

Ownership and Cross-Border Patent Sales in M&A Transactions

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Abstract

We examine the relation between acquirer and target firm ownership and the probability of a cross-border deal involving patents. By focusing on M&A deals involving intangible assets, we are better positioned to analyze technology sales. We show how different owners on the acquirer and the target side, and their relative position, are related to the decision to conduct a domestic versus cross-border transaction involving patent sales. We find that acquirer bank and fund ownership have very little association with cross-border M&A transactions involving patent sales. However, risk-averse family owners and insiders in an acquirer firm are negatively related to the probability if they are minority shareholders. In contrast, family owners and insiders have a positive association if they are the largest shareholder. We also illustrate how target owners shape cross-border M&A decisions. Family and fund owners in target firms are negatively related to the probability of a cross-border M&A transaction involving patent sales. This is attributable to the fact that the valuation of intangible assets can be overly complicated with foreign acquirers. Thus, target owners can likely secure better deals domestically.

Keywords: Ownership, Patent Sales, M&As

1. Introduction

Previous literature has shown there are numerous relevant factors for mergers and acquisitions (M&As), both domestically and internationally (Rossi and Volpin, 2004; Erel, Liao, and Weisbach, 2012). Cross-border transactions can bring novel benefits, but also change the costs associated with M&As. Cross-border M&As may also be associated with greater corporate governance difficulties.

Research has also shown that the importance of ownership and control affects firms' strategic choices (Hoskisson, Hitt, Johnson, and Grossman, 2002; Morck, Wolfenzon, and Yeung, 2005; Cumming, Siegel, and Wright, 2007; Goranova, Dharwadkar, and Brandes, 2010). Agency theory highlights the two types of conflicts that determine strategic firm choices: 1) the Principal-Agent conflict between the manager and shareholders, and 2) the Principal-Principal conflict between groups of shareholders.

Principal-Agent conflict can result when under-diversified risk-averse managers are unwilling to carry out risky but value-enhancing projects to increase shareholder value (Jensen and Meckling, 1976). Principal-Principal conflict can result when firm owners exhibit differing risk preferences, such as, e.g., in terms of strategic incentives (Filatotchev and Wright, 2011). For example, family owners and institutional investors may differ in their overall strategic goals, and thus their investment objectives may also differ.

Different owner types can also dramatically affect firm investment strategies. Institutional investors, depending on their type, positively affect investments in R&D and innovation (Bushee, 1998; Aghion, Van Reenen, and Zingales, 2013; Cumming, Peter, and Tarsalewska, 2019). Hedge fund investors tend to improve innovation in investee firms (Brav, Jiang, Ma, and Tian, 2018). Family owners, although usually risk averse, also tend to embrace innovation in their firms (Morck and Yeung, 2003; Diaz-Moriana, Clinton, Kammerlander, Lumpkin, and

Craig, 2018). Although the literature clearly shows owners' impact on firms' strategic innovation decisions, we do not know if they influence decisions whether to buy innovation in cross-border M&A transactions.

The goal of this paper is to study the Principal-Principal conflict among various groups of owners on the acquirer and target sides, and to explore the probability of the decision to acquire cross-border intangible assets in the form of patents. Acquisitions of firms with patents can pose significant risk to the acquirer firm. Not only do they face higher valuation risk when they merge and acquire intangible assets, but the integration of new technologies is often fraught with difficulty. Therefore, our primary research question is: Do owners of acquirer and target firms matter in cross-border mergers and acquisitions of firms with patents?

To explore this question, we use a comprehensive sample of 3,311 M&A deals involving patent sales from the European Union (28 countries including United Kingdom) for the 2010-2018 period. We collect ownership information for target and acquirer firms from Orbis. Our findings suggest that both acquirer and target owners matter in in cross-border mergers and acquisitions of intangible assets, and reflect the differing risk preferences of the owners.

