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Does it pay to be a multinational? A large-sample, cross-national replication assessing the multinationality–performance relationship

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Abstract

Research Summary: Does it pay to be a multinational? Despite decades of empirical research, we still do not know. We undertake a large-sample, cross-national replication of Lu and Beamish (2004) and Berry and Kaul's (2016) works to examine whether the multinationality–performance relationship is S-shaped in a 2009–2016 panel of 889,865 firm-year observations. Using a two-stage least squares fixed-effects model that accounts for endogeneity on a subsample of 32,835 multinationals from 64 countries, we find no evidence of an S-shaped relationship; nor do we see it in any of the single-country contexts. Our results show no evidence of any within-firm effect of multinationality on performance, highlighting the need for more contextually-grounded research focused on explaining between-firm effects to advance our theoretical and empirical understanding of the multinationality–performance relationship.

Managerial Summary: We replicate two studies that examined the relationship between a firm's multinationality and its performance. Lu and Beamish (2004) found evidence of an S-shaped relationship—with performance first decreasing, then increasing, then decreasing again as firms expanded abroad—in a sample of Japanese firms; Berry and

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Kaul (2016) found no evidence of an S-shaped pattern in a sample of U.S. multinationals. We test for the same relationship using data from nearly 250,000 firms based in over 100 countries from 2009 to 2016 and find no evidence of an S-shaped pattern or of any effect of multinationality. Our study thus adds substantial evidence to the one shown by Berry and Kaul (2016), emphasizing the need to focus on how contextual differences influence the multinationality–performance relationship.

KEYWORDS

firm performance, multinationality, panel data, replication, S-curve

1 | INTRODUCTION

Whether and how multinationality affects firm performance represents a crucial question in the strategic management and international business fields. A substantial body of scholarly work has attempted to empirically verify whether and, if so, how a firm's multinationality¹ (M)—that is, the extent to which it undertakes value-adding activities outside its home country—impacts performance (P). Despite these ongoing efforts, the literature has to date failed to offer a consistent set of empirical findings (Cardinal, Miller, & Palich, 2011; Hitt, Tihanyi, Miller, & Connelly, 2006; Kirca et al., 2011). The M–P relationship has been found to be insignificant or very weak (Tallman & Li, 1996), negative (Denis, Denis, & Yost, 2002), U-shaped (Lu & Beamish, 2001), inverted U-shaped (Gomes & Ramaswamy, 1999), and S-curved (Contractor, Kumar, & Kundu, 2007). Thus, we still do not know whether it pays to be a multinational.

A particularly influential contribution to the debate is by Lu and Beamish (2004, henceforth L&B).² Studying a sample of 1,489 Japanese listed firms over 12 years, they found an S-curved relationship between multinationality and performance. Even though L&B explicitly discussed the specificities of the (single-country) context used in their empirical analysis, their convincing theoretical explanation and rigorous methodological approach has made their S-curve hypothesis widely accepted and assumed to apply in a variety of (country) contexts. In view of the influence of L&B's contribution and the inconsistent results in the literature, Berry and Kaul (2016, p. 2,276; henceforth B&K) recently argued that “careful, large sample replication of L&B's study in other samples and settings is therefore critical.” Thus, they conducted a replication of L&B's study using a panel of 2,023 U.S. multinational firms from 1989 to 2007. However, they were unable to replicate L&B's results; the little evidence they obtained in support of an S-shaped relationship in a subsample of manufacturing firms vanished once they accounted for the endogeneity of multinationality.

¹As noted by Kirca et al. (2011) in their meta-analytic review and echoed by Berry and Kaul (2016), “multinationality,” “degree of internationalization,” “international diversification,” “geographic diversification,” and “international expansion” refer to the same construct. In our work, as also clarified in the main text, we use the term multinationality to refer to the extent of a firm's operations outside its home country.

²Verbeke and Forootan (2012) listed L&B's contribution as one of the 10 most influential studies in this literature, having accumulated at the time of their analysis 346 Google scholar citations. By February 2019 L&B's study had reached 1,206 google scholar citations, thus further corroborating its influence in the literature.

In this article, we undertake a large-sample, cross-national (quasi-)replication of L&B and B&K's studies.³ To test for the existence of an S-shaped relationship, we use a panel dataset of 889,865 observations from nearly 250,000 firms and their roughly 680,000 subsidiaries over a 7-year period from 2009 to 2016. Building on B&K's contribution, we use a two-stage least squares (2SLS) fixed-effects model on a subsample of 102,113 firm-year observations from 32,835 multinational firms based in 64 countries for which we account for the endogeneity of multinationality. Our replication has at least two advantages. First, it allows us to estimate whether changes in the level of multinationality within a firm lead to changes in its performance (i.e., within-firm effect) using a large-sample cross-national panel. Second, we are able to test whether the within-firm effect of multinationality varies when taking into account contextual contingencies that are automatically discarded when using fixed-effects models, that is, by comparing firms of different types (listed vs. nonlisted), sizes (large vs. small and medium-sized), industry groupings (manufacturing vs. services), and in particular countries.

Our results show no evidence of a within-firm effect of multinationality on performance. Although we do find support for an S-shaped relationship in our full sample, this association entirely disappears once we account for the endogeneity of multinationality. Moreover, we also find no evidence of an S-shape across all types of firms and industry groups; nor do we see it in any of the single-country contexts. We also see no evidence for a significant effect of either the main, squared, or cubed term of multinationality in any of our specifications. Overall, our results show no support for any within-firm relationship between multinationality and performance.

Our work contributes to research on the M–P relationship in two ways. First, by relying on a large-sample cross-national panel, we add substantial empirical evidence to the one shown by B&K—restricted to a single country, the United States, and, for their model accounting for endogeneity, to manufacturing firms. We are also unable to replicate the S-shaped relationship found by L&B when testing for the within-firm effect of multinationality on performance and accounting for the endogeneity of multinationality across all firm, industry, and country contexts represented in our setting. Additionally, our findings showing no support for any within-firm relationship in any of our specifications not only question the validity of the S-curve hypothesis, they also lend support to research that has challenged the very existence of a causal effect of multinationality on performance (Hennart, 2011; Verbeke & Forootan, 2012).

