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Short-Run Effects of U.S. Tariff Policies on China's New Energy Vehicle Industrial Chain and China's Responses: A Specific Factors Model Perspective

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Abstract. This paper examines the short-run impact of U.S. tariffs on China's new energy vehicle (NEV) industrial chain and evaluates enterprise and government responses. Drawing on the Specific Factors Model, it uses descriptive trade and policy analysis. Complete vehicle exports to the U.S. virtually ceased, battery exports declined, and upstream minerals faced indirect pressure. Enterprise measures—supply chain localization, R&D investment, and market diversification—along with government policies such as tax exemptions and RCEP utilization, appear to have partially mitigated the shock. The paper contributes a sector-specific short-run application of the Specific Factors Model and highlights causal identification challenges for future research. This paper concludes that although the U.S. market is largely closed to Chinese NEVs, the industry has adapted through factor reallocation and market redirection.

Keywords: tariff policy, new energy vehicle, Specific Factors Model, industrial chain, U.S.-China trade

1. Introduction

The global NEV industry has expanded rapidly, and China has become the largest producer and exporter. Since 2024, the United States has built a multi-layered tariff regime on Chinese NEVs and components, combining Section 301, Section 232, IEEPA, and reciprocal measures. These measures sharply reduced U.S. market access and created a short-run shock for China's NEV chain. Existing studies mainly examine aggregate or long-run effects. Li and Wang find broad damage to China's NEV supply chain using a general equilibrium model. The Specific Factors Model offers a short-run lens: sector-specific capital cannot move quickly, while labor can reallocate, so export-specific factors bear concentrated adjustment costs. This paper examines how the tariff shock affects complete vehicles, lithium batteries, and upstream critical minerals, and how Chinese enterprises and the government have responded. Using descriptive trade and policy analysis, it links observed outcomes to the model's qualitative predictions. The contribution is threefold: it maps the shock across the chain, connects responses to short-run factor adjustment, and discusses identification challenges [1-6].

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2. Analytical framework: the Specific Factors Model

The Specific Factors Model provides a short-run framework in which sector-specific capital cannot move across sectors, while labor is mobile [6]. This assumption fits China's NEV chain, where assembly lines, battery equipment, and mineral-processing assets are highly specialized. The U.S. tariff regime introduced in 2024–2025 is the policy shock. In 2025, reported composite rates reached prohibitive levels for complete vehicles, power batteries, and energy storage batteries, effectively closing the U.S. market. The model predicts the strongest contraction in complete vehicles, a decline in lithium batteries, and indirect pressure on upstream critical minerals. A tariff lowers the price Chinese exporters receive in the U.S. market and reduces demand. Export-sector output and employment contract. Because specific capital cannot be redeployed in the short run, its owners bear concentrated adjustment costs through lower quasi-rents, while mobile labor may move to other sectors with search and retraining frictions. Since this study is descriptive rather than computational, no equations are used.

3. Short-run impact on the NEV industrial chain

The tariff shock has produced differentiated effects across the NEV chain. In complete vehicles, the U.S. market became effectively closed to Chinese manufacturers. In 2024, China exported fewer than 30,000 NEVs to the United States, representing less than 2% of total NEV exports [7]. By 2025, Chinese self-brand NEV passenger vehicle exports to the United States were virtually zero. At the same time, total passenger vehicle exports to the United States—including all powertrains—fell from 104,000 units in 2024 to 71,000 units in 2025, a decline of 32%. This suggests that the tariff shock affected not only NEVs but also broader passenger vehicle exports.

The lithium battery segment experienced a sharp decline. China's lithium battery exports to the United States fell to USD 646 million in May 2025, a 43% decrease from the previous month and the lowest level since April 2022 [8]. This decline was driven by both the direct tariff effect and anticipation of further restrictions, as U.S. customers faced higher landed costs and uncertainty over future tariff changes.

Upstream critical minerals faced indirect pressures through anti-dumping measures. Graphite anode materials confronted effective tariff rates of approximately 160%, creating significant cost pressures for downstream battery manufacturers [4]. The United States relies heavily on Chinese supply for these materials. China processes 92% of global anode production and 77% of cathode production, making immediate substitution difficult [9]. Tariffs on upstream materials therefore raised costs throughout the supply chain and intensified uncertainty for both Chinese exporters and U.S. importers.

4. Response strategies and effectiveness

Because this study is descriptive and does not estimate a formal model or produce quantitative forecasts, no research design or simulation results are reported. The following assessment compares observed trade data with the qualitative predictions of the Specific Factors Model.

