Trade Wars and Solar Flares: The Unintended Consequences of Ray-dical Protectionist Policies

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Abstract

The recent shift in the global economy from openness to trade protectionism challenges international business (IB) practice and theory. We develop a framework in which multinational enterprises face institutional changes even under the World Trade Organization-ruled regime and complement it with a resource-based view of IB. We use this framework to analyze unintended consequences on multinational enterprises' strategies regarding their scope and structure. Our empirical strategy examines the AD-CVDs implemented by the US on the import of solar panels from China in 2012. Using the Dunn and Bradstreet database of corporate conglomerates and a difference-in-differences design, we document how Chinese MNEs were affected by this shock. Our findings show that targeted MNEs experience a reduction in their returns and an increase in their leverage ratio the year the policy is implemented. They respond by increasing the geographical dispersion of their foreign subsidiaries and restructuring their domestic units. These results show that Chinese conglomerates impacted by US protectionism develop strategic responses that avoid undermining their financial performance and preeminence in the international market.

Keywords: Trade Policy, Anti-Dumping, Firm Strategies, Multinational Enterprises, Solar Panels, United States, China.

1   Introduction

The recent shift in the global economy from openness to trade protectionism challenges international business practice and theory (Luo (2023)). This paradigm change raises questions about the potential impacts on multinational enterprises facing uncertainties in their global operations (Luo and Van Assche (2023), Petricevic and Teece (2019)). Specifically, the strategies they develop and how they affect the organization's structure (Witt (2019)).

Institutional changes impact many aspects of MNEs' activities (Meyer et al. (2023)). Trade policy, in particular, can have unintended consequences that amplify uncertainty in the global economy (Gereffi et al. (2021)). Thus, a comprehensive study of MNEs must include a framework that highlights the importance of unfolding capabilities in a changing environment (Petricevic and Teece (2019)). Especially in key industries, given the increased prevalence of industrial policy in strategic sectors (Luo (2023)).

We develop a framework for studying the unintended consequences of protectionist policies on multinational enterprises. Our focus is on anti-dumping and countervailing duties (AD-CVDs). For firms operating in the global economy, these administered forms of protection represent institutional changes that can potentially harm their activities and their use and development of resources. We apply this framework to the analysis of the AD-CVDs implemented by the US on the import of solar panels from China in 2012. Using the Dunn and Bradstreet database of corporate conglomerates and a difference-in-differences design, we document how targeted Chinese MNEs reacted to this shock.

Building on the proposal by Meyer et al. (2023) for the study of firms facing sanctions, we develop a framework in which MNEs' institutional changes come from the World Trade Organization-supported AD-CVDs, as suggested in Peng et al. (2008). We complement this institutional-based view of IB theory with a resource-based view (Meyer et al. (2009)).

We use this integrated framework to analyze how institutional changes in bilateral trade conditions have unintended consequences on the internal aspects of firms operating in the global economy. In particular, how they adapt and innovate in a changing environment. We focus on the financial effects firms experience due to this negative shock and their strategic and operational responses.

The institutional changes prompted by AD-CVDs can alter international trade and investment patterns several years after implementation (Montti (2024)). Thus, studies from a longer perspective can help us understand the theoretical and practical implications of IB strategies beyond the immediate response.

We examine the short and medium-run impact of these trade barriers on multinational enterprises in the renewable energy sector. Our empirical findings show that targeted MNEs experience a reduction in their returns and an increase in their leverage ratio the year the policy is implemented. They respond by increasing the geographical dispersion of their foreign subsidiaries and restructuring their domestic units, i.e. reducing the number of employees in Chinese subsidiaries. These results show that Chinese conglomerates impacted by US protectionism develop strategic responses that avoid undermining their financial performance and preeminence in the international market.

Our paper contributes to the advance of theoretical frameworks on MNEs' behavior by analyzing the unintended consequences of a negative institutional shock under the WTO regime and complementing it with a resource-based view of IB strategy. MNEs face institutional challenges even in a stable international rule-based system. Thus, maintaining an adaptive managerial approach is key to not losing relevance in the international markets while overcoming negative external shocks.

We make an empirical contribution by providing an identification strategy that allows us to find the causal effects of these policies on MNEs' international business (IB) strategies. We develop a difference-in-differences design exploiting that AD-CVDs target firms in the same industry with different rates. These different AD-CVD rates reflect the differential exposure to the US trade policy, with firms receiving a specific rate being the most exposed (Montti (2024)).