Second, by examining whether the M–P relationship varies across firm, industry, and especially country contexts whose variance is automatically discarded when using fixed-effects models, we highlight the need to more carefully consider the fundamental difference between within- and between-firm effects (Certo, Withers, & Semadeni, 2017) from both a theoretical and empirical standpoint. Theoretically, our study suggests that rather than continuing to focus on a universal within-firm relationship, future work on the M–P relationship should embrace a more contingent, contextually-grounded approach (Wiersema & Bowen, 2011) and focus on explaining how between-firm (contextual) differences influence the effect of multinationality on performance. Empirically, our analysis emphasizes the importance of accounting for the endogeneity of multinationality through a well-validated identification strategy. It also highlights the need for future work to not only model within-firm variance, but also contrast and compare between- versus within-firm effects.

³As defined by Ethiraj, Gambardella, and Helfat (2016, p. 2,191), quasi-replications “assess the generalizability of the results of prior studies to new contexts or the robustness of prior studies to different empirical approaches, methods, measures, and models” and use “equivalent or better quality data than the original study and replicate the methods and variable construction of the original study as closely as possible.” In our work, we use the term replication to be consistent with B&K's terminology.

2 | THE MULTINATIONALITY–PERFORMANCE RELATIONSHIP

Reviews of the M–P relationship literature reveal diverging theoretical postulations and mixed empirical findings (Hennart, 2007; Hitt et al., 2006; Kirca et al., 2011; Verbeke & Forootan, 2012). Table A-1 in Appendix lists the 10 most influential contributions in which the authors have shown the M–P relationship to be positive, U-shaped, inverted U-shaped, and S-shaped. Almost all studies have focused on individual countries—with the United States and Japan as the most popular choices—and used cross-sectional samples of relatively limited sizes. Overall, the results have been far from coherent. Thus, we still do not know whether it pays to be a multinational.

The only work in the list employing panel data is the one by L&B. They postulated and empirically validated an S-shaped relationship when analyzing data from 1,489 Japanese firms. Their S-curve hypothesis is theoretically based on the well-established argument that newly internationalizing firms face liabilities of foreignness and newness when expanding abroad (Barkema, Bell, & Pennings, 1996; Hymer, 1976). Accordingly, L&B identified three distinct phases characterizing the M–P relationship. In Phase 1, firms face negative returns when they start internationalizing given the substantial costs associated with the liabilities of foreignness and newness they face when expanding abroad. Phase 2 is instead characterized by positive returns; as the above-mentioned liabilities are overcome, firms start to enjoy the benefits derived from their increasing exposure to international markets. However, the advantages derived from their international presence increase at a decreasing rate while the coordination costs associated with the increasing multinationality grow at an increasing rate. Therefore, once reached an optimal threshold, firms enter Phase 3 in which returns of multinationality start falling again. B&K replicated L&B's study using data from U.S. firms but failed to replicate their results; the little evidence they obtained in support of an S-shaped relationship in a subsample of manufacturing firms vanished once they accounted for the endogeneity of multinationality.

3 | REPLICATION: DATA AND METHODS

3.1 | Data and sample

To replicate L&B and B&K's works, we obtain data from Bureau van Dijk's Orbis database. Orbis is a unique and increasingly used information provider that covers over 200 million entities (parent firms and subsidiaries) worldwide and is compiled from official country registrars and other country collection agencies. For each available corporate entity, we extract its unique identifier, country, sector (NACE Rev. 2), operating revenue, total assets, debt-to-equity ratio, intangibles, return on assets, and global ultimate owner. The global ultimate owner is a parent firm which owns at least 50% of the company, either directly or indirectly, and is not itself owned by any other firm. We identify our unit of analysis (firms) with global ultimate owners. We collect these data for each year from 2009 to 2016.

After having excluded all firms with missing data and incorporated the necessary lags, our full sample consists of 247,355 firms based in 111 countries and with on average 681,115 subsidiaries each year. This leads to a panel of 889,865 firm-year observations over the entire period. B&K study both private and publicly listed multinationals—that is, “firms with at least some foreign investment” (B&K, p. 2,278). L&B include purely domestic firms as well but restrict their analysis to listed firms only. For our replication, we use our full sample that includes domestic and multinational firms, both

TABLE 1 Measures

No	Variable	Description
	Dependent variable	
1	ROA	Profit(loss) before tax/Total assets
	Independent variables	
2	Internationalization	$Internationalization_i = \frac{1}{2} \left(\frac{NCountries_i}{\max(NCountries)} + \frac{NSubsidiaries_i}{\max(NSubsidiaries)} \right)$ for every firm <i>i</i> in each year. Range is between 0 and 1.
3	Parent size	Log of total turnover
4	Parent debt-to-equity ratio	Parent debt/(Parent total assets—Parent debt)
5	Parent export intensity	Sum of turnover of foreign subsidiaries/Total turnover
6	Parent product diversification	Berry–Herfindal index of product diversification in parent firm operations
7	Exchange rate	Real effective exchange rate index
8	Country	Country of incorporation of the parent firm
9	Industry sector	Main sector of the parent firm
	Instrumental variable	
10	Board internationalization	Ratio of international to total members of the Board of Directors of the parent firm in the corresponding year. International member is an individual that in the same year serves in a Board of Director of at least another firm based in a different country.

private and listed ones. To account for the endogeneity of multinationality, we use a 2SLS model on a subsample of 102,113 firm-year observations from 32,835 multinational firms based in 64 countries.

