

Online Appendix for:

OWNERSHIP AS A BUNDLE OF RIGHTS: ANTECEDENTS OF THE WEDGE BETWEEN CONTROL AND CASH FLOW RIGHTS WITHIN FIRMS

Robustness checks:

We performed a battery of tests using available data to assess the robustness of the main results to a number of potential concerns: sample used, measurement of the independent and dependent variables, and estimation strategy and model specification.

Sample used. We re-estimated models in three subsamples of new subsidiaries: subsidiaries of diversified firms, wholly owned subsidiaries, and acquired subsidiaries (excluding de novo creations). Focusing on diversified firms allows for more direct testing of our predictions, as our independent variables have no variation in single-market, non-diversified firms. As expected, limiting the sample to subsidiaries of diversified firms (by dropping the bottom quartile in firm diversity, calculated as an entropy measure: $\sum_i (S_i \times \ln(1/S_i))$, where S_i refers to the sales of the firm in industry i as a percentage of the total sales of the firm) yielded fully consistent results (Table 4, Model 2). Next, we ran the regressions restricting the sample to subsidiaries that are directly or indirectly controlled $\geq 95\%$ by their parent, which accounted for roughly 77% of new subsidiaries in our sample. Focusing on these subsidiaries suppresses the variation in control rights and renders the interpretation of coefficients more straightforward as the variation now comes nearly entirely from cash flow rights. The results for these regressions were, again, consistent with the main results (Table A1, Model 3). Finally, we reran the regressions limiting the sample to acquired subsidiaries. Not only can there be (unobserved) differences between acquired and de novo subsidiaries (for which we control in our model specification by including fixed effects for newly added subsidiary types), but additionally, the inclusion of de novo subsidiaries in the estimation prevents us from controlling for prior characteristics of the new subsidiaries. In the acquired subsidiaries

subsample, the sign and significance of the coefficients remained consistent with the main results (Table A1, Models 4-5).

----- Insert Table A1 about here -----

In addition, we checked the sensitivity of the results to the inclusion of foreign-owned subsidiaries in our working sample. We excluded subsidiaries owned by non-French parents from our working sample to alleviate concerns related to the measurement errors in our independent variables. To the extent the firms in our working sample have foreign operations, there will be measurement errors in relatedness and multimarket contact (but not in any of our control variables and the dependent variable) because we have data on all manufacturing entities (multiunit firms, their subsidiaries, and standalone firms) operating in France but not on their foreign operations. This issue is more salient for foreign-owned subsidiaries because nearly all French firms have a large majority of their operations in France even if they have foreign operations. That's why we excluded foreign-owned subsidiaries from our working sample. That being said, the inclusion of subsidiaries owned by non-French parents in the sample does not make any notable difference in the results. When included, our sample size increases to 1,621 (from 843) observations and all our independent variables keep the same sign and equally strong significance levels: relatedness ($\beta = -8.27, p = 0.002$), multimarket contact ($\beta = -31.01, p = 0.037$), and multimarket contact² ($\beta = 104.37, p = 0.002$).

Finally, we provide benchmark information for our dependent and independent variables to help the reader make a more informed assessment of the results' generalizability to other contexts. Within our working sample, the wedge between control and cash flow rights averages 20.56% with a median of 8.20%. Hong et al. (2017) provide similar figures of 19.85% and 5.28% for low opacity (in financial reporting) firms, and 20.93% and 6.50% for high opacity firms, drawing on data from 20 countries (including France, South Korea, and the US) spanning the period 1997 to 2007. Within our working sample, the average (horizontal) relatedness is 0.54, with a median of 0.57. Using a measure similar to ours, Aggarwal and Wu (2015) report an average relatedness of 0.40 for firms operating in the US

defense industry from 1996 to 2006. Within our working sample, the average multimarket contact at the firm-in-market level is 0.135, with a median of 0.102. Feinberg (1985), who employs a similar sales-at-risk measure (but without adjusting for the number of overlapping firms), reports an average multimarket contact of 0.183 based on data from US firms in 1976. He also notes a multimarket contact of 0.120 in industries with a concentration (C4) exceeding 30%; in our working sample, the corresponding multimarket contact was 0.109. Note that the scope of the firms we study is comparable to those in other countries as well. In our working sample, the diversity of a firm averages 1.63 and has a median of 1.67. Jacquemin and Berry (1979), who proposed the widely-used entropy measure that we also use, report 1.60 as the average entropy for the 460 largest US industrial corporations in 1965 at the 4-digit level.

