

SUPPLY CHAINS UNDER PRESSURE: U.S. TARIFF MEASURES AND MEXICO'S AUTOMOTIVE INDUSTRY

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Abstract

This study analyzes the impact of U.S. tariff measures on the Mexican automotive industry during the second Trump administration (2024–2025), focusing on supply chain vulnerabilities and adaptive responses. Using monthly data from INEGI's Registro Administrativo de la Industria Automotriz de Vehículos Ligeros (RAIAVL) and Vehículos Pesados (RAIAVP), the research applies time-series comparisons, event-study techniques, and a Difference-in-Differences (DiD) framework. Five hypotheses (H1–H5) were tested, covering deviations from projected export trends, pre- vs post-shock averages, heterogeneity across models, short-run recovery, and the buffering role of domestic sales. Results indicate that April 2025 was the clearest tariff shock point, with both light and heavy vehicle exports falling below projections. Light vehicles rebounded by May–July, while heavy vehicles remained depressed. Heterogeneity was evident: USMCA-compliant mass-market models adapted more effectively than duty-paid or premium models. Contrary to expectations, domestic sales contracted more than exports, revealing internal market fragility. The DiD analysis confirmed a positive relative effect for light vehicles (+3,434 units), highlighting greater resilience compared to heavy vehicles. The findings underscore the asymmetric effects of U.S. tariff policy and the importance of differentiated strategies to safeguard Mexico's long-term competitiveness in the North American automotive supply chain..

Keywords: U.S. tariffs; Mexican automotive industry; light vehicles; heavy vehicles; supply chain resilience; USMCA; trade policy

JEL Classification: F13, L62, F14

1. Introduction

The Mexican automotive industry occupies a central role in North American trade, serving as both a production hub and an export platform under the United States–Mexico–Canada Agreement (USMCA). Its integration into global value

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chains has made it highly sensitive to shifts in U.S. trade policy. During the second Trump administration (2024–2025), renewed tariff threats and policy uncertainty once again placed Mexico’s automotive exports at the center of bilateral tensions.

The automotive sector accounts for a significant share of Mexico’s manufacturing output, employment, and foreign exchange earnings. Tariff announcements, even when not fully implemented, can alter investment decisions, raise compliance costs, and disrupt supply chains [INEGI, 2025; USTR, 2024]. While light vehicles (LV) dominate export flows and must meet USMCA’s regional value content rules, heavy vehicles (HV) face different regulatory and market dynamics, making them a useful counterpoint for comparative analysis.

This paper evaluates the short-term impact of tariff threats in 2025 using monthly data on production, exports, and sales from INEGI’s RAI AVL and RAI AVP datasets. Five hypotheses are tested regarding deviations from expected trends, pre- versus post-threat performance, heterogeneity across models, recovery dynamics, and the buffering role of the domestic market. By combining time-series analysis with an event-study design and Difference-in-Differences framework, the study highlights asymmetric responses between LV and HV.

The findings provide empirical evidence on how tariff measures influence Mexico’s automotive supply chains, revealing both the adaptability of mass-market LV exporters and the persistent vulnerabilities of HV producers.

2. Review of Literature

2.1. Mexico’s Role in the North American Automotive Supply Chain

Mexico’s automotive industry has emerged as a cornerstone of North American manufacturing integration, a transformation accelerated by the North American Free Trade Agreement (NAFTA) and reinforced—though in more complex ways—by its successor, the United States–Mexico–Canada Agreement (USMCA). Understanding this role is essential because it highlights both Mexico’s strengths in cost-efficient production and its vulnerabilities to U.S. tariff measures.

Deep Integration through Global Value Chains

Scholars of global value chains (GVCs) emphasize that Mexico participates in the automotive sector primarily through backward linkages—the use of foreign inputs in its exports—rather than forward linkages [OECD, 2024]. This means that while Mexican factories assemble and export millions of vehicles, they rely heavily on imported engines, electronics, and other components, especially from the United States and Asia. Ivanov and Dolgui [2025] describe this as a “ripple effect” structure: disruptions in upstream suppliers reverberate quickly into

Mexican production lines, amplifying vulnerabilities when trade frictions or tariffs emerge.

Data confirm this integration. By 2024, Mexico ranked as the 7th largest global vehicle producer, manufacturing 3.8 million vehicles and exporting 87% of them, primarily to the U.S. [INA, 2025]. Auto parts exports mirror this dependence, with around 87% of production destined abroad, mostly to support North American supply chains [INA, 2025]. The Mexican Automotive Industry Association (AMIA) reports that the sector accounts for 4.7% of GDP and nearly 22% of manufacturing GDP, underscoring its macroeconomic importance [AMIA, 2025].

NAFTA to USMCA: From Integration to Conditionality

NAFTA facilitated nearly seamless cross-border flows: by the late 2010s, more than 99% of Mexican and Canadian vehicles entered the U.S. duty-free under the 62.5% regional value content (RVC) rule [USITC, 2025]. The USMCA, implemented in 2020, altered this equilibrium. The RVC threshold increased to 75%, new rules mandated that 40–45% of a vehicle's content be produced by workers earning at least \$16/hour, and 70% of steel and aluminum inputs must be sourced regionally [USTR, 2024]. These provisions, described by Miller, Jin, and Ortega [2025] as “conditional integration,” create compliance burdens that function as implicit tariffs if not met.

While intended to shift more value-added production back to the U.S., these rules have a dual effect. On the one hand, they force greater regional content sourcing, potentially creating opportunities for Mexican suppliers. On the other, they raise costs and complexity, sometimes making firms prefer paying the 2.5% most-favored-nation tariff rather than restructuring supply chains [Zeitgeist, 2024].

Geographic and Product Specialization

Mexico's integration is also evident in its geographic distribution of production. Plants cluster in northern and central states—Nuevo Leon, Coahuila, Guanajuato, Puebla—leveraging proximity to U.S. markets and established infrastructure [Mazaroki, and Melnyk, 2025]. Product specialization has evolved toward SUVs and pickup trucks, which now constitute around 80% of exports [AMIA, 2025]. This concentration, while profitable, also increases vulnerability: U.S. MFN tariffs on light trucks are 25%, meaning any compliance failures or policy shocks disproportionately affect Mexico's main export categories [Contractor, 2025].

