

ONLINE APPENDIX

For:

Third-country MNEs, trade wars, and competitive opportunities: A real-options perspective

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Parallel-trends assumption

As noted in the main manuscript, it is important to establish that the treatment and control groups are characterized by similar pre-shock trends – i.e., the parallel-trends assumption – to undertake valid DiD analysis. The parallel-trends assumption ensures that post-intervention differences across the treatment and control groups can be attributed to the intervention rather than pre-existing group differences. We accordingly follow common practices – descriptive-statistics comparisons, data visualization, and diagnostic testing – to validate the parallel-trends assumption in our empirical context.

First, Table A1 reports descriptive statistics (i.e., means and standard deviations) in the pre-event period for the dependent variables of interest (i.e., Subsidiary-Employees, Subsidiary-Assets, and Subsidiary-Revenues) for the treatment and control groups in our sample of third-country MNE subsidiaries. Due to our employing both the standard and triple DiD procedures, Table A1 identifies the seven treatment groups employed across the different estimations: the primary-treatment group consisting of outsider-MNE subsidiaries operating in the 74 industries characterized by tariff escalation, as well as what are essentially the six sub-treatment groups consisting of outsider-MNE subsidiaries with high-multinationality (but also low-multinationality), with a local partner (but also sans-local-partner), and with a bilateral agreement (but also sans-bilateral-agreement) characteristics. Most importantly, these descriptive statistics reveal no substantial differences between the treatment and control groups in the period prior to the trade war; accordingly, the descriptives indicate the comparable baseline conditions necessary for conducting valid DiD analysis.

Second, we visually assessed the pre-event trends for the three dependent constructs across the primary treatment and control groups via diagnostic plotting. To do so, Figure A1 presents multiple

diagnostic plots that allow visualization: where the top, middle, and lower levels respectively present two diagnostic plots related to subsidiary-employees, subsidiary-assets, and subsidiary-revenues. For each level, the plot on the left side illustrates the raw trend over time in the observed means for the primary-treatment and control groups. Further, the plot on the right side illustrates the predicted values over time from an augmented DiD model that incorporates interactions between treatment and time to allow comparing cross-group trends. A visualization of these plots reveals that the treatment and control groups exhibit parallel trends for subsidiary employees, assets, and revenues in the pre-event period, thereby satisfying the parallel-trends assumption and validating DiD analysis. As an aside, the treatment group also exhibits higher levels of subsidiary employees, assets and revenues when compared with the control group in the years following 2018—a stylized reality that conforms to our theoretical priors regarding the trade war’s impact.

Third, we follow Boehme et al. (2022) by conducting formal statistical testing that employs STATA’s ‘estat ptrends’ command to evaluate whether the pre-event trends for subsidiary employees, assets and revenues differed across the treatment and control groups. This testing consistently fails to reject the null hypothesis that the treatment and control groups are characterized by parallel pre-event time trends. In line with the recommendations of Callaway and Sant’Anna (2021), we also estimated year-specific treatment effects for the pre-event period (2015-2017). These estimates indicate that the treatment effects for each year prior to the trade war were statistically indistinguishable from zero thereby providing further support for the parallel-trends assumption. Figure A2 consolidates these findings by illustrating the year-specific coefficients and the consistency of these coefficients across the pre-intervention period.

The descriptive statistics, data visualization, and diagnostic testing all accordingly confirm the presence of parallel trends for the respective treatment and control groups of third-country MNE subsidiaries in the period prior to the trade war. Moreover, this co-movement across the treatment and control groups in the measures of subsidiary employees, assets and revenues supports the validity of the

DiD methodological approach. The parallel-trends assumption, which is essential for conducting differences-in-differences analysis, does then appear to be sustained in our empirical context.

Hypothesized mechanisms

We also engaged in empirical testing to support the presence of the hypothesized mechanisms. Where those two mechanisms residing behind our primary theoretical contention were as follows: (1) the trade war brought about improved factor-market conditions for outsider MNEs; and (2) the trade war brought about improved strategic-competition conditions for outsider MNEs.