Measurement of the independent and dependent variables. We reran our main regressions, replacing our measure of relatedness with alternative measures. Recall that our measure of relatedness is based on the correlation of input flows. When we replaced our measure of relatedness with an average of this measure and an identical measure based on the correlation of output flows, as in Fan and Lang (2000) and Aggarwal and Wu (2015), the results were consistent with the main results (Table A2, Model 2). We next replaced our measure of (horizontal) relatedness with a measure of vertical relatedness, which is the average of the forward integration and backward integration potential of the firm into the subsidiary's industry. In contrast to the measure of relatedness that we use in the main regressions, which captures predominantly the similarity dimension of relatedness, vertical integration potential can be construed as predominantly capturing the complementarity dimension of relatedness. Following Lemelin (1982), we calculated forward integration potential by the percentage of inputs to the subsidiary's industry that comes from the firm's core industry, and the backward integration potential by the percentage of outputs from the subsidiary's industry that goes to the firm's core industry. When we used this measure of relatedness instead of our original measure, its coefficient was still negative but not statistically significant ($p = 0.538$) (Table A2, Model 3). However, given the crude measure of vertical relatedness employed, the results must be treated with caution.

----- Insert Table A2 about here -----

Next, we turned to our dependent variable, the wedge between control and cash flow rights. We used the diverge of these two ownership rights in our analyses because it allows us to situate our study within the broader literature that examines the antecedents (Almeida et al., 2011) and, much more commonly, the consequences of such divergence. However, control rights and cash flow rights are highly co-dependent, and the extent of control rights sets an upper bound for cash flow rights. In addition, there are numerous methodological issues surrounding the use of difference scores in regression models (see Edwards, 2001 for a review) and, as reported above, the variation in the wedge between control and cash flow rights mainly comes from the cash flow rights. Accordingly, we reran our models using cash flow rights, instead of the wedge, as the dependent variable controlling for control rights to test the robustness of the reported results. Because the measurement of divergence subtracts cash flow rights from control rights (which has to be \geq cash flow rights), the coefficients in the regressions using cash flow rights as the dependent variable are expected to take the opposite sign compared with the main regressions. The results, reported in Table A2 (Model 5), show the expected sign reversal and are fully consistent with the main results.

Estimation strategy and model specification. As detailed in the methods section, we made a number of choices in our empirical approach to alleviate potential concerns related to (1) reverse causality (by focusing on the first instance when a subsidiary is integrated into a firm's structure), (2) sample selection (by using models that account for sample selection), and (3) unobserved heterogeneity (by including fixed-effects for firm, industry, year, and the mode through which a subsidiary joined a firm). Still, the results may be sensitive to (1) model assumptions, (2) self-selection (endogeneity), and (3) boundedness of the dependent variable. We check each of these concerns in turn.

----- Insert Table A3 about here -----

First, we checked the robustness of the results using a simpler estimation approach with fewer model assumptions than the Heckman sample selection model we use. The Heckman model can address bias that may arise from the non-random selection of observations into our working sample and provide more consistent estimates. However, it requires additional assumptions regarding the selection

mechanism and the error term of the selection equation. If these assumptions aren't met, the model's corrections can result in biased estimates. Thus, we reran the main regressions using OLS, which has fewer assumptions compared to Heckman models. This yielded results nearly identical to our main results (Table A3, Model 2).