For example, we find little evidence that acquirer bank owners are positively associated with the probability of cross-border M&A deals involving patents. Similarly, we find no effect of acquirer fund ownership. However, we find new and interesting evidence that acquirer family owners' influence depends on whether they are minority or majority shareholders. Family owners with a minority ownership in an acquirer firm are negatively related, while they are positively related when they are the largest shareholder. Acquirer insiders are negatively associated with the probability of a cross-border M&A deal involving patents only if they are minority shareholders.

In the case of target firm owners, we find that only funds and family owners have a negative and statistically significant association with the probability of cross-border M&A deals involving patents. There is also some evidence that target corporate owners have a positive association.

Our paper contributes to the literature in two key ways. First, we supplement prior research by showing that owners on both sides matter in cross-border M&A decisions involving patent sales. Ferreira, Massa, and Matos (2009) show that foreign institutional shareholders increase the probability that a deal will be cross-border. Cao, Cumming, Qian, and Wang (2015) show that deals involving institutional investors are more likely to be cross-border if creditor rights are stronger and antidirector rights are weaker. Finally, Chen, Hobdari, and Zhang (2019) show empirically that the heterogeneous preferences of owners of U.S. acquirer firms affect cross-border M&A decisions. Second, we show that whether owners are part of a block, or are the largest shareholder, matters.

The remainder of this paper is organized as follows. We discuss the data and our summary statistics in section 2. Section 3 presents the main results. Section 4 concludes.

2. Data and methodology

2.1. Data and sample selection

We examine the relation between acquirer and target ownership and the choice of cross-border versus domestic acquisitions that involve patent sales. We begin by collecting deal data from Bureau van Dijk's (BvD) Zephyr Merger and Acquisition database. We first select all M&A deals with the sub-type: patent sale. This gives us an initial sample of 17,210 transactions for 2010 through 2018. Of those transactions, we next choose completed deals. We are interested in change of ownership, so we choose deals where the initial stake is less than 50%, and the

final stake is higher than 50%. We also choose countries where the acquirer is from one of 28 EU countries (including the United Kingdom). This gives a sample of 4,495 M&A deals.

Subsequently, we collect data on ownership from the BvD Orbis database for 2010-2018. Orbis provides information on the type of shareholders and their direct and voting rights. After merging with the ownership data, we are left with 4,221 deals. We exclude any deals with missing information on deal characteristics, which leaves us with a final sample of 3,311.

Table 1 shows the sample distributions by announcement year for our 2010-2018 sample in panel A, by industry in panel B, and by country in panel C. Column (1) shows all deals, column (2) shows cross-border deals, and column (3) shows non-cross-border deals by year. We observe that the number of M&A deals grows steadily until 2016, and then drops back to 2010 levels. The largest amount of deals is in manufacturing industry followed by services industry. The top three acquirer countries are United Kingdom, Germany, and France.

[Insert Table 1 here]

Table 2 gives the summary statistics in panel A, and correlations in panel B. Variable definitions are in the Appendix. We measure ownership of acquirer and target firms in the fiscal year immediately preceding the announcement year. Acquirer firms on average are owned 2.69% by banks, 7.52% by funds, 10.86% by families, 32.77% by corporates, and 0.32% by insiders. The ownership percentages differ from those in Chen, Hobdari, and Zhang (2019), who focus on U.S. acquirers. This is mainly because of the differences in ownership models in the U.S., where more dispersed ownership is popular, and in the EU, where many firms are family-owned. Target firms on average are owned 1.69% by banks, 4.53% by funds, 8.27% by families, 47.15% by corporates, and 0.26% by insiders.

The main control variables in our regressions are acquirer age (*LNAGE*), asset size (*ASSETS*), a dummy variable that equals 1 if the acquirer and the target are in the same industry, and 0

otherwise (*SAME_IND*), if the transaction was paid in cash (*CASH*) or stock (*STOCK*), and if the acquirer or target firms are publicly listed (*TRG_LISTED*, *ACQ_LISTED*). Firms on average are 22 years old and have assets of 100,710 th euros. 47% have acquirer and target firms from the same industry, approximately 19% (17%) of transactions are paid in cash (stock), 34% of acquirer firms are listed, and 1% of target firms are listed.