First, we engaged in tests to support the factor-market mechanism; in particular, please see the first three DiD estimations (1-3) in Table A-2. There we engaged in equivalent tests to those reported in the manuscript (i.e., we take advantage of the fact that there were sectors both subject and not subject to US-China tariff escalation), but we ran DiD analysis on Chinese domestic firms: where we gathered this information on Chinese firms from Orbis. And again, we ran these DiD estimations for the three dependent constructs capturing operational scale: now Firm-Employees, Firm-Assets, and Firm-Revenues. The key DiD construct is the “Trade-War * Treatment” variable; and as can be seen in those results, they indicate that Chinese firms active in tariff-conflict sectors experienced a disproportionate downscaling in their employees, assets, and revenues. Such a decrease in the factors of production (employees and assets) and the sales by firms (revenues) is in line with corresponding decreases in the demand and prices for the relevant factors of production. This provides some additional empirical support for our hypothesized factor-market mechanism.

Second, we engaged in tests to support the strategic-competition mechanism by creating a market-share measure; in particular, please see the second three DiD estimations (4-6) in Table A-2. There, we report estimations for the employees, assets and revenues of the focal third-country MNE subsidiary with respect to all the firms (Chinese domestic firms, US-MNE subsidiaries, third-country MNE subsidiaries) in China operating in the same 4-digit NAICS industry. For instance, the dependent

variable in estimation 4 involves the focal third-country-MNE subsidiary's number of employees in the numerator and the total number of industry employees (so the employees of all Chinese firms, third-country-MNE subsidiaries, and US-MNE subsidiaries operating in the same 4-digit industry) in the denominator. This construct represents a market-share measure: i.e., the third-country-MNE subsidiary's respective share of the employees, assets, and revenues in the relevant 4-digit sector in China. Moreover, it appears from these three estimations that the third-country MNEs in the sectors experiencing US-China tariff escalation experienced a disproportionate increase in their share of sectoral employees, assets, and revenues. This improved market-share result is in line with the presence of improved strategic-competition conditions for third-country MNE subsidiaries operating in China in tariff-conflict industries. This provides some additional empirical support for our hypothesized strategic-competition mechanism.

References

- Boehme, H. M., Kaminski, R. J., & Leasure, P. (2022). A comparative interrupted time-series assessing the impact of the Armstrong decision on officer-involved shootings. *Police Practice and Research*, 23(5), 614-622.
- Callaway, B., & Sant'Anna, P. H. (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics*, 225(2), 200-230.

Table A1 Descriptive statistics for the control and treatment groups in the pre-event period

	Obs.	Subsidiary-Employees		Subsidiary-Assets		Subsidiary-Revenues	
		Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Control-Group	5,162	6.12	1.37	11.50	1.43	11.56	1.46
Treatment	2,040	5.06	1.69	11.77	2.10	12.16	1.95
High-Multinationality * Treatment	1,183	5.24	1.54	12.15	1.89	12.60	1.77
Low-Multinationality * Treatment	857	4.81	1.85	11.25	2.25	11.56	2.02
Local-Partner * Treatment	1,684	5.08	1.68	11.82	2.09	12.21	1.96
Sans-Local-Partner * Treatment	356	4.96	1.73	11.52	2.12	11.94	1.86
Bilateral-Agreement * Treatment	540	5.14	1.86	11.72	2.32	12.08	2.00
Sans-Bilateral-Agreement * Treatment	1,500	5.03	1.63	11.79	2.01	12.19	1.92

Table A2 Difference-in-differences estimations for mechanisms

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Chinese Domestic Firms	Chinese Domestic Firms	Chinese Domestic Firms	Third-Country MNE Subsidiaries	Third-Country MNE Subsidiaries	Third-Country MNE Subsidiaries
	Firm Employees	Firm Assets	Firm Revenues	Market Share Employee	Market Share Assets	Market Share Revenues
Constant	4.768 (0.000) [0.00221]	8.827 (0.000) [0.00135]	8.827 (0.000) [0.00135]	0.00603 (0.000) [0.000173]	0.000925 (0.000) [0.000133]	0.000950 (0.000) [0.000134]
Trade-War	0.0374 (0.000) [0.00541]	0.261 (0.000) [0.00366]	0.261 (0.000) [0.00366]	0.000727 (0.027) [0.000327]	0.000517 (0.038) [0.000249]	0.000507 (0.024) [0.000225]
Trade-War * Treatment	-0.0186 (0.010) [0.00720]	-0.0152 (0.004) [0.00527]	-0.0152 (0.004) [0.00527]	0.0262 (0.000) [0.000812]	0.0825 (0.000) [0.00113]	0.107 (0.000) [0.00113]
Observations	90,912	222,686	222,686	14,404	14,404	14,404
R-squared	0.001	0.068	0.068	0.280	0.819	0.892
Number of Firms/Subsidiaries	29,153	96,194	96,194	3,601	3,601	3,601