The paper is organized as follows: In section 2, we develop our conceptual framework, in section 3 we explain our methods, while section 4 discusses our results. Finally, in section 5 we conclude and present the implications of our findings for MNEs' managerial decisions.

2 MNE Reconfiguration as a Response to AD-CVDs

Building on the proposal by Meyer et al. (2023) for the study of firms facing sanctions, we develop a framework in which MNEs' institutional changes come from the World Trade Organization-supported AD-CVDs, as suggested in Peng et al. (2008). We complement this institutional-based view of IB theory with the resource-based view (Meyer et al. (2009)).

We use this integrated framework to analyze how institutional changes in bilateral trade conditions have unintended consequences on the internal aspects of firms operating in the global economy. In particular, how they adapt and innovate in a changing environment.

The institution-based view asks how institutions impact firm strategy and performance (Peng et al. (2008)). Recent developments in the global economy, such as the rise of protectionism and geopolitical tensions, have prompted IB theorists to suggest that the institutional view needs to adapt to be able to explain this new reality (Luo (2023), Luo and Van Assche (2023), Meyer et al. (2023)). However, tensions and uncertainties also arise under the global institutions governed by the World Trade Organization's rules, such as anti-dumping and countervailing duties.

The Anti-Dumping Agreement (Agreement on Implementation of Article VI of the GATT 1994) defines dumping as "the introduction of a product into the commerce of another country at less than its normal value" (World Trade Organization). The Agreement on Subsidies and Countervailing Measures allows countries to charge a countervailing duty when they find that subsidized imports are hurting domestic producers (World Trade Organization).[1] Because both mechanisms aim at specific products and exporters from a particular country they make for an interesting setting to analyze differential effects of institutional changes.

Multinational enterprises have to make critical strategic decisions regarding their operations when faced with a changing institutional context. These include exploiting loopholes in the regime or relocating operations to third countries, which have short and long-term intended and unintended consequences for the organization (Meyer et al. (2023)).

Many IB theories focus on the ownership, exploitation, and acquisition of resources

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[1]See more information for AD and CVD.

to explain MNEs' strategies (Dunning (1980)). We expand this resource -based view by focusing on how firms reconfigure their structure and scope across locations when AD-CVDs disrupt the external environment. Using this mechanism to examine institutional transitions allows us to focus on changes that are country and industry-specific.

Motivated by the challenges posed by a negative shift in bilateral trade policy, MNEs can move away from the targeted country into trade-neutral zones, increasing the geographic scope of their organizational units. This behavior has been recently discussed as "friend-shoring" (Hsu et al. (2022)). It is also described as a production-switching strategy, which involves moving production to countries not affected by the barriers; or a market-switching strategy, which implies selling products to alternative countries (Gereffi et al. (2021)). Chinese firms, due to the size of their economy, can even move away from foreign markets into their domestic economy to avoid trade barriers.

These responses by MNEs are possible by having context-specific capabilities. Strategic and organizational flexibility allows firms to compete and adapt in volatile environments, especially in emerging economies (Meyer et al. (2009),Meyer et al. (2023)). This adaptive managerial approach is key to firms not losing relevance in the international markets while overcoming negative external shocks.

3 Methods

In this section, we describe our dataset and the construction of the several variables we use for our empirical analysis. We then explain the estimation method we use to evaluate the impact of the AD-CVDs on targeted Chinese MNEs.

3.1 Data & Variables

We use the following data XXX

We depict the summary statistics in Table 1 and the evolution of variables by MNE groups in Figures 1.

3.1.1 Financial Results

We rely on two financial indicators as dependent variables to analyze the effects of the AD-CVDs on targeted MNEs' financial performance: the return on assets, and the leverage ratio.

The variable ROA (Return On Assets) is constructed as the ratio of net income over assets. This measure of performance compares the profit a company generates with the capital it has invested in assets. Meanwhile, the leverage ratio is defined as total assets over net worth. This indicator reflects how much of a firm's capital comes from debt, assessing the ability of the company to meet its financial obligations.

In some specifications, we include the logarithm of total assets as a control variable as a means to absorb the impact of the size of the firms on the results. In all cases, the variables are defined at the headquarters level.