Thus, the probability of a cross-border deal involving patent sale is significantly and positively correlated with acquirer bank ownership, and significantly and negatively correlated with acquirer family, acquirer corporation, target funds, and target family ownership. The remaining control variables have correlations with the probability of a cross-border deal at levels ranging from 4% to 21%.

[Insert Table 2 here]

2.2. Methodology

To empirically test how acquirer and target ownership affects the probability of cross-border transactions, we estimate the regression equation with fixed effects and clustered standard errors at industry level using a Probit model, as follows:

$$CB_DEAL = \alpha + \beta Ownership + Controls + Fixed\ Effects + \varepsilon \quad (1)$$

where the dependent variable *CB_DEAL* is a dummy variable that equals 1 if the M&A transaction involving a patent sale is a cross-border deal, and 0 otherwise. The main independent variables are types of ownership: banks, funds, families, corporations, and insider status of the acquirer or target firm. Following previous studies, we also include a set of controls, and we cluster standard errors at the industry level (Chen, Hobdari, and Zhang, 2019). We include two sets of fixed effects. First, we control for industry and year. Second, we also include country \times year \times industry fixed effects in order to eliminate unobserved cross-sectional heterogeneity.

Next, we construct four different measures of ownership: 1) total percentage held by a particular owner type (aggregate owner); 2) a dummy variable that equals 1 if a particular owner type holds a block of 5% or 3) 10%, and 0 otherwise; and 4) a dummy variable that equals 1 if a particular owner type is the largest owner, and 0 otherwise.

3. Results and discussion

3.1. Main results

Table 3 reports the results for the association between acquirer ownership and cross-border deal probability. Different acquirer owners have different effects on the probability of *CB_DEAL*. Acquirer bank ownership is positively related to *CB_DEAL*, but it is only significant when ownership is measured as an aggregate percentage and if the bank has 10% block or if it is the largest owner (in models 7 and 8). Similarly to Chen, Hobdari, and Zhang's (2019) reasoning, this may mitigate the conflict between banks and management. Acquirer fund ownership has no association with cross-border deal probability. This might be due to the fact that mutual funds are typically focused on returns, and can change their positions quickly if the forecasted M&A transaction is not likely to benefit them.

We find interesting results for acquirer family ownership. Aggregate and block ownership generally exhibit a negative and statistically significant association with *CB_DEAL*, suggesting that family owners are less likely to undertake risk and engage in cross-border M&A transactions involving patent sales. However, if a family is the largest owner, it tends to have a positive and statistically significant association with *CB_DEAL*. This reflects the non-linear U-shaped relation that exists between family ownership and a firm's risk taking, as found in Lee, Chae, and Lee (2018). They posit that, when families are minority owners, they take less risk because they value private benefits more. When they are majority owners, their interests are better aligned with the value-enhancing strategy of undertaking riskier projects.

We find that acquirer corporate ownership has a positive and statistically significant relation with the cross-border probability of M&A transactions involving patent sales only if the corporate owner is the largest owner or has a block (model 7). Acquirer insider ownership has a negative and statistically significant association *CB_DEAL* if they are minority owners or have a 5% block; and they have a positive association with *CB_DEAL* if they are the largest owner. This reflects an attitude similar to that of family owners: As undiversified risk-averse insiders, such as, e.g., employees, managers, and directors, they may act in their own benefit and avoid risky projects. Other controls are as expected. Firms are more likely to engage in cross-border deals if they are larger, in the same industry, when the acquirer is listed, and when the target is unlisted.