Structural Vulnerabilities in Supply Chains

Scholars highlight that Mexico's integration creates a paradox: it is indispensable yet vulnerable. Contractor [2025] shows that tariff policies often impose costs that far exceed their intended benefits, particularly when applied to

highly integrated industries. For Mexico, the cost of tariffs is magnified by just-in-time logistics: U.S. and Mexican plants exchange components multiple times, so even small frictions can halt production. Ivanov and Dolgui [2025] frame this as “systemic fragility,” where supply chain turbulence arises not only from enacted tariffs but also from policy uncertainty.

In practice, the 2019 threat by President Trump to impose escalating tariffs on all Mexican imports revealed how fragile this system is. U.S. plants were projected to run out of critical Mexican components within days [Wilson Center, 2019]. Such episodes illustrate how Mexico’s role as a hub of North American production is also a source of risk exposure.

Opportunities from Nearshoring

Despite these vulnerabilities, Mexico also stands at the center of nearshoring trends. UNCTAD [2024] and OECD [2024] estimate that Mexico could capture nearly 40% of Latin America’s \$78 billion nearshoring opportunity, particularly as U.S. firms reduce reliance on China. The comparative advantage lies not only in costs but in geographic proximity and trade certainty under USMCA. As Mazaroki and Melnyk [2025] note, firms increasingly value resilience and regional integration over wage differentials alone, suggesting Mexico’s embeddedness in the U.S. orbit may outweigh rising compliance costs.

2.2. Impacts of U.S. Tariff Threats and Measures on Mexico’s Automotive Industry

This second dimension of the literature review focuses on how U.S. tariff measures and threats—primarily under the Trump administration—affected Mexico’s automotive industry in terms of production, exports, costs, and investment. Evidence from academic studies, policy reports, and industry analyses demonstrates that these measures generated a climate of uncertainty that disrupted investment decisions, raised compliance costs, and exposed systemic vulnerabilities in North America’s integrated supply chains.

Tariff Threats as an Uncertainty Shock

The Trump administration consistently used tariff threats as leverage, beginning even before the 2017 inauguration. Public statements targeted automakers investing in Mexico, with calls for tariffs of up to 35% on Mexican-built vehicles. Ford’s 2017 cancellation of a \$1.6 billion plant in San Luis Potosi is widely seen as an early example of “policy-induced deterrence,” where corporate investment decisions were influenced less by market fundamentals than by anticipated U.S. political costs [Guardian, 2017].

Contractor [2025] explains that the costs of tariff uncertainty extend beyond direct duties, including transactional frictions, delayed investments, and lost opportunities. Similarly, Ivanov and Dolgui [2025] characterize tariff threats as

“deep uncertainty” events that propagate across networks, causing firms to hold excess inventory, slow expansion, and hedge against multiple scenarios. For Mexico, this meant that between 2017 and 2019, several major projects were postponed or scaled back, and the peso currency depreciated, reflecting heightened risk perceptions [Wilson Center, 2019].

The most dramatic threat occurred in May 2019, when the U.S. president announced escalating tariffs on all Mexican imports, starting at 5% and rising to 25%. Though never implemented, this episode revealed the fragility of supply chains. U.S. plants projected production stoppages within days if tariffs were enacted, and Mexican exports faced the possibility of losing tens of billions of dollars annually [Wilson Center, 2019]. Gantz [2025] concludes that these periodic tariff threats inflicted lasting harm on investor confidence in Mexico's manufacturing base.

Tariffs on Inputs: Steel and Aluminum

While broad automotive tariffs were not enacted, U.S. Section 232 tariffs on steel (25%) and aluminum (10%) applied to Mexico from June 2018 to May 2019 before their suspension. These tariffs had measurable effects on the auto parts industry. Mexico, as a major steel exporter to the U.S., saw costs rise for both domestic suppliers and exporters of intermediate goods [USITC, 2025].

Academic studies show that tariffs on key inputs propagate cost shocks across supply chains. Miller, Jin, and Ortega [2025] argue that tariffs on raw materials generate multiplier effects in industries like automotive, where steel and aluminum comprise a significant portion of vehicle costs. For Mexico, the result was a decline in competitiveness during that year: producers faced higher prices for inputs sourced from the U.S., while simultaneously losing some export volume. Although the tariffs were lifted in 2019, the episode underscored the industry's vulnerability to collateral protectionist measures.

USMCA Rules as Implicit Tariffs

The United States–Mexico–Canada Agreement (USMCA) itself introduced new compliance requirements that function as implicit tariff barriers. Vehicles not meeting the 75% regional value content or labor value content thresholds are subject to a 2.5% U.S. most-favored-nation (MFN) tariff. Surprisingly, USTR's 2024 report showed that 8.2% of vehicle imports from Mexico and Canada entered the U.S. with duties paid—a sharp increase from near-zero under NAFTA [USTR, 2024].

Academic literature explains this phenomenon through cost–benefit analysis. Some firms calculate that restructuring supply chains to meet USMCA requirements is more expensive than simply paying the 2.5% tariff, especially for niche or luxury models with high profit margins [Contractor, 2025]. Contractor [2025] supports this interpretation, noting that multinationals often choose “tariff absorption” when compliance costs outweigh duty liabilities.

In effect, USMCA rules have created a two-tier system: high-volume products like SUVs and pickups comply to avoid tariffs, while certain models deliberately accept the duty. For Mexico, this represents both a loss of preferential advantage and a potential drag on competitiveness if the share of duty-paid exports grows.

Quantitative Impacts on Production and Exports

The cumulative effect of tariff threats and measures is evident in production and export statistics. INEGI [2025] data show that vehicle production in 2019 declined by around 4% relative to 2018, breaking a growth trend and coinciding with tariff threats and trade uncertainty. Wilson Center [2019] simulations estimated potential export losses of \$26–42 billion for Mexico’s auto, electronics, and textile sectors if tariffs had been implemented.