3.1.2 Geographical Dispersion and Number of Employees

To account for the geographical dispersion of firms, we create a variable that counts the number of subsidiaries by company headquarters per year.

To investigate the domestic restructuring of firms, our variable considers the number of employees in Chinese subsidiaries for conglomerates that operate within the same industry as the targeted firms.

In some of our estimations, we include as a control variable the number of employees at the headquarters level. This aims to consider how the differential size of the companies might impact the estimations.

3.2 Model and Estimation

We develop a difference-in-differences design exploiting that AD-CVDs target firms in the same industry with different rates. The treatment is given by the AD-CVD rate imposed in 2012 by the US on the imports of Chinese solar cells and modules.

This design has specific characteristics given by the US anti-dumping law defining China as a non-market economy (Section 771(18) of the Tariff Act of 1930). The US Department of Commerce assumes that all Chinese firms are under government control unless they prove otherwise, in which case they are granted a specific anti-dumping duty rate. All other Chinese firms in the industry are assigned a general - larger - rate (PRC-wide). Firms that were granted a specific rate in the 2012 solar panel case are larger exporters than those granted the PRC-wide rate. Thus, the different AD-CVD rates reflect the differential exposure to the US trade policy, with firms receiving the specific rate being the most exposed (Montti (2024)).

Our model is expressed at the level of firm i and year t as follows:

$$Y_{it} = \sum_{s=2009}^{2015} \delta_t(D_{it} \times 1[t = s]) + \beta \boldsymbol{X}_{it} + \gamma_i + \lambda_t + \epsilon_{it}. \tag{1}$$

Where Y_{it} represents different variables depending on the effect we are assessing: return over total assets, leverage ratio, geographical dispersion, or the number of employees in Chinese subsidiaries. X_{it} are control variables such as financial indicators or the number of employees in the headquarters or the subsidiaries. γ_i are firm fixed effects; λ_t are year fixed effects; and ϵ_{it} is the error term. Robust standard errors are clustered at the firm level. We use OLS to estimate our main coefficient of interest δ_t.

The key assumption in a difference-in-differences design is the existence of parallel trends, which implies that the pre-treatment trajectories for treated and control groups are parallel (Cunningham (2021)). We present support for this assumption in the event study plots in Figures 2. These show that in all cases the estimated coefficients have no statistically significant effects in the pre-policy period. For the number of employees in Chinese subsidiaries, the results are for the financial subsample and they are significant at the 10% level.

4 Results: MNE Reconfiguration

4.1 Financial Effects

4.2 Geographical Dispersion

4.3 Domestic Restructure

5 Conclusion: Implications for MNEs

Multinational firms that faced a changing environment adapted by making new business decisions.

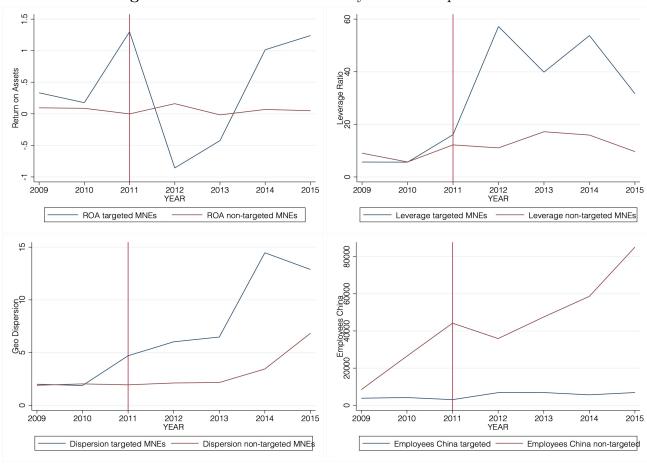## 5.1 Limitations and Future Research

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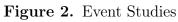
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Table 1. Summary Statistics

Variable	Obs	Mean	Std. dev	Min	Max
ROA	678	-.0013	.131	-.537	.172
Leverage Ratio	697	3.21	10.07	-17.23	201.32
Log of Assets	697	21.95	1.30	16.06	27.08
Geo Dispersion	1,091	7.32	8.06	1	30
Employees in China	177	20940.54	71907.63	0	390254

Figure 1. Evolution of Variables by MNE Groups

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Figure 2. Event Studies

Return on Assets · Leverage Ratio · Geo Dispersion · Employees in Chinese Subsidiaries

Note: Bars display 95 C.I.