[Insert Table 3 here]

Table 4 presents the results on the effect of target ownership on cross-border M&A deals involving patent sale probability. Firms with fund ownership and family ownership are less likely to be targets in cross-border acquisitions including intangible assets. These results are consistent and statistically significant irrespective of the ownership definition, but they are more economically significant when the family or fund owner is the largest shareholder.

Greenwood and Schor (2009) show for a U.S. sample that hedge fund activists are more likely to force investee firms to be targets in acquisitions because of the potentially large positive returns to the target firm. Our results complement this evidence. We show that funds are generally interested in selling their shares in target firms, but less so in the case of cross-border deals including intangible assets. The intuition is that intangible assets are usually less profitable if sold to a foreign, rather than domestic, acquirer. We also find an increase in the probability of a cross-border M&A deal involving a patent sale if the owner is a corporation.

[Insert Table 4 here]

Our results are robust to including different sets of fixed effects as well different types of clustering by country and industry, and both.

4. Conclusion

This paper explores the role of acquirer and target owners in cross-border M&A decisions involving patent sales. We find that acquirer and target owners, and their relative positions, are related to the decision to conduct a domestic versus cross-border merger or acquisition involving patent sales. Acquirer bank and fund ownership have little association with cross-border M&A transactions involving patent sales. Risk-averse family owners and insiders in acquirer firms have are negatively related if they are minority shareholders, but family owners and insiders are positively related if they are the largest shareholder.

We also show that target firm owners have an important role in shaping cross-border M&A decisions. Family and fund owners in target firms are negatively related to the probability of cross-border M&A transactions involving patent sales. We attribute these results to the notion that the valuation of intangible assets can be overly complicated with foreign acquirers, and thus target owners can secure better deals domestically.

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Table 1
Sample Distribution

This table presents the sample distribution by year. It includes 3,311 completed mergers and acquisitions from the Zephyr database for the 2010-2018 period, where the initial stake is less than 50% and the final stake is higher than 50%. Acquirers must be from one of 28 European Union countries. Column (1) shows all deals, column (2) shows only cross-border (CB) deals, and column (3) shows only non-cross-border (non-CB) deals. In Panel A we present distribution by year, in Panel B by industry, and in Panel C by country.

Panel A. Distribution by year

Year	(1) Number of deals	(2) Number of CB deals	(3) Number of non-CB deals
2010	265	128	137
2011	360	194	166
2012	369	184	185
2013	332	143	189
2014	370	170	200
2015	459	242	217
2016	592	345	247
2017	339	208	131
2018	225	134	91
Total	3,311	1,748	1,563

Panel B. Distribution by industry

Industry	(1) Number of deals	(2) Number of CB deals	(3) Number of non-CB deals
Agriculture (00-09)	15	7	8
Construction (15-17)	77	21	56
Finance, Insurance, And Real Estate	231	102	129
Manufacturing (20-39)	1,966	1,169	797
Mining (10-14)	37	17	20
Public Administration (91-99)	9	7	2
Retail Trade (52-59)	46	15	31
Services (70-89)	660	313	347
Transportation, Communications (40-49)	131	50	81
Total	3,311	1,748	1,563

Panel C. Distribution by country

Country (Acquirer)	(1) Number of deals
Austria	78
Belgium	103
Bulgaria	4
Croatia	3
Cyprus	4
Czech Republic	34
Denmark	49
Estonia	1
Finland	122
France	475
Germany	537
Greece	0
Hungary	8
Ireland	62
Italy	190
Latvia	3
Lithuania	42
Luxemburg	2
Netherlands	237
Norway	2
Poland	41
Portugal	7
Romania	1
Sweden	361
Slovenia	3
Slovakia	4
Spain	175
United Kingdom	763
Total	3,311

Table 2
Summary Statistics and Correlations

This table reports summary statistics in panel A and Pearson correlations in panel B. Variable definitions are in the Appendix. * denotes statistical significance at the 5% level.