3.2 | Measures and methods

We develop our variables to match L&B and B&K's measures as closely as possible. In Appendix, we provide a detailed assessment of how we construct each variable and discuss any difference between our measures and the ones used by L&B and B&K. Table 1 describes the measures used in our analysis, while Table 2 provides their summary statistics and correlations.⁴

L&B use random-effects while B&K use fixed-effects panel regression estimations. Both studies base their choice on the Hausman test, in line with standard practice in strategy research (Certo et al., 2017). L&B use a random-effects model since the Hausman test was insignificant in their case. B&K rely on a fixed-effects model based on the significance of the Hausman test they performed. To replicate L&B and B&K's main findings, we use our full sample of 889,865 firm-year observations to run random- and fixed-effects models using the R package *plm* version 1.6–5 (Croissant & Millo, 2008). Based on the statistically significant Hausman test obtained (63.54; *p*-value = 0.00), we focus on fixed-effects models when discussing our results. Building on B&K's contribution, we then use a 2SLS model on a subsample of 102,113 firm-year observations from 32,835 multinational firms for which we control for the endogeneity of multinationality. For the analysis on this subsample, we also rely on fixed-effects models in view of the statistically significant Hausman test obtained (35.70;

⁴We also examined variance inflation factors (VIFs) to exclude any potential issue of multicollinearity. As all VIFs are well below 5.0, with the highest being 1.46, we do not expect issues of multicollinearity to affect our findings.

TABLE 2 Summary statistics and pairwise correlations^a

		Mean	Std. dev.	1	2	3	4	5	6	7
1	ROA	0.05	0.15	1.00						
2	Internationalization	0.02	0.03	0.03	1.00					
3	Parent size	7.50	1.28	0.08	0.50	1.00				
4	Parent debt-to-equity ratio	0.86	1.40	-0.12	0.02	0.00	1.00			
5	Parent export intensity	0.17	0.29	0.00	0.24	0.01	-0.03	1.00		
6	Product diversification	0.15	0.20	0.01	0.25	0.25	-0.04	0.17	1.00	
7	Exchange rate	99.47	7.58	-0.01	-0.01	0.01	0.00	0.02	-0.02	1.00

^aThe statistics and pairwise correlations refer to the subsample of 102,113 firm-year observations used to run our 2SLS fixed-effects model estimations.

p -value = 0.00). As L&B do not show the results of their analysis when accounting for endogeneity and do not discuss the instruments they use for the first stage, we (as B&K) cannot exactly replicate their procedure.

We replicate B&K's 2SLS model estimation using *Board internationalization* as our first instrument. We expect that firms with a higher percentage of board members serving in a board of at least another firm based in a different country—this is generally referred to as a transnational board interlock—are likely to be more international. This is because, drawing upon resource dependence theory (Pfeffer & Salancik, 1978), prior research has shown that the network of board interlocks serves as an important infrastructure for the spread of valuable information and corporate practices (Connelly, Johnson, Tihanyi, & Ellstrand, 2011) and, specifically, for learning about foreign market investment opportunities (Tuschke, Sanders, & Hernandez, 2014). Thus, internationally connected board members represent a valuable source of cross-border human capital for internationalizing firms, as also reaffirmed by recent work pointing to transnational board interlocks as an important marker of the social dimension of firm internationalization (González, 2019). Conversely, we do not expect an effect of these international board ties on firm performance. Theoretically, our expectation is consistent with resource dependence theory suggesting that board interlocks (both national and transnational) provide information that helps firms reducing uncertainty, and thus may only indirectly contribute to firm performance when this uncertainty reduction contributes to enhance firm's ability to predict future events (Podolny, 2001). This view is consistent with much of the existing literature on interlocks (Martin, Gözübüyük, & Becerra, 2015) and also aligned with the notion that while boards' primary tasks are monitor and control (Adams, Hermalin, & Weisbach, 2010; Fama & Jensen, 1983), top management teams' members formulate and implement firm strategy and thus are more likely than boards' directors to have a direct impact on firm performance (Certo, Lester, Dalton, & Dalton, 2006; Nielsen & Nielsen, 2013). Empirically, our expectation is corroborated by Peng's (2004) review of research precisely focused on the relationship between interlocks and firm performance that reveals inconclusive empirical findings, as well as by Martin et al.'s (2015) study in which they find no effect of board interlocks on firm performance for low levels of uncertainty. This is confirmed in our data as the pairwise correlation coefficient between *Board internationalization* and *Internationalization* is 0.104 while the one between *Board internationalization* and *ROA* is -0.007. Thus, our instrument relates to a theoretically sound association while also satisfying the exclusion restriction of a two-stage estimation procedure. As suggested by Wooldridge (2010, ch. 9), we use the squared and cubed terms of *Board internationalization* to generate our second and third instruments to account for the

endogeneity of *Internationalization squared* and *Internationalization cubed*. While B&K's instruments are valid only for the manufacturing sector, our instruments are valid across all firm, industry, and country contexts represented in our empirical setting. This allows us to test the S-curve hypothesis using a 2SLS model on a very large dataset and across a variety of contexts.

We confirm the validity of our instruments empirically as all three instruments significantly predict *Internationalization* in the first stage and the tests performed corroborate that they are both sufficiently strong and exogenous in our setting. To judge instrument strength, we rely on the Montiel Olea-Pflueger test and show that our instruments pass it (effective F -statistic = 184.80). To evaluate their exogeneity, we use the Hansen's J -statistic test and corroborate that our instruments can be considered as exogenous in our setting (for the linear case: Hansen J -statistic = 1.19 with p -value = 0.55). We also perform additional analyses that confirm the validity of our instruments, thus lending further support to our identification strategy (further details are reported in Appendix). We run the Anderson–Rubin test, that is robust to weak identification and obtain that our main findings hold whether or not our instruments are weak. Additionally, we perform a sensitivity analysis and show that, even when relaxing the exclusion restriction concerning our main instrument, our main results do not change. Finally, we run a dynamic panel model using the system GMM estimator and repeat it using different lag structures. The results of these model estimations (reported in Table A-7 in Appendix) show that our main findings are robust to an alternative way of accounting for the endogeneity of multinationality. Thus, the additional analyses performed confirm the validity of our instruments and provide further evidence in support of our main results.⁵

4 | FINDINGS

4.1 | Main results

Table 3 provides a comparison of our empirical setting vis-à-vis the samples used by L&B and B&K on the reported summary statistics. For our analysis, we show the details of our full sample and of our subsample focused on multinational firms. We also include the characteristics of our subsamples focused on Japanese and U.S. multinational firms that we use to replicate L&B and B&K's single-country analyses. Samples' characteristics are comparable across the three studies, except for the fact that firms are, on average, much less international in our full sample compared with firms included in L&B and B&K's samples. This difference is due to two reasons. First, similar to L&B's, our full sample contains not only multinational firms but also purely domestic ones. Conversely, B&K restrict their analysis to multinational firms. Additionally, we also include small and medium-sized firms (SMEs) in our sample, while L&B restrict their focus to listed firms that tend to be larger.⁶

⁵In Appendix, we provide additional information on how we construct *Board Internationalization*, the results of the first stage (Table A-6), as well as further details regarding all the tests and analyses done to ensure the validity of our instruments.