Note: Bars display 90 C.I.

Table 2. Financial Results

	(1) Return on Assets	(2) Leverage Ratio
TargetedHQ*2009	0.0180	-0.437
	(0.0312)	(0.953)
TargetedHQ*2010	0.0125	-0.160
	(0.0465)	(0.839)
TargetedHQ*2012	-0.100***	1.589***
	(0.0302)	(0.557)
TargetedHQ*2013	0.0278	-0.830
	(0.0868)	(2.385)
TargetedHQ*2014	-0.0809	-3.731
	(0.0702)	(3.633)
TargetedHQ*2015	-0.0606	-4.006
	(0.0488)	(2.512)
Fixed effects		
Firm	✓	✓
Year	✓	✓
Mean	0.0140	2.883
Std_Dev	0.109	3.422
Observations	106	108
R^2	0.447	0.156

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3. Geographical Dispersion of Subsidiaries

	(1) Geo Dispersion	(2) Geo Dispersion	(3) Geo Dispersion	(4) Geo Dispersion	(5) Geo Dispersion	(6) Geo Dispersion
TargetedHQ*2009	-2.423	-2.174	-1.281	-2.071	-2.936	-1.295
	(1.629)	(1.566)	(1.612)	(1.867)	(1.951)	(1.602)
TargetedHQ*2010	-1.230	-1.173	-2.391	-2.499	-2.735	-2.737
	(0.882)	(1.047)	(1.847)	(1.987)	(2.180)	(2.289)
TargetedHQ*2012	1.461**	1.688**	2.088**	2.128**	3.386**	3.515**
	(0.715)	(0.823)	(0.985)	(1.018)	(1.341)	(1.395)
TargetedHQ*2013	2.002**	2.253**	2.393*	2.452*	2.262	2.279
	(0.808)	(0.907)	(1.378)	(1.381)	(1.563)	(1.661)
TargetedHQ*2014	4.763	5.356	7.336	7.500	8.201	8.132
	(3.587)	(3.860)	(4.962)	(4.864)	(5.112)	(5.074)
TargetedHQ*2015	2.739	3.035	7.726	7.079	7.759	8.918*
	(3.486)	(3.764)	(4.584)	(4.574)	(4.764)	(4.934)
Fixed effects						
Firm	✓	✓	✓	✓	✓	✓
Year	✓	✓	✓	✓	✓	✓
Control variables						
Num. Employees HQ		✓	✓	✓	✓	✓
Log of Assets			✓			✓
Leverage Ratio				✓		✓
Return on Assets					✓	✓
Mean	5.295	5.708	6.684	6.684	6.826	6.826
Std_Dev	6.694	6.925	8.068	8.068	8.176	8.176
Observations	631	568	370	370	357	357
R^2	0.331	0.353	0.449	0.447	0.475	0.480

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4. Geographical Dispersion of Subsidiaries

	(1) Geo Dispersion	(2) Geo Dispersion	(3) Geo Dispersion	(4) Geo Dispersion	(5) Geo Dispersion	(6) Geo Dispersion
TargetedHQ*2009	-2.423	-2.370	-1.182	-1.758	-2.288	-0.816
	(1.629)	(1.520)	(1.522)	(1.618)	(1.689)	(1.696)
TargetedHQ*2010	-1.230	-1.055	-1.636	-1.650	-1.669	-1.581
	(0.882)	(0.948)	(1.427)	(1.534)	(1.755)	(1.830)
TargetedHQ*2012	1.461**	2.030**	2.530**	2.587**	3.581***	3.764**
	(0.715)	(0.854)	(1.009)	(1.027)	(1.244)	(1.339)
TargetedHQ*2013	2.002**	2.408**	3.267**	3.361***	3.063**	3.096*
	(0.808)	(0.957)	(1.195)	(1.182)	(1.451)	(1.566)
TargetedHQ*2014	4.763	5.493	8.560	8.764	9.444*	9.365*
	(3.587)	(4.063)	(5.293)	(5.208)	(5.395)	(5.368)
TargetedHQ*2015	2.739	3.314	8.631*	7.911	8.516	9.877*
	(3.486)	(3.957)	(4.919)	(4.906)	(5.084)	(5.313)
Fixed effects						
Firm	✓	✓	✓	✓	✓	✓
Year	✓	✓	✓	✓	✓	✓
Control variables						
Num. Employees Subs.		✓	✓	✓	✓	✓
Log of Assets		✓				✓
Leverage Ratio				✓		✓
Return on Assets					✓	✓
Mean	5.295	5.963	7.343	7.343	7.505	7.505
Std_Dev	6.694	7.318	8.645	8.645	8.752	8.752
Observations	631	462	289	289	279	279
R^2	0.331	0.353	0.476	0.474	0.497	0.502