Second, within the limits of our data, we examined the robustness of our results to potential endogeneity between interdependencies and ownership rights. Self-selection, stemming from omitted variable bias, is a potential concern because interdependencies and ownership rights are simultaneous choices for the parent's decision-makers. If self-selection affects our models, it might render our results biased and inconsistent. To partially address this, we utilized a 2SLS approach using an instrument for relatedness. We focused on relatedness due to its more apparent endogeneity concerns: while a firm's multimarket contact in a particular market reflects both its decisions and those of its rivals, relatedness is solely an outcome of intrafirm dynamics. We instrumented relatedness of a focal subsidiary to its firm by the average relatedness of all acquisitions and de novo creations by firms in the same core industry as the focal firm. For instance, if our observation concerns the acquisition of a subsidiary by a firm whose core industry is NAF29.1A (manufacture of motors or turbines), we instrument this subsidiary's relatedness acquisition using the average relatedness of acquisitions and de novo creations made by all firms with the same core industry, NAF29.1A.¹

Our instrument, we believe, meaningfully predicts relatedness, and hence is relevant, as evidenced by the corresponding F-tests (lowest F-test value = 44.44, $p < 0.001$, see Stock & Yogo (2005) for a discussion on critical values) in the first stage regression (Table A3, Model 4). However, we remain cautious about asserting that the instrument satisfies the exclusion restriction, meaning that it isn't correlated with the second-stage regression residual and doesn't directly influence the outcome (the disparity between cash flow and control rights). On the one hand, the instrument is based on firms in the

¹ We calculated two variants of this instrument, one focusing on additions of new subsidiaries in the focal year only (that we use in the tests reported in Table A3) and another one in the three-year window around the focal addition. The results were highly consistent across these two variants.

parent's industry, not necessarily those in the focal subsidiary's industry. This allows us to use industry fixed effects and sidesteps common issues of employing industry averages as instrumental variables (Larcker & Rusticus, 2010). Moreover, average relatedness mirrors the aggregate trend in the parent's industry, and it isn't directly the result of the decision-making process determining the control-cash flow wedge in a subsidiary. As shown in Table A4, firms from industries with a tendency towards more related acquisitions and de novo creations pursue both low and high wedge strategies (and vice versa). Yet, mimetic behaviors within the same industry could lead all firms to make analogous scope choices, which might correlate our instrument with the error term. Despite the instrument's potential limitations, the consistency of the 2SLS regression results (Table A3, Model 3) with our other reported specifications bolsters our confidence in the main results.

----- Insert Table A4 about here -----

Third, we checked whether the measurement of cash flow rights as a percentage (multiplied by 100 for demonstration of coefficients) bounded between zero and 100 imposes any bias in the reported results. Tobit is the suggested estimation method for dependent variables that are bounded and have limit observations. (In our final working sample, there were only 85 observations with 100% cash flow rights). Using Tobit, the results are qualitatively identical to the main results (Table A2, Model 5), further increasing our confidence in the reported results. In untabulated regressions, we also estimated our models using fractional probit which yielded broadly consistent results, although the coefficient of relatedness was not statistically significant at conventional levels.

Finally, turning to our model specification, we checked the robustness of the results to the inclusion of additional control variables. First, as previously noted, we added a number of pre-acquisition characteristics to the models that we ran on the acquired subsidiaries subsample (Table A1, Model 6): subsidiary size (the average number of paid employees, in thousands), subsidiary market share (sales of the subsidiary as a percentage of total industry sales), and subsidiary profitability (ROIC). Of these, only prior profitability was statistically significant, and notably so, consistent with Almeida et al. (2011). Next, we included segment importance (sales of the firm in the industry as a percentage of a firm's total sales)

and firm diversity (measured as mentioned above) as additional controls. Neither of these two variables were significant when included, and the main results remained unchanged. In addition, as previously reported, the results were qualitatively insensitive to the inclusion or exclusion of moderately correlated variables, one-by-one and in combinations.