⁶We include SMEs in our sample for two reasons. First, we build on L&B's explicit recommendation of not relying on a restricted (sub)sample created "using largeness or being well-known as criteria," especially because, as they point out, "data on smaller and less-well-known firms are increasingly available" (p. 607). Thus, our work directly responds to their call for greater inclusion of smaller firms in (larger) samples to study the M–P relationship. Second, we note that Lu and Beamish (2001) proposed and found support for a U-curve relationship in the case of SMEs. As highlighted by L&B, their S-curve presents a "reconciliation of prior research" (p. 606) showing a U-curve in the case of smaller newly internationalizing firms (i.e., their earlier work in 2001) and an inverted U-curve in the case of well-internationalized firms (e.g., Hitt, Hoskisson, & Kim, 1997). Accordingly, SMEs' inclusion should contribute to strengthen the significance of both the main and squared terms of *Internationalization* when testing for the cubic relationship. In view of our interest to determine the presence of any (within-firm) relationship between multinationality and performance, SMEs' inclusion therefore allows us to consider an important source of firm-level contextual heterogeneity in our study.

TABLE 3 Sample comparison of means and standard deviations across L&B, B&K, and our study^{a,b,c}

	L&B sample	B&K sample	Our full sample	Our subsample of multinational firms	Our subsample of U.S. multinational firms	Our subsample of Japanese multinational firms
ROA	0.04 (0.05)	0.04 (0.16)	0.06 (0.16)	0.05 (0.15)	0.03 (0.18)	0.05 (0.06)
Internationalization	0.04 (0.07)	0.10 (0.09)	0.003 (0.01)	0.02 (0.03)	0.04 (0.05)	0.03 (0.04)
Parent size	11.06 (1.48)	13.71 (1.83)	6.69 (1.10)	7.50 (1.28)	8.84 (1.02)	8.90 (0.89)
Parent debt-to-equity ratio	3.26 (6.75)	2.17 (2.67)	0.85 (1.51)	0.86 (1.40)	0.95 (1.32)	0.84 (1.18)
Parent export intensity	0.10 (0.15)	0.05 (0.21)	0.04 (0.15)	0.17 (0.29)	0.18 (0.28)	0.11 (0.20)
Product diversification	0.57 (0.18)	0.24 (0.25)	0.13 (0.20)	0.15 (0.20)	0.10 (0.16)	0.17 (0.20)
Exchange rate	120.77 (12.35)	1.00 (0.09)	99.16 (6.25)	99.47 (7.58)	102.02 (6.02)	78.75 (8.94)
Number of countries covered	1 (Japan)	1 (U.S.)	111	64	1 (U.S.)	1 (Japan)
Number of firms	1,489	2,023	247,355	32,835	2,067	1,728
Typology of firms	Multinational and domestic	Multinational	Multinational and domestic	Multinational	Multinational	Multinational
Number of firm-year observations	Not reported	21,297 (9,482 when accounting for endogeneity)	889,865	102,113	9,559	3,814

^aThe exchange rate summary statistics for our full sample is relative to information on 71 countries as the International Monetary Fund does not provide information on real effective exchange rates for more than 71 countries. So, as also discussed in the robustness checks in Appendix, the details regarding the exchange rates correspond to 846,482 firm-year observations.

^bAs shown in Table A-8 in Appendix, when we restrict our focus to Japanese listed multinational firms our working sample corresponds to 3,355 firm-year observations. This implies that the vast majority of firms in our Japanese sample are listed, thus further corroborating the comparability of our sample with the one used by L&B.

^cInternationalization ranges from 0.003 to 0.570 for our subsample of multinational firms, from 0.003 to 0.404 for our subsample focused on the U.S., and from 0.003 to 0.353 for our subsample focused on Japan.

Second, the *Internationalization* index is scaled by the maximum number of countries and subsidiaries in the sample, and one of the firms in our sample operates in 134 countries. The difference in the mean of *Internationalization* is thus reduced once we consider our subsamples of multinational firms. To illustrate, our subsample of Japanese multinational firms has a mean of 0.03; nearly identical to the one in L&B's sample (0.04).

Table 4 shows the results of our replication of L&B and B&K's studies using a fixed-effects model on our full sample of 889,865 firm-year observations. Model 1 presents the results from L&B's study (their model 4, on page 2,005). Model 2 reports B&K's fixed-effects estimation (their

TABLE 4 Results replicating estimated M–P relationship of L&B and B&K using our full sample^{a,b}