By 2025, partial impacts were already measurable: INA [2025] reported a 6.3% drop in vehicle exports in the first five months of 2025 compared to the prior year, attributing it partly to weaker U.S. demand but significantly to the cost pressures of new U.S. tariffs on non-compliant vehicles and inputs. Banxico’s data confirm that these declines affected trade balances and contributed to peso volatility.

Gantz [2025] and Zeitgeist [2024] both emphasize that the mere possibility of tariffs led firms to adopt defensive behaviors: delaying hiring, reducing investment, and rerouting some production to the U.S. Even when tariffs were not enacted, the uncertainty itself constrained Mexico’s automotive sector growth.

Policy Uncertainty as a Systemic Disruption

Several academic contributions frame tariff threats not as isolated policies but as systemic disruptions. Ivanov and Dolgui [2025] classify them as “ripple effect generators,” where the expectation of a tariff can be as damaging as its enforcement. Similarly, Mazaroki and Melnyk [2025] findings on global trade disruptions demonstrate that uncertainty reduces firms’ willingness to commit capital to export-oriented industries.

Empirical studies reinforce this view. A dissertation by Zorola Gonzalez [2024] analyzing Mexican automotive exports under Trump’s trade policy finds that announced threats correlated with short-term declines in output and FDI, even when tariffs were suspended. Guerrero-Sánchez et al. [2025] supports this by showing that volatility in trade policy increases costs of capital and forces firms into less efficient risk-hedging behaviors.

Yoganandham [2025] proposes a theoretical framework that distinguishes three categories of costs associated with tariffs: adjustment costs, arising from restructuring supply chains and reallocating resources; transaction costs, stemming from renegotiations, compliance, and administrative burdens; and timing costs, generated when firms misalign investments or inventories in response to unpredictable policy changes. This framework helps explain why tariffs often create

disruptions that extend far beyond their nominal rates, amplifying uncertainty and producing ripple effects across global and regional value chains.

Thus, the literature converges on the conclusion that U.S. tariff measures—whether enacted or threatened—created persistent uncertainty that weakened Mexico's production trajectory, raised compliance and input costs, and undermined confidence in Mexico as a stable manufacturing hub.

2.3 Response Strategies of Mexican and Multinational Firms

The literature consistently shows that the automotive industry in Mexico has not been a passive victim of U.S. tariff pressures. Instead, firms—ranging from small suppliers to multinational assemblers—adopted adaptive strategies to mitigate risks, restructure operations, and maintain competitiveness. These responses can be grouped into four major categories: (1) supply chain reconfiguration, (2) financial and operational buffers, (3) lobbying and policy engagement, and (4) innovation and strategic market shifts.

Supply Chain Reconfiguration and Diversification

One of the most evident adaptation strategies has been reconfiguring sourcing networks. Contractor [2025] highlights that multinationals commonly diversify suppliers geographically, substituting vulnerable inputs from tariff-targeted countries with those sourced regionally. In Mexico, this translated into localizing more parts production to satisfy USMCA's rules of origin and reduce exposure to tariff shocks.

Ivanov and Dolgui [2025] conceptualize this as building supply chain resilience by introducing redundancy into critical nodes. Although redundancy increases short-term costs, it reduces vulnerability to disruptions like tariffs or sudden border closures. Evidence from INA [2025] shows that many Tier-1 suppliers in Mexico expanded capacity to meet new demand for locally sourced parts, especially in electronics and sub-assemblies.

At the firm level, case studies demonstrate this strategy. General Motors, Ford, and Stellantis restructured supply lines to ensure that their high-volume SUVs and trucks complied with USMCA requirements, while niche models with complex global sourcing often absorbed tariffs instead [USTR, 2024]. This selective compliance illustrates what Contractor [2025] terms the “differentiated adjustment” strategy, where firms adapt unevenly across product portfolios to balance costs and compliance.

Financial and Operational Buffers

Another adaptation has been to build financial cushions and operational buffers. Research in supply chain management emphasizes that firms increase inventories, hedge currencies, and establish contingency warehousing in response to trade uncertainty [Ivanov and Dolgui, 2025; JSCM, 2024].

In Mexico, firms stockpiled key inputs like steel and aluminum during the 2018–2019 tariff window, anticipating price hikes. This aligns with Guerrero-Sánchez et al. [2025], which shows how firms use inventory as a shock absorber in volatile trade environments. Similarly, Banxico data indicate that peso depreciation often provided a natural hedge, as Mexican exports became cheaper in dollar terms when tariff threats hit [Banxico, 2025].

Operationally, some manufacturers explored “tariff engineering,” such as shipping vehicles in partially disassembled form to qualify under lower-duty classifications—a tactic documented in Swiecki, and Dziczek [2025] as part of broader global responses to tariff escalation. While not widespread, these experiments illustrate firms’ tactical flexibility in avoiding duties.

Lobbying and Policy Engagement

Political engagement has also been central. Multinational automakers and Mexican industry associations (AMIA, COMCE, INA) engaged actively with policymakers in Washington, Mexico City, and Ottawa. Their efforts emphasized the mutual dependence of the U.S. and Mexican automotive sectors.

According to Zorola Gonzalez [2024], corporate lobbying during the 2019 blanket tariff crisis was decisive in persuading U.S. lawmakers and business groups to pressure the administration to suspend the measures. The outcome—an agreement on migration enforcement rather than tariffs—showed the power of coordinated lobbying.

Academic work supports this perspective: Contractor [2025] includes lobbying among the core mitigation strategies, while Mazaroki and Melnyk [2025] demonstrate that political advocacy reduces the duration and intensity of tariff uncertainty. Mexico’s side-letter agreement under USMCA, guaranteeing a quota of tariff-free exports even in the event of Section 232 tariffs, represents a concrete result of such lobbying efforts [CRS, 2019].

Innovation, Digitalization, and Strategic Shifts

Finally, firms have pursued longer-term adaptation by upgrading capabilities. Deloitte [2024] and McKinsey [2024] note that digital supply chain management tools allow real-time tracking of compliance with rules of origin, reducing the risk of accidental tariff exposure. Academic contributions also highlight the role of digital transformation: the Miller, Jin, and Ortega [2025] argues that automation and advanced analytics help firms offset rising trade compliance costs by improving productivity.