Note: The p-values – based on robust SEs clustered at the firm level – are reported in parentheses, and the standard errors are reported in brackets. Furthermore, estimations (1-3) involve firm-based and year-based fixed effects, while estimations (4-6) involve subsidiary-based, parent-country-based, and year-based fixed effects. Columns (1) to (3) present a Difference-in-Differences (DiD) analysis using Chinese domestic firms. Columns (4) to (6) report DiD estimates based on third-country MNE subsidiaries. The dependent variables in Columns (4) to (6) are measured as the ratio of the focal subsidiary's employees, assets, or revenues to the total employees, assets, or revenues of all firms in China operating in the same four-digit NAICS industry.

Figure A1 Graphical diagnostics for parallel trends

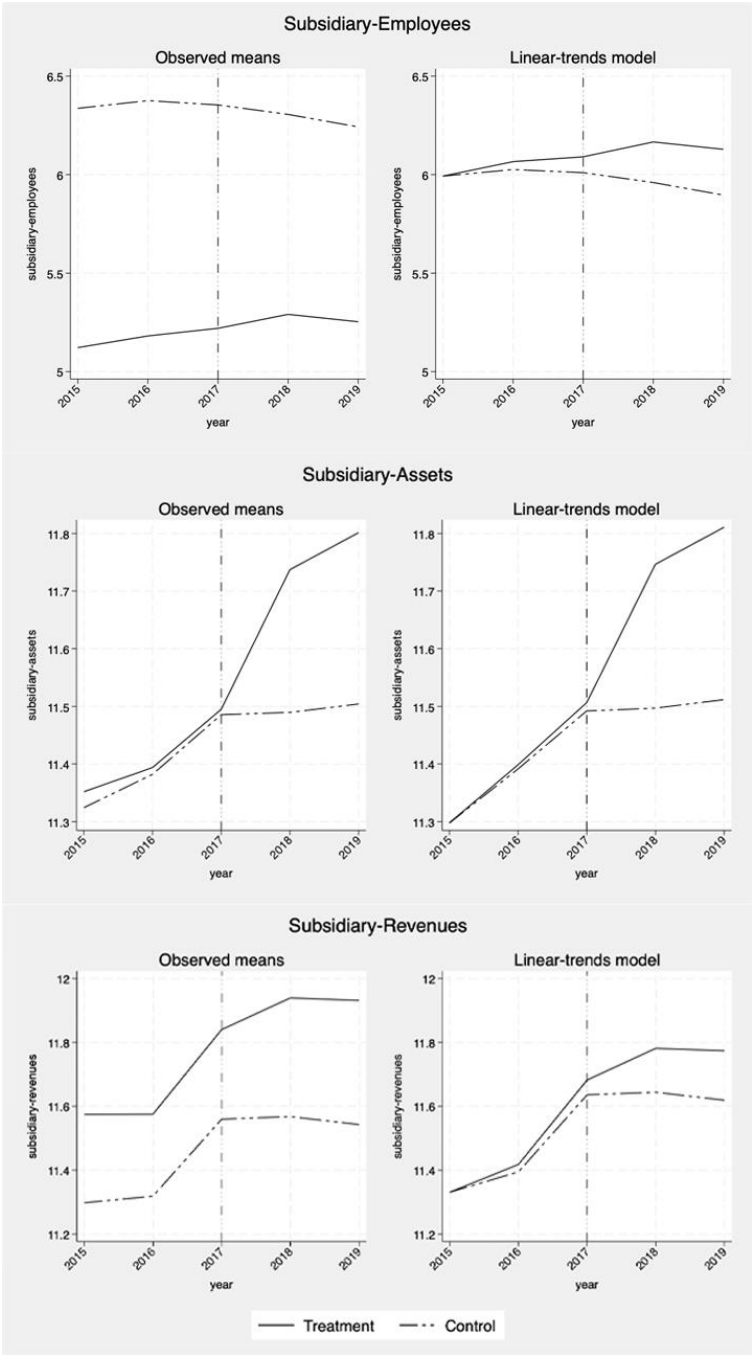


Figure A2 Event study plots for year-specific treatment effects

