the debate on 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 and 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.[3] 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 and Helpman (2004); in high-tech sectors, although the sourcing strategies ordering follows Antràs and Helpman (2004), the share of FFs engaged in FI is lower.

[2] Prior investments that pay-off more inside the relationship between the final good producer and the input supplier than outside it.

[3] Antràs and Helpman (2008) allow for different degrees of contract incompleteness, under the partial contracting framework of Acemoglu et al. (2007). They show that improvements in contractibility of inputs, leading to a decrease in contract incompleteness, can either encourage or discourage FO relative to FI.

In the last decade, burgeoning empirical literature has tested the main predictions of Antràs and 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 studies have considered all sourcing instances within a joint empirical framework (Federico, 2010; Kohler & Smolka, 2011; Gattai & Trovato, 2016). Available evidence confirms that firms committing 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 *Family firms' internationalisation in family business and international business*

Regarding the FFs internationalisation modes, FB and IB scholars have mainly concentrated on exports, alliances, joint ventures, and foreign direct investments (Arregle et al., 2017, Debellis et al., 2021). 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 is best when suppliers are competitive on the cost side, and endowed with market-specific skills and relational capital facilitating a trustworthy relationship with local players (Maloni et al., 2017; 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 regarding FFs' internationalisation and the extent to which FFs differ from non-FFs.

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 internationalization, 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)[4] (Fernández & Nieto, 2006; Gómez-Mejía et al., 2007; Verbeke & Kano, 2012).

[4] '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).

Family presence in ownership and management allows family members to shape both strategic and day-to-day operations, such that the firm's identity and objectives are likely to be family-centred (Arregle et al., 2017). On one hand, this allows benefiting from the aforementioned facilitative factors, potentially fostering internationalization. On the other hand, elements against international engagement might be exaggerated. The additional financial, managerial, and knowledge resources required to internationalise and the related risks could collide with the FFs' principles of risk aversion, firm control, SEW preservation, and preference for family-related assets (Arregle et al., 2012; Verbeke & Kano, 2012); furthermore, simultaneous ownership and control could incentivise the use of resources to maximise family goals rather than firms, including passing-up internationalisation opportunities (Singla et al., 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 the establishment of entities under family control, 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 to the firm and its social links may lead FFs to establish long-lasting, family-like relationships with suppliers, resulting in a preference for outsourcing (Miller & Le Breton-Miller, 2014). In addition, issues such as limited financial resources and managerial expertise might favour the adoption of 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).

2.3 *Testable predictions and intended contribution*

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' internationalization, 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' internationalization, 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), our approach contributes 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, our approach contributes 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.

3. Data, variables, and methods

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%) (Iammarino et al., 2019), and its volume of trade over value added (73%) is 30% greater than the national average (Unioncamere Lombardia, 2021). 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 (Bentivogli 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 engaged in foreign sourcing. In light of its

positioning within GVCs, 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—they are designated as northwest, northeast, southwest, and southeast.[5] The manufacturing activity stratification follows Pavitt's (1984) taxonomy, which classifies industries into four macro categories according to the source of technology and technical change: supplier-dominated, specialised suppliers, science-based, and scale-intensive. Firm size stratification reflects the number of employees and 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 with 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. The survey was conducted 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 as shown in Table 1, it is highly representative of the entire population.

[Table 1]

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

3.2 Variables

3.2.1 Dependent variables

To assess global 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 equal to 1 for firms engaged in foreign sourcing (i.e., FO, FI, or both), regardless of their domestic strategies.[6]

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

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

Regarding the ownership decision, the binary variable $Ownership_i$ is defined to capture firm i's make-or-buy choice: it is assigned a value of 0 for firms engaged exclusively in outsourcing (i.e., DO, FO, or both), and 1 for firms engaged in integration (i.e., DI, FI, or both), regardless of their outsourcing strategies.[7]

Additionally, we define the categorical variable $SourcingStrat_i$ to account for all possible combinations of ownership and location considerations. The characterization of $SourcingStrat_i$ follows the definitions spelled out in Antràs & Helpman (2004), where the four instances of global sourcing are thought of as a set of independent alternatives, rather than following 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. Obviously, it is possible that a firm is simultaneously engaged in more than one strategy: in such case, we assign the value 1 in presence of DI absent any foreign alternative, and 2 in presence of FO absent FI (in a similar fashion to Engel & Procher, 2012).

3.2.2 Core independent variables

Consistent with the testable predictions, our core independent variables are $FamFirm_i$, $RelSpecInputs_i$, and TFP_i.