4.1. Enterprise-level responses

Chinese enterprises adopted three main strategies. First, supply chain localization: CATL built plants in Mexico and Spain [10]; BYD established factories in Brazil and Thailand [11]. These moves

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localize production in third countries and bypass tariffs. Second, R&D investment: NIO and XPENG developed self-designed automotive chips, while Huawei's HarmonyOS vehicle system had exceeded 10 million installations. China's automotive chip localization has advanced unevenly: overall self-sufficiency remains around 18%, power semiconductors reached roughly 35%, and high-end SoCs remain below 5% [12]. Third, market diversification: the self-brand NEV share of overseas sales rose from 9.5% in 2024 to 15.3% in 2025 (see Table 2), reflecting a broader shift toward Europe, Southeast Asia, Latin America, and Belt and Road markets.

4.2. Government-level responses

The Chinese government implemented three principal countermeasures. First, NEV purchase tax exemptions were extended through 2027; vehicles purchased in 2026–2027 receive a 50% reduction capped at RMB 15,000 per vehicle [13]. Second, China utilized RCEP provisions to reduce tariffs on NEV components, with key items such as lithium battery separators and electric motors reaching zero tariffs among member states [14]. Third, the government pursued international cooperation agreements, including new energy protocols with Gulf countries and EU negotiations on EV pricing commitments.

4.3. Effectiveness assessment

This paper assesses effectiveness by comparing observed outcomes with the model's predictions. Prohibitive tariff rates match the prediction that complete vehicles would face the sharpest contraction. Meanwhile, total NEV exports grew strongly and market share increased, while U.S.-bound exports fell. These patterns are consistent with the model: factors specific to the U.S.-export segment suffered losses, while mobile capital and labor shifted toward other markets and domestic demand. Response strategies appear to have partially mitigated the shock, though the U.S. market remains largely inaccessible. These associations should not be interpreted as causal.

According to Table 2, China's total NEV exports rose significantly in 2025, while passenger vehicle exports to the United States across all powertrains declined. These patterns align with the Specific Factors Model: factors specific to the U.S.-export segment suffered concentrated losses, while mobile labor and reallocable capital shifted toward other markets and domestic demand, allowing overall exports to grow. Existing research estimates that a 4.5% increase in domestic NEV consumption subsidies could offset the adverse effects of U.S. and EU tariffs [15]. This finding is consistent with the model's implication that demand-side policies can ease adjustment pressure on export-specific factors.

Table 1. Reported U.S. composite tariff rates on Chinese NEV products, 2025

Product category	Reported composite tariff rate	Key policy components
Electric vehicles	147.5%	2.5% base + 100% Section 301 + 25% Section 232 + 20% IEEPA
EV power batteries	73.4%	3.4% base + 25% Section 301 + 25% Section 232 + 20% IEEPA
Energy storage batteries	173.4%	3.4% base + 25% Section 301 + 20% IEEPA + 125% reciprocal

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Data sources: SMM (Shanghai Metals Market); EV Trend Research Report.
Note: The 155.9% rate was in effect during 2025; it is scheduled to rise to 173.4% in Jan 2026. Reported composite rates may reflect exemptions, exclusions, and overlapping measures.

Table 2. China's NEV export performance, 2024-2025

Indicator	2024	2025	Change
Total NEV exports (units)	1,284,000	2,615,000	+103.7%
China's share of global NEV market	60.0%	68.4%	+8.4 pp
Lithium battery exports to U.S. (May, USD billion)	—	0.646	-43% MoM
Passenger vehicle exports to U.S., all powertrains (units)	104,000	71,000	-32%
Self-brand NEV share of overseas sales	9.5%	15.3%	+5.8 pp

Data sources: CAAM; China Customs; CPCA.
Note: The passenger vehicle export row includes all powertrains and should not be interpreted as NEV-only exports. The lithium battery row refers to May 2025 and reports month-on-month change.

5. Discussion: endogeneity and causal identification

Section 301 and IEEPA tariff coverage is not random. Tariff rates are highly correlated with products' factor intensity and technological content. If subsequent research employs difference-in-differences strategies, the parallel trends assumption may be invalid. A potential approach is the Shift-Share Instrumental Variable, using U.S. import demand growth from alternative countries as an instrument. The key challenge lies in justifying the exclusion restriction—demonstrating that alternative countries' import demand affects China's exports only through the tariff channel, not through other pathways such as global supply chain restructuring or exchange rate fluctuations. Future research should explore the validity of this instrument. This paper does not claim to provide causal estimates.

6. Conclusion

This paper examined the short-run impact of U.S. tariffs on China's NEV chain through the Specific Factors Model. Three conclusions emerge. First, the U.S. multi-layered tariff regime has made the U.S. market largely inaccessible to Chinese NEVs. Second, the shock produced differentiated impacts: complete vehicle exports virtually ceased, battery exports declined, and upstream minerals faced indirect pressures. Third, enterprise and government responses coincided with overall export growth and market diversification, though these associations should not be interpreted as causal.

The study acknowledges limitations. As a descriptive analysis, it cannot establish causal relationships. The endogeneity of tariff coverage poses challenges for causal identification. Future research should extend the time horizon, incorporate enterprise-level data, and develop rigorous causal identification strategies to quantify the net effects of tariff shocks on industrial chain adjustment.

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