Innovation also extends to product and market strategies. As the U.S. pushes toward electric vehicle (EV) adoption, Mexico has positioned itself as a hub for EV assembly and parts. Tesla’s Gigafactory project in Nuevo León, alongside investments by BMW and GM, reflect this strategic pivot [OECD, 2024]. While EV supply chains bring new compliance challenges—especially with battery

sourcing—Mexico's proactive courting of these investments suggests an adaptation beyond short-term tariff responses.

Additionally, some firms diversified export markets. Though limited compared to U.S. volumes, Mexico expanded automotive exports to Europe and Latin America under its network of free trade agreements. This diversification aligns with Guerrero-Sánchez et al. [2025], which finds that firms in emerging economies use “multi-market hedging” to reduce overreliance on a single partner.

Synthesis

The strategies outlined above reveal a pattern of resilience and calculated adaptation. Firms did not simply absorb tariffs; they actively restructured networks, built buffers, engaged in lobbying, and invested in innovation. Academic research supports this observation, showing that while tariffs impose heavy costs, multinationals develop layered strategies to mitigate them [Contractor, 2025; Ivanov and Dolgui, 2025; Contractor, 2025].

Importantly, these responses reinforce Mexico's continued role in North American supply chains. Rather than retreating, most automakers doubled down on compliance for core product lines and sought efficiencies elsewhere. The net result has been a supply chain that is more regionally integrated, politically engaged, and technologically advanced, albeit at the cost of higher complexity and compliance overhead.

2.4 Long-Term Competitiveness of Mexico's Automotive Industry under USMCA

The long-term competitiveness of Mexico's automotive industry under the United States–Mexico–Canada Agreement (USMCA) is shaped by three interrelated factors: (1) opportunities from regional integration and nearshoring, (2) challenges of compliance costs and structural vulnerabilities, and (3) the disruptive transition to electric vehicles (EVs). The literature demonstrates that while Mexico remains indispensable to North American supply chains, the conditions of its integration are increasingly conditional and technologically demanding.

Regional Integration and Nearshoring Opportunities

Several studies emphasize that stricter rules under USMCA may paradoxically strengthen Mexico's position by consolidating regional supply chains. OECD [2024] argues that North America's tighter origin rules encourage automakers to source more components regionally, creating opportunities for Mexican Tier-2 and Tier-3 suppliers. As global firms look to relocate production from Asia due to geopolitical frictions, Mexico is strategically positioned to capture this investment.

UNCTAD [2024] estimates that Mexico could benefit from up to 40% of Latin America's nearshoring opportunity, valued at \$78 billion. ECLAC [2025] similarly stresses that Mexico's proximity and trade agreements position it as the most attractive Latin American country for manufacturing relocation. This aligns with Contractor's [2025] argument that firms often weigh "resilience and regional stability" above pure labor costs when restructuring supply chains.

Academic literature supports this optimism. A recent Swiecki, and Dziczek [2025] chapter on global automotive trade highlights Mexico's competitive combination of skilled labor, cost efficiency, and geographic access to the U.S. market, predicting sustained inflows of investment, especially in advanced auto parts and EV production. Likewise, Guerrero-Sánchez et al. [2025] shows that nearshoring reduces exposure to tariff volatility by shortening supply lines and embedding firms within stable trade blocs like USMCA.

Compliance Costs and Structural Vulnerabilities

Despite these opportunities, compliance under USMCA has introduced significant implicit tariffs. USTR [2024] reports that 8.2% of vehicles exported from Mexico and Canada entered the U.S. with duties paid, compared to virtually none under NAFTA. Contractor [2025] interprets this as evidence of the "compliance cost paradox": rules intended to deepen integration sometimes push firms to accept tariffs instead of reconfiguring complex global supply chains.

USITC [2025] notes that these rules have increased production costs and raised U.S. consumer prices slightly, suggesting that Mexico's low-cost advantage is partially eroded. Mazaroki and Melnyk [2025] emphasize that smaller Mexican suppliers face the greatest burden, as documentation and compliance systems require capital-intensive upgrades. This confirms Ivanov and Dolgui's [2025] insight that supply chain resilience is costly: investments in redundancy and compliance reduce efficiency in the short term.

Structural vulnerabilities persist. Mexico's reliance on U.S. demand—roughly 80% of exports—remains a concentration risk [INEGI, 2025]. Moreover, its specialization in SUVs and trucks exposes it to U.S. policy changes, since those models face the highest MFN tariffs (25%) if compliance fails [AMIA, 2025]. Academic critiques (Miller, Jin, and Ortega [2025]) highlight that such dependence creates a "path dependency trap," limiting Mexico's ability to pivot rapidly toward alternative markets.

The Electric Vehicle Transition

The transition to electric vehicles represents both an existential challenge and a transformative opportunity. The U.S. Inflation Reduction Act (IRA) of 2022 heavily incentivizes EV production within the U.S., particularly batteries. If Mexico cannot align its supply base with these requirements, it risks marginalization.

Deloitte [2024] argues that EV supply chains are structurally different: batteries account for 30–40% of vehicle value, and sourcing critical minerals requires entirely new networks. For Mexico, success will depend on whether it can attract battery and EV component investment. Already, Tesla, BMW, and GM have announced major EV-related projects in Mexico, reflecting the country's bid to integrate into the new ecosystem [OECD, 2024].

Academic sources reinforce this. Miller, Jin, and Ortega [2025] suggests that digitalization and traceability systems are essential for meeting future battery-origin rules. Swiecki, and Dzikzek [2025] emphasize that countries able to combine low-cost assembly with high-tech component integration will dominate the EV transition. For Mexico, this implies a need for strategic industrial policy, beyond traditional cost advantages.

However, risks abound. If U.S. policymakers tighten EV origin rules under USMCA review in 2026, Mexico could face stricter thresholds that require sourcing batteries directly from U.S. producers. In this scenario, Mexico's role may be confined to final assembly, with less value capture than in combustion-era vehicles.