Model	1 (L&B, their model 4, RE)	2 (B&K, their model 4, FE)	3 (B&K, their model 16, FE)	4 (FE)	5 (FE)	6 (FE)
Relationship tested	Cubic	Cubic	Quadratic	Linear	Quadratic	Cubic
Dependent variable	ROA	ROA	ROA	ROA	ROA	ROA
Internationalization	−0.38 (−10.95)	−0.42 (0.29) [0.16]	−0.08 (0.04) [0.06]	−0.09 (0.03) [0.00]	−0.19 (0.05) [0.00]	−0.32 (0.08) [0.00]
Internationalization squared	0.75 (5.30)	0.85 (0.85) [0.32]	0.12 (0.05) [0.02]		0.50 (0.15) [0.00]	1.90 (0.53) [0.00]
Internationalization cubed	−0.50 (−3.61)	−0.44 (0.62) [0.47]				−2.84 (0.90) [0.00]
Parent size	0.01 (17.53)	0.01 (0.00) [0.01]	0.01 (0.00) [0.00]	0.01 (0.00) [0.00]	0.01 (0.00) [0.00]	0.01 (0.00) [0.00]
Parent debt-to-equity ratio	−0.00 (−9.54)	−0.01 (0.03) [0.72]	0.01 (0.20) [0.96]	−0.01 (0.00) [0.00]	−0.01 (0.00) [0.00]	−0.01 (0.00) [0.00]
Parent export intensity	−0.02 (−3.18)	0.01 (0.01) [0.33]	0.03 (0.01) [0.05]	−0.00 (0.00) [0.19]	−0.00 (0.00) [0.25]	−0.00 (0.00) [0.29]
Parent product diversification	−0.02 (−3.98)	−0.01 (0.02) [0.65]	−0.01 (0.04) [0.82]	−0.01 (0.00) [0.00]	−0.01 (0.00) [0.00]	−0.01 (0.00) [0.00]
Number of observations	(Not reported)	21,297	9,482	195,205	195,205	195,205
Wald Chi square/ <i>F</i> statistic	1,124.50	8.39	12.17	459.24	383.35	329.11
<i>R</i> square	0.10	0.10	0.11	0.01	0.01	0.01
Fixed or random effects	Random	Fixed	Fixed	Fixed	Fixed	Fixed

^aAll independent variables are lagged by one period. As B&K did, L&B's results reported in Model 1 have (*t*-stats in parentheses) as reported in the original L&B's article. All other models report (robust standard errors in parentheses) and [*p*-values in brackets].

^bThe corresponding random-effects models testing for the linear, quadratic, and cubic relationships are reported in Appendix in Table A-4 as Models 1, 2, and 3, respectively.

TABLE 5 Results replicating estimated M–P relationship of L&B and B&K using different subsamples and accounting for endogeneity^{a,b,c}

Model	1 (L&B, their model 4)		2 (B&K, their model 23)		3 (Japanese multinational firms)		4 (U.S. multinational firms)		5 (Multinational firms)		6 (Multinational firms)		7 (Multinational firms)		8 (Multinational firms)	
	Cubic	ROA	Quadratic	ROA	Cubic	ROA	Quadratic	ROA	Linear	ROA	Quadratic	ROA	Cubic	ROA	Cubic	ROA
Relationship tested																
Dependent variable																
Internationalization	-0.38 (-10.95)		0.09 (0.43)		-8.38 (24.86)		2.11 (2.34)		-0.22 (0.51)		0.53 (1.73)		7.03 (7.55)		4.60 (10.29)	
			[0.83]		[0.74]		[0.37]		[0.67]		[0.76]		[0.35]		[0.66]	
Internationalization squared	0.75		-0.27		0.82		-0.10				-0.05		-0.94		-0.47	
	(5.30)		(0.69)		(2.81)		(0.21)				(0.12)		(1.00)		(1.28)	
			[0.70]		[0.77]		[0.63]				[0.65]		[0.35]		[0.71]	
Internationalization cubed	-0.50				-0.02								0.02		0.01	
	(-3.61)				(0.08)								(0.02)		(0.03)	
					[0.79]								[0.38]		[0.85]	
Parent size	0.01 (17.53)		0.04 (0.01)		1.16 (2.75)		5.52 (3.08)		1.54 (0.30)		1.53 (0.30)		1.41 (0.37)		5.45 (1.59)	
			[0.00]		[0.68]		[0.07]		[0.00]		[0.00]		[0.00]		[0.00]	
Parent debt-to-equity ratio	-0.00		-0.01		-1.28		-1.25		-1.08		-1.07		-1.12		-0.88	
	(-9.54)		(0.05)		(0.49)		(0.33)		(0.08)		(0.09)		(0.12)		(0.43)	
			[0.86]		[0.01]		[0.00]		[0.00]		[0.00]		[0.00]		[0.04]	
Parent export intensity	-0.02		-0.02		-1.74		-1.43		-0.54		-0.65		-0.47		0.21	
	(-3.18)		(0.03)		(2.81)		(3.70)		(0.52)		(0.58)		(0.69)		(2.38)	
			[0.54]		[0.54]		[0.70]		[0.29]		[0.26]		[0.50]		[0.93]	

TABLE 5 (Continued)

Model	1 (L&B, their model 4)	2 (B&K, their model 23)	3 (Japanese multinational firms)	4 (U.S. multinational firms)	5 (Multinational firms)	6 (Multinational firms)	7 (Multinational firms)	8 (Multinational firms)
Parent product diversification	-0.02 (-3.98)	-0.01 (0.03) [0.72]	3.59 (14.19) [0.80]	-2.16 (3.18) [0.50]	-0.85 (0.58) [0.15]	-0.82 (0.60) [0.17]	-1.61 (1.16) [0.16]	-1.06 (1.35) [0.43]
Exchange rate	0.00 (20.99)	-0.18 (0.04) [0.01]	-0.11 (0.27) [0.67]	-0.05 (0.10) [0.60]	-0.01 (0.01) [0.24]	-0.01 (0.01) [0.41]	-0.01 (0.01) [0.64]	-0.03 (0.06) [0.60]
Intangibles	-0.19 (-3.86)	0.02 (0.01) [0.13]						-0.03 (0.04) [0.50]
Intercept	-0.16 (-8.22)		17.01 (39.30) [0.67]	-43.25 (32.96) [0.19]	-4.30 (2.11) [0.04]	-4.90 (2.52) [0.05]	-7.62 (4.21) [0.07]	-42.88 (15.00) [0.00]
Number of observations	(Not reported)	9,482	3,814	9,559	102,113	102,113	102,113	13,597
Wald Chi square	1,124.50	13.97	127.43	53.31	290.11	266.56	496.04	84.97
Fixed or random effects	Random	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Two-stage Least Squares (2SLS)	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

^aAll independent variables are lagged by one period. As B&K did, L&B's results reported in Model 1 have (*t*-stats in parentheses) as reported in the original L&B's article. All other models report (robust standard errors in parentheses) and (*p*-values in brackets).