Panel A. Summary statistics

	(1)	(2)
	Mean	Std. Dev.
ACQ_BANKS	2.69	11.40
ACQ_FUNDS	7.52	21.79
ACQ_FAMILY	10.86	28.75
ACQ_CORP	32.77	45.54
ACQ_INSIDER	0.32	4.62
TRG_BANKS	1.69	11.05
TRG_FUNDS	4.53	18.95
TRG_FAMILY	8.27	25.78
TRG_CORP	47.15	54.09
TRG_INSIDER	0.26	4.35
LNAGE	3.11	1.05
ASSETS	11.52	3.15
SAME_IND	0.47	0.50
CASH	0.19	0.39
STOCK	0.17	0.37
TRG_LISTED	0.01	0.08
ACQ_LISTED	0.34	0.47

Panel B. Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1 CB_DEAL	1.00										
2 ACQ_BANKS	0.06*	1.00									
3 ACQ_FUNDS	-0.03	0.01	1.00								
4 ACQ_FAMILY	-0.16*	-0.06*	-0.08*	1.00							
5 ACQ_CORP	-0.04*	-0.14*	-0.19*	-0.24*	1.00						
6 ACQ_INSIDER	-0.03	-0.01	-0.00	-0.00	-0.04*	1.00					
7 TRG_BANKS	0.02	0.02	-0.01	0.01	-0.01	0.00	1.00				
8 TRG_FUNDS	-0.04*	0.06*	0.02	-0.03	-0.03	-0.00	-0.02	1.00			
9 TRG_FAMILY	-0.06*	-0.02	-0.00	0.03*	-0.01	0.00	-0.02	-0.03	1.00		
10 TRG_CORP	0.03	0.02	0.01	-0.01	0.06*	0.02	-0.06*	-0.16*	-0.20*	1.00	
11 TRG_INSIDER	0.01	-0.00	0.00	-0.00	-0.02	0.15*	-0.00	-0.00	-0.00	-0.02	1.00

Table 3. Cross-Border Patent Sales in M&A Transactions and Acquirer Firm Ownership