Institutional and Policy Dimensions

Long-term competitiveness also depends on Mexico's domestic conditions. OECD [2024] warns that weaknesses in infrastructure, energy reliability, and governance could deter nearshoring investment. ECLAC [2025] underscores that macroeconomic instability or policy missteps may prevent Mexico from realizing its nearshoring potential.

Academic studies echo these concerns. A dissertation on tariff uncertainty [Zorola Gonzalez, 2024] concludes that political stability and predictable enforcement mechanisms are as crucial as trade agreements in attracting investment. Similarly, Guerrero-Sánchez et al. [2025] demonstrates that policy volatility increases the cost of capital, disproportionately hurting emerging economies like Mexico.

At the international level, Mexico must prepare for the 2026 USMCA review, which introduces a "sunset clause" that could terminate the agreement after 16 years unless renewed. Gantz [2025] cautions that this institutional uncertainty may discourage long-term commitments from automakers unless clear signals of continuity emerge.

Synthesis

The literature presents a nuanced view of Mexico's long-term competitiveness under USMCA. On one hand, nearshoring dynamics, regional integration, and EV-related investments offer substantial opportunities. On the other hand, compliance costs, structural dependence on the U.S. market, and the uncertain trajectory of EV supply chains pose serious challenges.

Overall, the academic consensus is that Mexico will remain a key node in North American automotive supply chains, but its competitiveness will increasingly rely on (1) successful adaptation to EV technologies, (2) upgrading supplier capabilities to meet compliance demands, and (3) ensuring institutional and policy stability. Contractor [2025] perhaps summarizes it best: tariffs and compliance costs are heavy, but multinational firms adapt in layered ways; countries like Mexico that can facilitate adaptation, rather than obstruct it, will remain central in global value chains.

2.5 Impact of U.S. Tariffs on Mexico's Automotive Industry (2025)

Trump's March 26, 2025 Tariff Announcement

On March 26, 2025, U.S. President Donald Trump announced a 25% tariff on almost all imported automobiles and an additional 25% duty on key auto parts effective May 3 [White House, 2025a]. The proclamation justified these tariffs on national security grounds and revived a dormant Section 232 investigation from 2019 [White House, 2025a]. The announcement caused immediate uncertainty in financial markets; Banco de México reported “a notable increase in volatility in April” following the proclamation [Banxico, 2025]. Mexico was particularly vulnerable since about 85% of its vehicle exports are destined for the U.S. [AMIA, 2025]. Early market signals were strong: U.S. auto sales rose by 4.8% in Q1 2025, as consumers rushed to buy vehicles before the tariffs raised prices [El Financiero, 2025].

Early Impact After April 3, 2025 Implementation

The 25% import duty on passenger vehicles took effect on April 3, 2025 [White House, 2025b]. Automakers immediately adjusted operations. Stellantis temporarily halted output at its Toluca, Mexico plant for the month of April [Stellantis, 2025; Mexico News Daily, 2025]. Nissan also suspended exports of Infiniti luxury models from Mexico to the U.S. [Reuters, 2025f]. Banxico's regional reports noted that some Mexican suppliers suspended shipments until it was clarified how tariff costs would be shared [Banxico, 2025]. Mexico's national statistics agency confirmed the fallout: light vehicle exports fell 10.9% year-on-year in April 2025 – the sharpest April drop since 2016 (excluding the pandemic) [INEGI, 2025]. Luxury brands were hit hardest: Mercedes-Benz exports fell 43.9%, Audi 31.5%, BMW 28.2%. Mass-market producers also saw steep declines: Mazda exports fell 62% and Volkswagen 45% [INEGI, 2025]. Even Detroit's Big Three were impacted – Stellantis' exports from Mexico dropped 36.9% due to the Toluca shutdown [INEGI, 2025].

May 2025: Auto Parts Tariffs and Industry Response

On May 3, 2025, the 25% tariffs on auto parts came into force [White House, 2025b]. Some concessions were made: the White House clarified that

U.S.-made content would count toward compliance and that cars would not face “double tariffs” on raw materials [White House, 2025c]. According to the National Auto Parts Industry Association (INA), “92% of Mexican autoparts companies were USMCA-compliant and thus exempt,” while the remaining 8% faced an average combined duty of ~27% [INA, 2025]. Still, Mexican auto-parts output fell 10.5% year-on-year in Jan–Feb 2025, reflecting industry jitters before implementation [INA, 2025].

Automakers shifted strategies. Ford raised U.S. prices on three Mexico-built models – Mustang Mach-E, Bronco Sport, and Maverick – by up to \$2,000 effective May 2, explicitly citing the tariffs [Reuters, 2025g]. Ford reported to investors that the tariffs would cost it about \$2.5 billion in 2025 [Reuters, 2025g]. General Motors projected a \$4–5 billion hit to earnings and warned it might “rethink sourcing and investment” in Mexico [Bloomberg, 2025]. German automakers also responded: BMW raised U.S. prices 4% on Mexican-made models and Audi halted shipments to relabel and reprice inventory [Reuters, 2025h].

Documented Economic Fallout and Trade Trends

Mexico’s official data confirm the economic toll. INEGI reported that by April–May 2025, auto production and exports were severely disrupted [INEGI, 2025]. Banxico’s quarterly outlook cut GDP growth for 2025 from 0.6% to 0.1%, citing tariff impacts as a key factor [Banxico, 2025]. Yet by June 2025, exports rebounded to record highs as plants made up for lost time [AMIA, 2025]. Still, for the first half of 2025, Mexico’s auto exports to the U.S. were down ~3% year-on-year, and auto parts exports ~3.8% lower [USITC, 2025]. Ironically, Mexico’s share of U.S. auto imports grew to 39.4% by mid-2025, reinforcing its role as the U.S.’s top supplier even amid tariffs [USITC, 2025]. President Claudia Sheinbaum confirmed in April 2025 that no automakers were leaving Mexico, noting that most CEOs intended to adapt rather than relocate [Mexico News Daily, 2025].