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; Maloni 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 regarding the firm's ownership, governance, and management configurations 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. Following Gal (2013), we measure the firm's output in terms of value added, the input labour as the number of employees,

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

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.

3.2.3 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[8] and sharper categories based on NACE 2-digit industries and provinces (Cerrato & Piva, 2012; Giovannetti et al., 2013).

3.3 Methods

3.3.1 Descriptive statistics and mean comparison tests

Tables 2 and 3 provide descriptive statistics of the categorical and continuous variables, respectively.[9]

[Tables 2, 3]

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 assumed by Antràs & Helpman (2004).

[8] The same used for stratification purposes.

[9] Lagged explanatory variables are employed in our empirical specifications (see section 3.3.2). Hence, to preserve consistency, our descriptive statistics refer to 2016.

Regarding the independent variables, the percentage of FFs is remarkably high, amounting to 86% (Table 2).[10] 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 are characterised by 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 a significant (positive) difference in input specificity than firms engaged in outsourcing.

[Table 4]

3.3.2 Econometric models

Our econometric approach is threefold.

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

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

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:

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

with the variables defined in Subsection 3.2. 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, and employing the same regressors and specifications as in Equations (1) and (2):

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

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

[10] This share of FFs is consistent with previous studies about Italy (Cucculelli & Storai, 2015). Compared with other samples characterised by a lower percentage of FFs (D'Angelo et al., 2016), ours accounts for micro-firms, which are more likely to be family-controlled.

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).[11]

[Table 5]

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 estimates, all explanatory variables are three-year lagged across all specifications (D'Angelo et al., 2016).[12]

4. Results

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

[Table 6]

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 statistically 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 statistically insignificant. Conversely, the ownership decision is significantly correlated with firms' reliance on specific inputs, consistent 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]

[11] More results are available upon request.

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

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 positive and significantly related to the choice of DI over DO; this is in line with Hypothesis 2 that relying on specific inputs matters in explaining the domestic ownership decision. Conversely, $FamFirm_i$ and TFP_{lp_i} do not play any role, once 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}, which are significant at the 5% level; this is in line with Hypothesis 1 that FFs and lower productivity firms are less likely to engage in foreign rather domestic sourcing. 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 positive, but not significant, 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).

5. Robustness checks

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

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 (see Tables A1 and A2 in the Online Appendix).

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 (Kohler & Smolka, 2011; Gattai & Trovato, 2016). Our findings are consistent with previous results, testifying to the appropriateness of our stratification and the satisfactory balance of survey responses (see Tables A3 and A4).

Third, we consider an alternative measure of productivity (TFP_w_i) 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 summarised in Section 4 (see 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 (see Tables A7 and A8).

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 identifies certain features of FFs fostering international engagement and certain features dampening it (Fernández & Nieto, 2006). As far as global sourcing is concerned, the latter seem to outweigh the former, which is a novel contribution of this study. 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; Gattai & Trovato, 2016). Our results are consistent with those studies.

Regarding ownership, our estimates suggest no significant difference between FFs and non-FFs. Looking at this result from an SEW perspective, facilitative and restrictive factors balance out, implying that there is no clear propensity of FFs for either integration or outsourcing. On a similar note, FFs' traits such as limited financial resources and managerial abilities seem not to hinder their engagement in integration compared with non-FFs.

To some extent, this 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 the potential drivers of the make-or-buy choice other than the FF status. Theoretical 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.

Noteworthy considerations emerge 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. In other words, 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. This evidence is a novel contribution of the present study that provides a more comprehensive framework for analysing global sourcing.

7. Conclusion

This paper provides an empirical assessment of global sourcing. Relying on previous literature on FB, IB, and IE, our conceptual framework lies 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 increases the probability of integration over outsourcing. Multinomial probit estimates confirm these results: keeping DO as the baseline category, DI is driven by the determinants of the ownership decision (i.e., input specificity and group membership), whereas foreign sourcing is favoured by the 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.

In conclusion, we comment on the limitations and potential developments. The cross-sectional nature of our dataset does not allow designing more sophisticated identification strategies to account for endogeneity. Additionally, although sample representativeness seems satisfactory, larger samples of firms from multiple home regions/countries would improve the external validity of our results. Finally, this study relies on the distinction between FFs and non-FFs. Following recent developments (Arregle et al., 2019; De Massis et al., 2018; Pongelli et al., 2016), heterogeneity in the FFs status might account for heterogeneity in sourcing decisions. 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 squared parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$

Appendix A

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