This table gives the results of a Probit regression of cross-border deals involving the sale of intangible assets. The dependent variable is a dummy variable that equals 1 for a cross-border deal, and 0 otherwise. Variable definitions are in the Appendix. All regressions control for industry and year fixed effects in model (1) to (4) and country \times industry \times year fixed effects in model (5) to (8). Standard errors (in parentheses) are robust errors corrected for clustering of observations at the industry level. The economic significance of the main variables is in brackets underneath the standard errors. It represents the marginal effect on the probability of a CBA for a 1-standard deviation change in a continuous variable, holding other variables at their mean levels. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Aggregate ownership	10% block	5% block	Largest owner	Aggregate ownership	10% block	5% block	Largest owner
BANKS	0.003** (2.03)	0.091 (1.54)	0.051 (1.20)	0.247 (1.36)	0.006*** (3.41)	0.146** (2.36)	0.086 (1.24)	0.397*** (3.87)
FUNDS	-0.001 (-1.51)	-0.053 (-0.57)	0.024 (0.28)	0.032 (0.23)	-0.001 (-0.52)	-0.001 (-0.01)	0.080 (1.23)	0.128 (1.60)
FAMILY	-0.004*** (-4.01)	-0.289*** (-6.54)	-0.283*** (-9.37)	0.211*** (7.34)	-0.003*** (-3.30)	-0.189*** (-5.54)	-0.176*** (-6.41)	0.236*** (5.85)
CORP	-0.000 (-0.06)	0.018 (0.63)	0.038 (1.61)	0.212** (2.20)	-0.000 (-0.28)	0.007 (0.30)	0.036** (2.32)	0.323*** (2.71)
INSIDER	-0.006*** (-2.97)	-0.200 (-1.17)	-0.308*** (-3.49)	0.107 (1.41)	-0.002 (-1.48)	-0.033 (-0.31)	-0.243*** (-5.53)	0.238*** (4.58)
LNAGE	-0.004 (-0.22)	-0.006 (-0.29)	-0.005 (-0.28)	-0.014 (-0.72)	0.038 (1.33)	0.036 (1.19)	0.038 (1.29)	0.033 (1.14)
ASSETS	0.077*** (2.65)	0.078*** (2.59)	0.078** (2.54)	0.079*** (2.61)	0.080** (2.20)	0.081** (2.18)	0.081** (2.13)	0.078** (2.05)
SAME_IND	0.121*** (3.28)	0.121*** (3.12)	0.120*** (3.05)	0.119*** (3.21)	0.119*** (3.65)	0.122*** (3.81)	0.122*** (3.78)	0.118*** (3.62)
CASH	0.003 (0.05)	0.003 (0.05)	0.003 (0.05)	0.009 (0.14)	0.023 (0.32)	0.021 (0.28)	0.021 (0.28)	0.013 (0.17)
STOCK	0.056 (0.48)	0.063 (0.53)	0.064 (0.54)	0.078 (0.68)	0.056 (0.44)	0.061 (0.48)	0.061 (0.49)	0.076 (0.62)
TRG_LISTED	-0.563*** (-4.63)	-0.564*** (-4.72)	-0.567*** (-4.67)	-0.563*** (-4.39)	-1.179** (-2.24)	-1.182** (-2.31)	-1.194** (-2.29)	-1.173** (-2.18)
ACQ_LISTED	0.264*** (4.48)	0.284*** (6.96)	0.289*** (6.94)	0.301*** (6.76)	0.249*** (3.12)	0.262*** (4.29)	0.264*** (4.47)	0.227*** (5.61)
Industry FE	Yes	Yes	Yes	Yes				
Year FE	Yes	Yes	Yes	Yes				
Country \times industry \times year FE					Yes	Yes	Yes	Yes
Observations	3,311	3,311	3,311	3,311	3,311	3,311	3,311	3,311
Pseudo R-sq	0.092	0.091	0.091	0.089	0.296	0.294	0.294	0.295