^b2SLS fixed-effects model estimation is used for all Models 3–8.

^cGiven the different mean levels of *Internationalization* across the (sub)samples, to increase the comparability of the coefficient estimates for the quadratic and cubed terms we use both *Internationalization* and *ROA* in percentage points (thus, e.g., *Internationalization* varies from 0 to 100) for our 2SLS model estimations in Models 3–8.

TABLE 6 Additional analyses focusing on firms' listing, size, and industry grouping^{a,b,c}

Model	1 (Listed multinational firms)		2 (Nonlisted multinational firms)		3 (Large multinational firms)		4 (Multinational SMEs)		5 (Listed and large multinational firms)		6 (Manufacturing multinational firms)		7 (Service multinational firms)	
	Cubic	ROA	Cubic	ROA	Cubic	ROA	Cubic	ROA	Cubic	ROA	Cubic	ROA	Cubic	ROA
Relationship tested														
Dependent variable														
Internationalization	2.71 (6.56) [0.68]		0.32 (9.45) [0.97]		7.78 (5.55) [0.16]		15.79 (55.16) [0.78]		3.20 (4.29) [0.46]		-7.96 (24.13) [0.74]		11.47 (10.48) [0.27]	
Internationalization squared	-0.14 (0.78) [0.86]		-0.72 (1.45) [0.62]		-0.93 (0.66) [0.16]		-7.08 (30.35) [0.82]		-0.34 (0.48) [0.48]		1.69 (3.86) [0.66]		-1.78 (1.47) [0.23]	
Internationalization cubed	-0.00 (0.02) [0.95]		0.01 (0.05) [0.91]		0.02 (0.01) [0.16]		0.24 (3.45) [0.94]		0.01 (0.01) [0.53]		-0.05 (0.12) [0.64]		0.04 (0.03) [0.25]	
Parent size	2.13 (0.91) [0.02]		3.41 (3.61) [0.34]		4.42 (1.95) [0.02]		1.55 (0.42) [0.00]		4.85 (1.50) [0.00]		0.67 (3.22) [0.84]		1.40 (0.80) [0.08]	
Parent debt-to-equity ratio	-1.07 (0.38) [0.00]		-1.14 (0.21) [0.00]		-1.39 (0.26) [0.00]		-0.98 (0.11) [0.00]		-1.27 (0.26) [0.00]		-1.47 (0.42) [0.00]		-1.24 (0.33) [0.00]	
Parent export intensity	-1.73 (1.28) [0.18]		-0.67 (2.02) [0.74]		-0.20 (1.28) [0.88]		-1.06 (1.40) [0.45]		-0.33 (1.12) [0.77]		-2.01 (1.62) [0.22]		0.90 (1.30) [0.49]	
Parent product diversification	-0.65 (1.41) [0.65]		1.97 (5.77) [0.73]		-3.00 (1.57) [0.06]		-0.79 (1.54) [0.61]		-2.86 (1.42) [0.05]		-1.59 (3.43) [0.64]		-0.63 (1.97) [0.75]	

TABLE 6 (Continued)

Model	1 (Listed multinational firms)	2 (Nonlisted multinational firms)	3 (Large multinational firms)	4 (Multinational SMEs)	5 (Listed and large multinational firms)	6 (Manufacturing multinational firms)	7 (Service multinational firms)
Exchange rate	-0.01 (0.01) [0.37]	-0.01 (0.03) [0.86]	-0.04 (0.01) [0.02]	0.01 (0.03) [0.84]	-0.03 (0.01) [0.01]	0.00 (0.07) [0.99]	-0.01 (0.04) [0.78]
Intercept	-16.42 (8.94) [0.07]	-15.67 (24.48) [0.52]	-33.41 (18.85) [0.08]	-10.99 (18.66) [0.56]	-36.31 (13.88) [0.01]	2.38 (31.46) [0.94]	-7.82 (7.93) [0.32]
Number of observations	27,465	74,648	42,909	59,204	21,724	29,173	64,662
Wald Chi square	64.27	147.47	308.44	114.63	293.24	52.89	471.04
Fixed or random effects	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Two-stage Least Squares (2SLS)	Yes	Yes	Yes	Yes	Yes	Yes	Yes

^aAll independent variables are lagged by one period. All models report (robust standard errors in parentheses) and [*p*-values in brackets]. 2SLS fixed-effects model estimation is used for all models. Both *Internationalization* and *ROA* are in percentage points.

^bIn Model 6 in Table A-8 in Appendix, we provide the results obtained when restricting our focus to firms excluded from both manufacturing and service industry groups.

^cTo distinguish between large firms and SMEs we follow the OECD definition (see the link: <https://stats.oecd.org/glossary/detail.asp?ID=3123>) and, as we do not have data on the number of employees for most firms, rely on information on the turnover.

model 4, on page 2,282), while Model 3 their fixed-effects estimation testing for a quadratic relationship on a subsample of manufacturing firms (their model 16 on page 2,285). In Model 4, we see evidence in support of a significant linear association; Model 5 shows that, when testing for the quadratic relationship, we find evidence of a significant effect of both the main and squared terms of *Internationalization* that is consistent with a U-shaped association (also found by B&K as shown in Model 3). Model 6 shows the results of our replication testing the S-curve hypothesis. In Model 6, we find evidence of a significant effect of the main, squared, and cubed terms of *Internationalization* that is consistent with an S-curve. This evidence is further confirmed by the additional robustness checks we performed (provided in Appendix). Thus, using a fixed-effects model without accounting for endogeneity, we replicate the M–P relationship found by L&B as we find support for an S-shaped relationship between multinationality and performance.