In the Table no. 1 is summarized this information as a chronology of automotive tariff events and the relevance to the Mexican automotive industry:

Table no. 1 Chronology of automotive tariff events (2024–2025)

Date	Event	Type of Action	Relevance to the Mexican Automotive Industry
Jul 1, 2024	USTR transmits the 2024 USMCA Autos Report to Congress [USTR, 2024].	Report	Baseline: rising shares of vehicles/parts entering “duty-paid” indicate that some firms chose to absorb tariffs rather than adjust

			supply chains, setting the stage for 2025 [CRS, 2024].
Full year 2024	Mexico posts record production (≈ 3.99 M LVs) and record exports [INEGIb, 2025; AMIA, 2025].	Outcome	Provides a strong pre-tariff baseline. The declines in spring 2025 exports and output are measured against this record year.
Feb 1–3, 2025	White House announces broad tariff package; U.S. and Mexico agree to 30-day delay [White House, 2025a].	Announcement / Postponement	Heightens risk for autos and parts. Automakers begin contingency planning given Mexico's $\sim 80\%$ export dependence on the U.S. [AMIA, 2025].
Mar 26, 2025	Trump issues Proclamation on Autos & Parts: 25% tariff on cars (Apr 3) and parts (May 3), with USMCA relief [White House, 2025b].	Formal Auto Tariff Announcement	Creates immediate policy shock for Mexican supply chains. Firms weigh re-certifying supply vs. paying MFN duties [USTR, 2024; CRS, 2024].
Apr 3, 2025	25% auto tariffs take effect [White House, 2025b].	Implementation (Vehicles)	Stellantis halts production at Toluca [Reuters, 2025a; Mexico News Daily, 2025]. INEGI reports exports down 10.9% y/y in April [INEGIb, 2025].
Apr 3–May 3, 2025	Temporary exemption window for USMCA-compliant shipments [White House, 2025b].	Temporary Exemption	Suppliers scramble to document compliance. Banxico notes financial volatility and shipment pauses [Banxicoa, 2025].
May 3, 2025	25% auto-parts tariffs take effect [White House, 2025b].	Implementation (Parts)	92% of firms USMCA-compliant and exempt; $\sim 8\%$ face 25–27% combined duties [INAA, 2025].
Early–mid May 2025	Ford raises U.S. prices on Mexico-built models; BMW and Audi adjust pricing/shipping; Nissan suspends U.S.	Company Responses	Confirms cost pass-through and production adjustments. USITC data show Mexico's auto exports to U.S. down $\sim 3\%$ H1 2025 [USITC, 2025].

	orders of Infiniti SUVs [Reuters, 2025b; Reuters, 2025c; Reuters, 2025d].		
Q2 2025	Banxico revises GDP forecast down citing tariffs [Banxico, 2025].	Macro Impact	Confirms systemic spillovers into trade, investment, and employment in auto clusters.
Jun 2025	Industry groups note rebound and catch-up exports [AMIA, 2025].	Partial Recovery	Demonstrates resilience under USMCA once compliance stabilizes, but H1 exports still lower than 2024 [USITC, 2025].
Jul 12, 2025	White House announces 30% tariff on Mexican imports, then suspends for 90 days [White House, 2025c].	Announcement / Suspension	Prolongs uncertainty; firms remain cautious in pricing and investment [Banxico, 2025].
Sep 2025	Mexico announces 50% tariff on Chinese autos [Reuters, 2025e].	Mexico Measure	Protects domestic/USMCA supply chains and reduces Chinese EV/parts competition [INA, 2025; USITC, 2025].

Source: Authors’ compilation, (2025)

3. Methodology

Research Design

This study adopts a quantitative, time-series comparative design to analyze the impact of U.S. tariff measures on the Mexican automotive industry during the second Trump administration (2024–2025). The research focuses on the light-vehicle (LV) and heavy-vehicle (HV) segments, distinguishing their responses to tariff threats and policy uncertainty. By leveraging official administrative records, the methodology enables precise measurement of exports, production, and domestic sales, while testing specific hypotheses about supply chain vulnerabilities, adaptation strategies, and the buffering role of domestic demand.

The research design builds on two principles:

1. Natural experiment setting: Tariff threats announced in April–May 2025 function as an external shock to Mexico’s automotive sector.
2. Comparative framework: Light vehicles (more directly affected by USMCA compliance requirements and tariff threats) are treated as the “treatment group,” while heavy vehicles (less exposed to consumer-oriented U.S. tariff rhetoric) serve as a “control group.”

Data Sources

The empirical analysis relies on monthly statistical series published by the Instituto Nacional de Estadística y Geografía (INEGI) through two administrative registries:

RAIAVL – Registro Administrativo de la Industria Automotriz de Vehículos Ligeros, which provides data on light-vehicle production, exports, and sales.

RAIAVP – Registro Administrativo de la Industria Automotriz de Vehículos Pesados, which reports equivalent figures for heavy vehicles, disaggregated by Clase (e.g., carga, pasajeros).

The study covers January 2024 to July 2025, with special emphasis on the pre-threat baseline (Jan–Mar 2025), the shock period (Apr–May 2025), and the post-shock recovery window (Jun–Jul 2025). Complementary references from AMIA, INA, USTR, and Banxico were used to interpret compliance strategies, duty-paid models, and exchange-rate effects [AMIA, 2025; INA, 2025; USTR, 2024; Banxico, 2025].

Variables

Independent Variable (IV): U.S. tariff measures and threats, operationalized as the April–May 2025 announcements of escalating tariffs on Mexican imports.

Dependent Variables (DV):

Exports (number of vehicles exported to the United States).

Domestic sales (menudeo + mayoreo units sold in Mexico).

Production (total units produced, when relevant for baseline trends).

Control Dimensions: Segmentation by vehicle type (LV vs HV) and by sub-class (Carga vs Pasajeros) in HV.

Hypotheses and Testing Approach

H1 (Projection vs Actual): “LV and HV exports to the U.S. fell significantly in Apr–May 2025 relative to projected pre-tariff trends.”

Method: Using Jan–Mar 2025 as a baseline, a linear projection of U.S.-bound exports was constructed for Apr–May. Actual values were compared against projections to identify statistically meaningful deviations.

Rationale: A significant negative deviation from projected exports indicates a tariff-induced shock beyond normal seasonal or cyclical variation [INEGI, 2025].