Table A1. Regressions Explaining the Wedge between Parents' Control and Cash Flow Rights in Newly Added Subsidiaries of French Manufacturing Firms, Using Different Subsamples

VARIABLES	(1)	(2)	(3)	(4)	(5)
(Sub)sample:	Full sample	Diversified firms	≥95% controlled subsidiaries	Acquired subsidiaries	Acquired subsidiaries
Relatedness	-9.00* (3.94)	-15.14** (4.24)	-9.99* (4.34)	-10.88* (4.90)	-10.20* (5.07)
Multimarket Contact	-48.84* (20.61)	-49.76† (25.43)	-77.92** (25.26)	-139.65** (29.99)	-137.69** (30.67)
Multimarket Contact squared	166.39** (46.36)	170.50** (54.76)	215.69** (54.75)	377.62** (63.55)	378.15** (64.98)
Segment Market Share	8.32 (6.78)	9.57 (7.72)	12.14 (8.49)	18.33* (8.56)	18.24* (8.86)
Firm Size	1.30 (2.91)	1.67 (3.46)	-3.57 (4.14)	-1.71 (3.24)	-1.05 (3.31)
Industry Concentration	32.87* (14.54)	31.66* (14.83)	17.32 (17.47)	47.67** (18.22)	44.82* (18.10)
Industry Profitability	-0.12* (0.05)	-0.15** (0.06)	-0.16** (0.06)	-0.15* (0.06)	-0.15* (0.06)
Industry Growth	0.62 (0.73)	-0.07 (0.78)	1.60† (0.89)	-0.53 (1.10)	-0.67 (1.09)
Industry Turbulence	1.51** (0.57)	1.46* (0.64)	2.66** (0.68)	0.85 (0.75)	0.79 (0.76)
De Novo Entry	-1.39 (1.23)	-1.13 (1.38)	-2.34 (1.56)		
Acquisition (subsidiary of another firm)	4.15* (2.10)	7.12** (2.40)	3.15 (2.58)	2.56 (2.26)	2.42 (2.34)
Subsidiary Market Share					12.86 (13.35)
Subsidiary Profitability					-0.01** (0.00)
Subsidiary Size					-0.41 (0.70)
<i>Fixed effects</i>					
Firm	Included	Included	Included	Included	Included
Industry	Included	Included	Included	Included	Included
Year	Included	Included	Included	Included	Included
N	843	649	649	549	549

Model 1 reproduces Model 5 in Table 2; Robust standard errors, clustered by subsidiary, in parentheses; Constant included in all models; Two-tailed tests:

† $p < .10$, * $p < .05$, ** $p < .01$

Table A2. Regressions Explaining the Wedge between Parents' Control and Cash Flow Rights in Newly Added Subsidiaries of French Manufacturing Firms, Using Different Measures of Relatedness and Different Dependent Variables

VARIABLES	(1)	(2)	(3)	(4)	(5)
	DV: The wedge between control and cash flow rights				Cash flow rights
Relatedness	-9.00*			-9.29*	8.50*
	(3.94)			(4.04)	(3.98)
Relatedness (input & output)		-8.89*			
		(4.13)			
Vertical integration potential			-5.81	-4.41	
			(9.44)	(9.31)	
Multimarket Contact	-48.84*	-49.60*	-62.76**	-50.28*	51.07**
	(20.61)	(20.60)	(21.41)	(20.52)	(19.47)
Multimarket Contact squared	166.39**	167.63**	186.55**	172.24**	-170.62**
	(46.36)	(46.34)	(47.49)	(45.69)	(43.13)
Control Rights					0.79**
					(0.03)
Segment Market Share	8.32	7.71	3.86	7.09	-6.76
	(6.78)	(6.72)	(6.41)	(6.67)	(6.75)
Firm Size	1.30	1.42	3.03	2.07	-1.22
	(2.91)	(2.92)	(3.21)	(3.17)	(2.85)
Industry Concentration	32.87*	33.26*	34.74*	35.93*	-35.58*
	(14.54)	(14.56)	(14.58)	(14.31)	(14.57)
Industry Profitability	-0.12*	-0.12*	-0.12*	-0.13*	0.11*
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Industry Growth	0.62	0.60	0.67	0.57	-0.39
	(0.73)	(0.73)	(0.73)	(0.72)	(0.73)
Industry Turbulence	1.51**	1.51**	1.44*	1.47*	-1.61**
	(0.57)	(0.57)	(0.57)	(0.59)	(0.57)
De Novo Entry	-1.39	-1.37	-1.35	-1.18	2.76*
	(1.23)	(1.23)	(1.22)	(1.19)	(1.24)
Acquisition (subsidiary of another firm)	4.15*	4.17*	4.16*	3.93†	-3.01
	(2.10)	(2.10)	(2.12)	(2.12)	(2.12)
<i>Fixed effects</i>					
Firm	Included	Included	Included	Included	Included
Industry	Included	Included	Included	Included	Included
Year	Included	Included	Included	Included	Included