Standard errors in parentheses
$* p < 0.10$, $** p < 0.05$, $*** p < 0.01$

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Table 5. Geographical Dispersion of Subsidiaries - Heterogeneous Effects

	(1) Geo Dispersion	(2) Geo Dispersion	(3) Geo Dispersion	(4) Geo Dispersion
TargetedHQ*2009	-1.451	0.697	-3.378	1.642
	(1.567)	(1.741)	(2.137)	(1.384)
TargetedHQ*2010	-1.686	0.973	-1.426	0.0628
	(1.248)	(0.819)	(0.955)	(0.557)
TargetedHQ*2012	2.096**	-0.515	1.664**	-0.248
	(0.982)	(0.408)	(0.764)	(0.809)
TargetedHQ*2013	2.877**	0.306	2.274**	-0.294
	(1.133)	(0.637)	(0.857)	(0.855)
TargetedHQ*2014	7.930	-0.443	5.168	-0.507
	(5.055)	(0.621)	(3.743)	(0.932)
TargetedHQ*2015	7.273	-2.430	3.270	-2.131
	(4.753)	(2.304)	(3.670)	(4.139)
Fixed effects				
Firm	✓	✓	✓	✓
Year	✓	✓	✓	✓
Sample	Financials	No Financials	Ticker	No Ticker
Mean	6.613	3.363	5.633	2.354
Std_Dev	8.038	3.107	6.942	2.414
Observations	375	256	566	65
R^2	0.443	0.390	0.339	0.388

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6. Number of Employees in Chinese Subsidiaries

	(1) Number Employees	(2) Number Employees	(3) Number Employees	(4) Number Employees
TargetedHQ*2009	-355.4	-994.2	-18.87	-7.438
	(2177.8)	(2746.9)	(2198.2)	(2269.5)
TargetedHQ*2010	-1466.6	-1805.2	-1813.3	-1805.5
	(998.2)	(1348.9)	(1321.1)	(1307.6)
TargetedHQ*2012	-197.5	-464.1	-545.3	-539.7
	(366.4)	(797.3)	(871.4)	(866.0)
TargetedHQ*2013	-267.7	-1492.2*	-1565.8*	-1555.3*
	(243.4)	(759.3)	(761.1)	(798.1)
TargetedHQ*2014	549.8	-1440.8	-1537.0	-1532.2
	(1223.5)	(851.6)	(908.3)	(944.2)
TargetedHQ*2015	589.6	-1301.5	-745.0	-739.5
	(1247.3)	(1078.1)	(1298.0)	(1337.8)
Fixed effects				
Firm	✓	✓	✓	✓
Year	✓	✓	✓	✓
Control variables				
Leverage Ratio		✓		✓
Log of Assets			✓	✓
Mean	23922.5	9731.0	9731.0	9731.0
Std_Dev	77464.5	43651.5	43651.5	43651.5
Observations	151	81	81	81
R^2	0.160	0.204	0.284	0.284

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7. Number of Employees in Chinese Subsidiaries - Heterogeneous Effects

	(1) Number Employees	(2) Number Employees
TargetedHQ*2009	-918.2	
	(2633.7)	
TargetedHQ*2010	-1746.9	-3200.0**
	(1336.8)	(1453.7)
TargetedHQ*2012	-421.2	125.0
	(846.5)	(130.1)
TargetedHQ*2013	-1413.4*	1318.6
	(702.2)	(1299.0)
TargetedHQ*2014	-1404.1*	3278.2
	(806.7)	(3104.7)
TargetedHQ*2015	-1265.6	3278.2
	(1021.0)	(3104.7)
Fixed effects		
Firm	✓	✓
Year	✓	✓
Sample	Financials	No Financials
Mean	9731.0	40344.0
Std_Dev	43651.5	101616.4
Observations	81	70
R^2	0.203	0.320

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$