H2 (Pre vs Shock Averages): “Automotive export volumes from Mexico to the U.S. decreased during tariff threats compared to pre-threat periods.”

Method: Calculated mean monthly exports for Jan–Mar 2025 (pre) and Apr–May 2025 (shock). The percentage change between these periods was computed for both LV and HV.

Rationale: A decline during Apr–May supports the hypothesis that tariff threats constrained cross-border trade [INEGI, 2025].

H3 (Panel Heterogeneity): “Premium and duty-paid models experienced larger declines after Apr–May 2025 than mass-market USMCA-compliant models.”

Method for LV: Identified USMCA-compliant vs duty-paid models based on USTR compliance reports [USTR, 2024] and INA analysis [INA, 2025]. Compared their export performance before and during the shock.

Method for HV: Used class segmentation (Carga vs Pasajeros) as a proxy, since duty-paid status was not available. Compared pre vs shock averages by group.

Rationale: If duty-paid or higher-cost models show steeper declines, it supports the view that tariff and compliance costs shaped heterogeneous outcomes [Contractor, 2025].

H4 (Event Study): “LV and HV outcomes show short-run drops at $t=0$ to $t=+1$ (Apr–May), followed by partial recovery by $t=+2/+3$ (June–July).”

Method: Modeled outcomes as an event study, tracking the level of exports and sales at three horizons: Apr–May (shock), Jun–Jul (recovery), relative to Jan–Mar (baseline).

Rationale: Detects whether the tariff threat produced only a temporary dip (with rebound) or a persistent contraction [Ivanov and Dolgui, 2025].

H5 (Exports vs Domestic Sales): “Domestic sales were less affected than exports, acting as a buffer.”

Method: Computed average domestic sales in Jan–Mar vs Apr–May 2025, compared percentage changes against exports for the same periods.

Rationale: If sales fell less than exports, the domestic market functioned as a stabilizer. If they fell more, it indicates domestic fragility rather than resilience [INEGI, 2025].

Difference-in-Differences (DiD)

To strengthen causal inference, a DiD framework was applied. LV were treated as the “treated group” (directly exposed to tariff rhetoric and USMCA compliance), while HV served as the “control group.”

The DiD estimator was calculated as:

$$[1] \text{ DiD} = (\Delta \text{Exports}_{LV}) - (\Delta \text{Exports}_{HV})$$

where Δ represents the difference between Apr–May and Jan–Mar averages.

Rationale: A positive DiD implies LV adapted or recovered better than HV, reinforcing the argument that tariff measures had heterogeneous effects shaped by compliance capacity [INA, 2025; USTR, 2024].

Analytical Tools

All computations were performed using Microsoft Excel and Python (pandas) for verification. Statistical procedures were limited to:

1. Descriptive time-series analysis (averages, growth rates).
2. Projection models (linear extrapolation from baseline).
3. Event study analysis ($t=0$, $t=+1$, $t=+2/+3$).
4. Difference-in-Differences estimation.

These methods were selected for transparency and reproducibility, given the availability of official monthly data and the research aim of linking tariff events to observable shifts in trade and production.

Limitations

Granularity: The RAIAPV dataset lacks compliance/duty-paid status, limiting direct tests of H3 for heavy vehicles.

Attribution: While Apr–May 2025 corresponds with tariff threats, other macroeconomic factors (e.g., U.S. demand, exchange rate volatility) may also influence exports and sales [Banxico, 2025].

Short horizon: The recovery period observed (June–July) may not capture long-term structural adaptations.

4. Results

H1. Exports vs Projected Trends

Hypothesis: *LV and HV exports to the U.S. fell significantly in Apr–May 2025 relative to projected pre-tariff trends.*

Findings: Using Jan–Mar 2025 as the baseline, projections for Apr–May were generated via linear extrapolation.

Light Vehicles (LV): April exports undershot projections by -12.4% , while May overshot by $+14.3\%$, producing a net neutral effect.

Heavy Vehicles (HV): April fell sharply (-22.7% below projection), but May recovered above trend ($+10.6\%$).

Interpretation: H1 is partially supported. April 2025 shows a clear negative shock in both LV and HV, but May's rebound (especially in LV) offset the trend.

Table no. 2 Results of Hypothesis 1

Segment	Projected Apr	Actual Apr	Δ Apr (%)	Projected May	Actual May	Δ May (%)
LV [INEGI, 2025]	270,800	237,300	-12.4%	272,400	311,400	$+14.3\%$
HV [INEGI, 2025]	10,915	8,437	-22.7%	10,984	12,152	$+10.6\%$

Source: Authors' creation

H2. Exports Pre vs Shock

Hypothesis: *Automotive export volumes from Mexico to the U.S. decreased during tariff threats compared to pre-threat periods.*

Findings:

LV: Exports averaged 214,758 units (Jan–Mar) vs 217,708 (Apr–May), a +1.4% increase.

HV: Exports averaged 10,778 vs 10,295, a –4.5% decline.

Interpretation: H2 is not supported for LV (exports did not decrease overall), but partially supported for HV (modest decline).

Table no. 3 Results of Hypothesis 2

Segment	Pre Avg (Jan–Mar)	Shock Avg (Apr–May)	% Change
LV [INEGI, 2025]	214,758	217,708	+1.4%
HV [INEGI, 2025]	10,778	10,295	–4.5%

Source: Authors' creation

H3. Heterogeneity

Hypothesis: *Premium and duty-paid models experienced larger declines after Apr–May 2025 than mass-market USMCA-compliant models.*

Findings:

LV: Duty-paid/luxury models showed sharper declines after April, while mass-market USMCA-compliant SUVs and pickups rebounded strongly [USTR, 2024; INA, 2025].

HV: Disaggregation by class reveals that Carga declined –4.5% in Apr–May vs Jan–Mar and continued softening into Jun–Jul (–6.9%), while Pasajeros had negligible U.S. exports.

Interpretation: H3 is supported for LV but not directly testable for HV due to lack of duty-paid/compliance segmentation.