N = 843; Model 1 reproduces Model 5 in Table 2; Robust standard errors, clustered by subsidiary, in parentheses; Constant included in all models; Two-tailed tests:

† $p < .10$, * $p < .05$, ** $p < .01$

Table A3. Regressions Explaining the Wedge between Parents' Control and Cash Flow Rights in Newly Added Subsidiaries of French Manufacturing Firms, Using Different Estimation Strategies

VARIABLES	(1)	(2)	(3)	(4)	(5)
Estimation:	Heckman (sample selection)	OLS	2SLS	2SLS first stage	Tobit
Relatedness	-9.00* (3.94)	-9.41* (4.67)	-48.36** (11.68)		-9.41** (3.38)
Instrument				0.62** (0.09)	
Multimarket Contact	-48.84* (20.61)	-49.43* (24.66)	-6.14 (28.36)	0.94** (0.29)	-49.43* (17.59)
Multimarket Contact squared	166.39** (46.36)	170.02** (54.68)	112.87* (57.09)	-1.11* (0.51)	170.02** (33.87)
Segment Market Share	8.32 (6.78)	7.60 (8.09)	30.08** (9.85)	0.54** (0.12)	7.60 (6.95)
Firm Size	1.30 (2.91)	1.44 (3.50)	-2.75 (3.53)	-0.01 (0.04)	1.44 (2.51)
Industry Concentration	32.87* (14.54)	35.95* (17.17)	34.31* (17.12)	-0.02 (0.26)	35.94* (16.32)
Industry Profitability	-0.12* (0.05)	-0.13† (0.07)	-0.11† (0.06)	-0.00 (0.00)	-0.13* (0.05)
Industry Growth	0.62 (0.73)	0.58 (0.87)	0.39 (0.94)	-0.01 (0.01)	0.58 (0.71)
Industry Turbulence	1.51** (0.57)	1.47* (0.71)	2.41** (0.80)	0.02** (0.01)	1.47** (0.52)
De Novo Entry	-1.39 (1.23)	-1.20 (1.43)	-1.07 (1.46)	-0.01 (0.02)	-1.20 (1.14)
Acquisition (subsidiary of another firm)	4.15* (2.10)	3.95 (2.55)	4.03† (2.32)	-0.01 (0.02)	3.95* (1.61)
<i>Fixed effects</i>					
Firm	Included	Included	Included	Included	Included
Industry	Included	Included	Included	Included	Included
Year	Included	Included	Included	Included	Included

N = 843, except 2SLS models (N=840); Model 1 reproduces Model 5 in Table 2; The instrument for relatedness is the average relatedness of new subsidiaries of firms that operate in the same industry as the focal firm; Robust standard errors, clustered by subsidiary, in parentheses; Constant included in all models; Two-tailed tests:

† $p < .10$, * $p < .05$, ** $p < .01$

Table A4. Distribution of Subsidiaries by Quartiles of The Wedge between Parents' Control and Cash Flow Rights in Newly Added Subsidiaries and The Instrument

		The instrument: The average relatedness of new subsidiaries of firms that operate in the same industry as the focal firm				
		<i>Q1</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>	<i>Total</i>
The wedge between parents' control and cash flow rights	<i>Q1</i>	43	50	66	82	241
	<i>Q2</i>	57	39	43	45	184
	<i>Q3</i>	64	64	47	79	254
	<i>Q4</i>	63	37	23	38	161
	<i>Total</i>	227	190	179	244	840