Table 4. Cross-Border Patent Sales in M&A Transactions and Target Firm Ownership

This table gives the results of a Probit regression of cross-border deals involving the sale of intangible assets. The dependent variable is a dummy variable that equals 1 for a cross-border deal, and 0 otherwise. Variable definitions are in the Appendix. All regressions control for industry and year fixed effects in model (1) to (4) and country \times industry \times year fixed effects in model (5) to (8). Standard errors (in parentheses) are robust errors corrected for clustering of observations at the industry level. The economic significance of the main variables is in brackets underneath the standard errors. It represents the marginal effect on the probability of a CBA for a 1-standard deviation change in a continuous variable, holding other variables at their mean levels. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Aggregate ownership	10% block	5% block	Largest owner	Aggregate ownership	10% block	5% block	Largest owner
BANKS	0.001 (0.30)	0.027 (0.17)	0.074 (1.08)	0.015 (0.14)	0.003 (0.81)	0.084 (0.40)	0.158** (2.11)	0.093 (0.82)
FUNDS	-0.003*** (-4.43)	-0.270*** (-6.30)	-0.219*** (-3.95)	-0.226*** (-3.73)	-0.004*** (-6.06)	-0.447*** (-6.11)	-0.397*** (-5.52)	-0.336*** (-5.13)
FAMILY	-0.003*** (-3.19)	-0.238*** (-4.62)	-0.205*** (-3.54)	-0.240*** (-6.15)	-0.004*** (-2.61)	-0.310*** (-4.22)	-0.265*** (-3.58)	-0.362*** (-3.76)
CORP	0.000* (1.75)	0.045** (1.97)	0.068** (2.57)	0.053 (1.34)	0.000** (2.24)	0.060** (2.23)	0.084*** (2.68)	0.071** (2.45)
INSIDER	0.000 (0.07)	0.064 (0.48)	0.154 (1.31)	-0.240 (-1.06)	0.008 (1.33)	0.609 (1.32)	0.675*** (3.91)	0.143 (0.41)
LNAGE	-0.012 (-0.90)	-0.012 (-0.91)	-0.013 (-0.98)	-0.014 (-1.13)	0.034** (2.55)	0.034*** (2.89)	0.033*** (2.83)	0.031*** (2.62)
ASSETS	0.084*** (4.85)	0.085*** (4.82)	0.085*** (4.82)	0.086*** (4.98)	0.086*** (4.12)	0.087*** (4.11)	0.087*** (4.15)	0.087*** (4.26)
SAME_IND	0.125*** (3.02)	0.125*** (3.03)	0.128*** (3.15)	0.128*** (3.18)	0.125*** (4.16)	0.123*** (4.17)	0.128*** (4.62)	0.131*** (4.69)
CASH	0.010 (0.22)	0.022 (0.46)	0.023 (0.50)	0.027 (0.60)	0.024 (0.70)	0.036 (1.09)	0.041 (1.25)	0.042 (1.20)
STOCK	0.073 (1.27)	0.081 (1.40)	0.077 (1.31)	0.075 (1.25)	0.074 (1.03)	0.088 (1.35)	0.086 (1.24)	0.076 (1.07)
TRG_LISTED	-0.604*** (-5.57)	-0.555*** (-5.58)	-0.574*** (-5.41)	-0.557*** (-5.05)	-1.202*** (-3.34)	-1.100*** (-3.27)	-1.160*** (-3.36)	-1.209*** (-3.66)
ACQ_LISTED	0.315*** (20.07)	0.316*** (20.22)	0.318*** (19.93)	0.313*** (19.05)	0.297*** (15.05)	0.297*** (15.30)	0.298*** (14.74)	0.299*** (14.07)
Industry FE	Yes	Yes	Yes	Yes				
Year FE	Yes	Yes	Yes	Yes				
Country \times industry \times year FE					Yes	Yes	Yes	Yes
Observations	3,311	3,311	3,311	3,311	3,311	3,311	3,311	3,311
Pseudo R-sq	0.090	0.091	0.090	0.090	0.298	0.300	0.300	0.298

Appendix A1. Variable Definitions

Variable Name	Definition [Source]
CB_DEAL	Dummy variable that equals 1 if the deal involving the sale of intangible assets is cross-border, and 0 otherwise. [Zephyr]
ACQ_BANKS	Proportion of shares owned by banks in the acquirer or target firm. [Orbis]
TRG_BANKS	
ACQ_FUNDS	Proportion of shares owned by funds in the acquirer or target firm. [Orbis]
TRG_FUNDS	
ACQ_FAMILY	Proportion of shares owned by a family in the acquirer or target firm. [Orbis]
TRG_FAMILY	
ACQ_CORP	Proportion of shares owned by corporates in the acquirer or target firm. [Orbis]
TRG_CORP	
ACQ_INSIDER	Proportion of shares owned by insiders (i.e., employees, managers, directors) in the acquirer or target firm. [Orbis]
TRG_INSIDER	
LNAGE	Logarithm of the market value of assets in thousands of euros. [Zephyr]
ASSETS	
SAME_IND	Dummy variable that equals 1 if acquirer and target are in the same industry, and 0 otherwise. [Zephyr]
CASH	Dummy variable that equals 1 if the deal payment is financed by cash, and 0 otherwise. [Zephyr]
STOCK	Dummy variable that equals 1 if the deal payment is financed by stock, and 0 otherwise. [Zephyr]
TRG_LISTED	Dummy variable that equals 1 if the target's status is unlisted, and 0 otherwise. [Zephyr]
ACQ_LISTED	Dummy variable that equals 1 if the target's status is unlisted, and 0 otherwise. [Zephyr]