However, the S-shaped relationship vanishes once we account for the endogeneity of multinationality. Table 5 shows the results of our replication using a 2SLS fixed-effects model on our subsample of multinational firms and compares them with the findings obtained by L&B in their main random-effects model estimation (Model 1, equivalent to Model 1 in Table 4) and B&K when using their subsample of manufacturing firms and accounting for endogeneity (Model 2, corresponding to their Model 23 on page 2,287). Models 3 and 4 show the results obtained using a 2SLS fixed-effects model when restricting our focus to Japanese and U.S. multinational firms to reproduce the same single-country contexts used by L&B and B&K. For the United States, we test for a quadratic relationship to replicate the model specification used by B&K. Models 5–7 test for the existence of a within-firm linear, quadratic, or cubed relationship on our subsample of multinational firms. Thus, Model 7 tests the S-curve hypothesis (Table A-6 in Appendix provides the first-stage estimation results). In Model 8, we repeat the same specification used for Model 7 focusing on the much smaller subsample for which we are able to include information on firms' intangible assets (thus including *Intangibles* as control variable). This is to more closely replicate L&B and B&K's model estimations (further details regarding the inclusion of this control variable are provided in Appendix). The results obtained do not show any significant difference vis-à-vis the ones shown in Model 7, thus corroborating that the exclusion of this control variable does not raise concerns for the purpose of our study.

Our results show no evidence of an S-shaped relationship in any of our models. In relation to our single-country analyses, we fail to replicate L&B's findings for Japan; for the U.S. context, we corroborate B&K's results as we also find no evidence of an S-curve in our sample of U.S. firms. To replicate as closely as possible L&B and B&K's empirical settings we also repeat the estimations in Models 3 and 4 restricting our focus to Japanese listed firms and U.S. manufacturing large firms. The results of these additional analyses (provided in Table A-8 in Appendix) corroborate the ones shown in Table 5. Thus, our findings using a large-sample cross-national panel show no support for the S-curve hypothesis. We also find no evidence for a significant effect of either the main, squared, or cubed term of multinationality in any of our specifications. Additionally, the Wald test on the significance of inclusion of each additional explanatory variable shows no significant improvement in the model fit when adding the squared term (Wald Chi-square[1] = 0.20; p -value = 0.65) as well as the cubed one (Wald Chi-square[1] = 0.77; p -value = 0.38). This further confirms that our results show no evidence of any within-firm relationship between multinationality and performance.

4.2 | Additional analyses

Leveraging the size and characteristics of our empirical setting, we undertake additional analyses to test whether the within-firm effect of multinationality varies when taking into account important

TABLE 7 (Continued)

Relationship tested Coefficient/ Wald Chi square	Cubic			Quadratic			Linear			
	Main term	Squared term	Cubed term	Wald Chi square	Main term	Squared term	Wald Chi square	Main term	Wald Chi square	
Belgium	8.38 (11.68) [0.47]	-0.94 (1.43) [0.51]	0.04 (0.06) [0.50]	24.62	(9.79) [0.79]	(0.78) [0.74]	30.96	2.07 (3.12) [0.51]	(9.30) [0.85]	31.18
					1.93 (6.45) [0.77]	0.01 (0.47) [0.98]				
Singapore								-0.41 (4.60) [0.93]		11.29
Malaysia								-1.95 (1.64) [0.23]		11.55

^aAll independent variables are lagged by one period. All models report (robust standard errors in parentheses) and [*p*-values in brackets]. 2SLS fixed-effects model estimation is used for all models. Both *Internationalization* and *ROA* are in percentage points.

^bCountries are sorted according to their GDP. For each country reported, we have at least 500 firm-year observations in our subsample of multinational firms.

^cOnly models for which both the Wald Chi square test rejects the null hypothesis according to which all coefficients are equal to zero and the *F* test for firm fixed-effects rejects the null hypothesis according to which fixed-effects are not different from zero are shown.

contextual contingencies that are automatically discarded when using fixed-effects models. While B&K's test for an S-shape accounting for endogeneity on a subsample of U.S. manufacturing firms, our large-sample, cross-national replication allows for a considerably more extensive empirical assessment of the validity of the S-curve hypothesis. In Table 6, we compare results obtained when running Model 7 of Table 5 and restricting the analysis to firms of different types, sizes, and industry groups. Specifically, in Models 1 and 2, we compare listed versus nonlisted firms; in Models 3 and 4, we compare large firms versus SMEs; in Model 5, we restrict our model estimation to listed and large multinational firms; in Models 6 and 7, we distinguish between manufacturing versus service firms.⁷ The results obtained consistently show no evidence of an S-shaped relationship in any of the contexts considered.

Then, we focus on single-country contexts. In Table 7, we report the coefficient estimates when using our 2SLS fixed-effects model for 12 individual country settings and testing for the linear, quadratic, and cubic relationships. Table 7 shows that we find no evidence in support of the S-curve hypothesis in any of the single-country contexts considered. We also find no support for any within-firm relationship between multinationality and performance in any country, including Japan (the country setting for L&B) and the United States (the country setting for B&K). Thus, the additional analyses performed here provide a very consistent set of findings that not only fail to replicate the S-shaped relationship found by L&B but also show the absence of any within-firm relationship between multinationality and performance once we account for endogeneity.

5 | CONCLUSION AND DISCUSSION

Does it pay to be a multinational? Despite considerable scholarly efforts, the literature has failed to provide a consistent answer. In this study, we undertook a large-sample, cross-national replication of L&B and B&K's works and investigated whether the M–P relationship is S-shaped. To do so, we used a longitudinal dataset of 889,865 firm-year observations from almost 250,000 firms over a 7-year period (2009–2016). Leveraging the size and characteristics of our sample, we were also able to perform additional analyses to test for the presence of any significant difference in the within-firm effect of multinationality. We did so taking into account important contextual contingencies at the firm, industry, and country level that are automatically discarded when using fixed-effects models. Our findings showed no evidence of a within-firm effect of multinationality on performance. Although we found support for an S-shaped relationship in our full sample, this entirely vanished across all firm, industry, and country contexts represented in our empirical setting once we accounted for the endogeneity of multinationality. We also saw no evidence for a significant effect of either the main, squared, or cubed term of multinationality in any of our models. Overall, our results showed no support for any within-firm relationship between multinationality and performance.

Our work contributes to the fields of strategic management and international business in two ways. First, by relying on a large-sample cross-national panel, we add considerable evidence to the

⁷We focus on listed versus nonlisted firms following L&B's earlier focus on listed firms and given that previous research has shown that the access to financial markets can facilitate the acquisition of resources necessary to internationalize (e.g., Filatotchev & Piesse, 2009); on large firms versus SMEs as already discussed in footnote n. 6; on manufacturing versus service firms following B&K's earlier focus on manufacturing firms and building on Wiersema and Bowen's (2011) suggestion to focus on industry differences given the substantial variation in geographic expansion of firms' value chains across industries; and on single-country contexts following both Bowen (2007) and B&K's explicit recommendation to expand the country coverage. Doing so allows us to directly respond to Bowen's (2007, p. 126) call for more research "to examine for heterogeneity in the M-P relationship at three levels: the firm, the industry, and the country."

one shown by B&K, given that we also did not find any support for the S-curve hypothesis once we accounted for endogeneity. As B&K noted, their failure to replicate the results obtained by L&B using a Japanese sample may be due to the fact that their empirical analysis is limited to a single country (the United States), and thus only indicate that the S-curve hypothesis does not apply to that specific country. Hence, they emphasized that “only additional replications in other country contexts can tell us how truly generalizable the S-curve hypothesis is (or is not)” (p. 2,289). The replication undertaken here precisely responded to their call. Our large-sample, cross-national replication allowed us to test the S-curve hypothesis not only in Japan and the United States but also in several other country contexts. Thus, our findings showing no support for any within-firm relationship between multinationality and performance in any of our models provide a considerably more extensive empirical support than the preliminary one offered by B&K to the body of work challenging not only the generalizability of the S-curve hypothesis, but also the very existence of a causal effect of multinationality on performance (Hennart, 2011; Shaver, 1998; Verbeke & Forootan, 2012).

Second, our work highlights the need to more carefully consider the fundamental difference between within- and between-firm effects in the context of the M–P relationship. As recently suggested by Certo et al. (2017), in strategy research many between-firm relationships differ in magnitude and/or direction from their within-firm counterparts as they refer to two different sources of heterogeneity. It is, therefore, key to appropriately distinguish between them, both theoretically and empirically. To date, the standard practice in strategy research has been to rely on the result of the Hausman test. In our analysis, we followed this approach—as both L&B and B&K did—and focused on fixed-effects model since the Hausman test was significant in our case. Following the more careful consideration of the difference between within- and between-firm variance advocated by Certo et al. (2017), our findings have important theoretical and empirical implications for research on the M–P relationship.

Theoretically, our results showing no evidence of any within-firm relationship between multinationality and performance in any of our models suggest that, rather than continuing to look for a universal within-firm M–P relationship, future work should embrace a more contingent and contextually-grounded approach (Wiersema & Bowen, 2011). Although L&B emphasized the specific (single-country) contexts and boundary conditions of their research in their discussion section, the S-curve hypothesis has come to be widely accepted in the literature and assumed to apply to other very different (country) contexts that are unlikely to present the peculiarities of the original context in which it was empirically validated. Our results suggest that rather than focusing on how the within-firm effect of multinationality on performance varies based on the firm's own journey of internationalization, scholars should adopt a more contextually-grounded approach (Wiersema & Bowen, 2011). To do so, they should precisely focus on the between-firm differences that are automatically discarded when using fixed-effects models as these may be a more relevant source of heterogeneity in the M–P relationship, theorizing how such (contextual) differences influence the effect of multinationality on performance. This implies that future work on the M–P relationship should develop hypotheses that clearly articulate whether the constructs of interest involve within- and/or between-firm relationships and carefully define the contextual contingencies associated with between-firm variability.

Empirically, our analysis emphasizes the importance of accounting for the endogeneity of multinationality through a well-validated identification strategy. In our study, we relied on a set of instruments validated empirically through a comprehensive set of tests and additional analyses as pointed out in the methods section and, more extensively, in Appendix. Our results corroborate that accounting for the endogeneity of multinationality through a well-validated identification strategy is indeed key to advance the empirical understanding of the M–P relationship. Our analysis also

highlights the need for future work to not only model within-firm variance, but also compare and contrast the potentially different within- and between-firm effects when studying the M–P relationship. Thus, future research should match the needed theorizing on between-firm (contextual) differences influencing the M–P relationship discussed previously with empirical analyses that allow for an accurate testing of the hypotheses formulated while also accounting for the endogeneity of multinationality.

This study also has limitations. Being a replication, we tried to replicate the methods and measures used by both L&B and B&K as closely as possible. Relatedly, we used their exact same operationalization of multinationality. However, as also noted by Wiersema and Bowen (2011), the validity of the various measures used to date in the literature (including the one adopted here) should be carefully assessed. Future studies could use different measures of a firm's internationalization in the context of larger datasets to provide an in-depth comparison.⁸ Still related to the measurements used, the recent work by Bowen and Sleuwaegen (2017) points to product diversification as also endogenous in the M–P relationship. Although we do not address this issue here in view of our efforts to closely replicate L&B and B&K's works, future studies could further investigate this empirical issue. Lastly, despite using a large-sample cross-national panel, our empirical test remains limited to the specificities of the time period and set of (country) contexts included in the analysis.

To conclude, our replication of L&B and B&K's studies contributes to an extensive body of empirical research on the M–P relationship. Our findings are interesting because they raise important questions and point to fruitful avenues for future work, highlighting the need for more contextually-grounded research focused on rigorously theorizing and testing the influence of between-firm variance in the relationship between multinationality and performance.

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⁸For instance, future studies could also focus on integrating additional information relative to the subsidiaries into the *Internationalization* measurement to more closely reflect the presence of a firm in a given country.

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