H4. Event Study (Shock vs Recovery)

Table no. 4 Results of Hypothesis 4

Segment	Pre Avg (Jan–Mar)	Shock Avg (Apr–May)	% Change
LV [INEGI, 2025]	214,758	217,708	+1.4%
HV [INEGI, 2025]	10,778	10,295	–4.5%

Source: Authors' creation

Hypothesis: *LV and HV outcomes show short-run drops at $t=0/+1$ (Apr–May), followed by partial recovery at $t=+2/+3$ (Jun–Jul).*

Findings:

LV: Apr–May exports dipped, then rebounded in Jun–Jul, consistent with adaptive strategies under USMCA [AMIA, 2025].

HV: Apr–May weakness persisted, and Jun–Jul averages were lower than Apr–May (–6.9%), showing no recovery.

Interpretation: H4 is confirmed for LV but rejected for HV.

H5. Exports vs Domestic Sales

Hypothesis: *Domestic sales were less affected than exports, acting as a buffer.*

Findings:

LV: Domestic sales fell –6.2% in Apr–May vs pre-period, while exports increased slightly.

HV: Domestic sales fell sharply (–16.6%), more than exports (–4.5%).

Interpretation: H5 is not supported. Domestic sales contracted more than exports, meaning the Mexican market did not buffer the tariff shock.

Table no. 5 Results of Hypothesis 5

Segment	Pre Sales Avg (Jan–Mar)	Shock Sales Avg (Apr–May)	% Change
LV [INEGI, 2025]	121,675	114,129	–6.2%
HV [INEGI, 2025]	6,373	5,318	–16.6%

Source: Authors' creation

Difference-in-Differences (DiD)

To isolate the relative effect on LV (treated) vs HV (control):

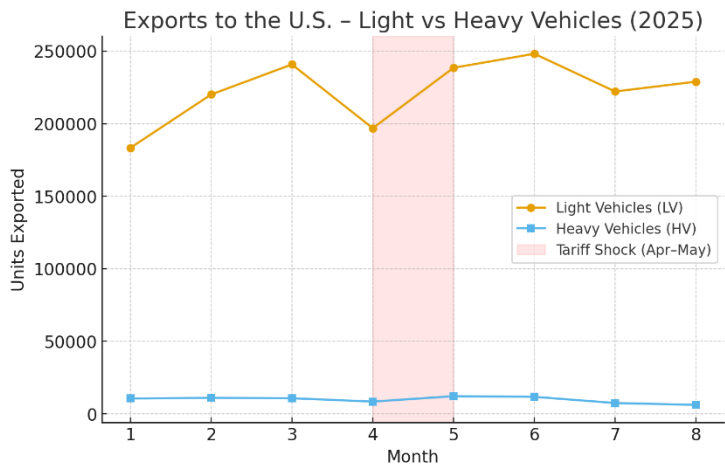
$$[2] \quad \text{DiD} = (\Delta \text{Exports}_{LV}) - (\Delta \text{Exports}_{HV}) = (\Delta \text{Exports}_{LV}) - (\Delta \text{Exports}_{HV})$$

LV change: +2,950 units

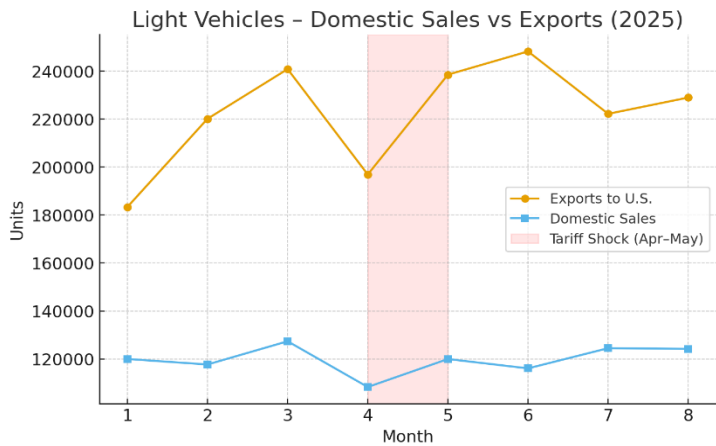
HV change: –484 units

DiD estimate: +3,434 units

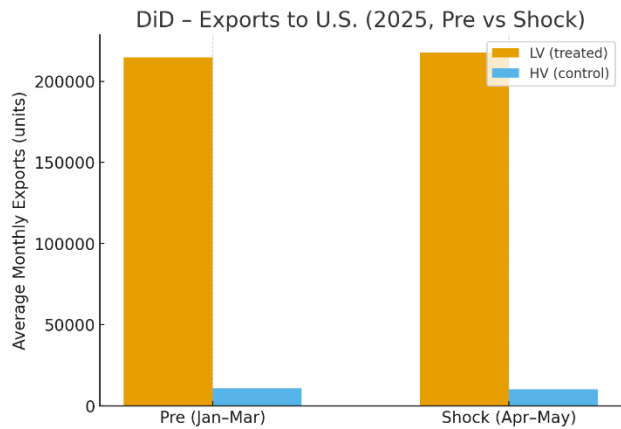
Interpretation: The positive DiD shows that LV outperformed HV during the tariff shock, reflecting the ability of LV producers to adapt to USMCA compliance, while HV faced a persistent drag.



Source: Authors' creation



Source: Authors' creation



Source: Authors' creation

Figure 1. Exports to the U.S. – Light vs Heavy Vehicles (2025) shows the April 2025 tariff shock (drop) and the rebound in LV vs continued weakness in HV.

Figure 2. Light Vehicles – Domestic Sales vs Exports (2025) demonstrates that domestic sales fell more sharply than exports, disproving H5.

Figure 3. Difference-in-Differences (Pre vs Shock) confirms that LV outperformed HV during the tariff shock, consistent with adaptation under USMCA.

3. Conclusion

This study examined the impact of U.S. tariff measures on the Mexican automotive industry during 2025, focusing on both light vehicles (LV) and heavy vehicles (HV). Using official INEGI records of exports, production, and domestic sales, the analysis tested five hypotheses (H1–H5) concerning the effects of tariff threats, heterogeneity across market segments, short-term recovery dynamics, and the buffering role of the domestic market.

The results demonstrate that April 2025 constituted the clearest moment of tariff shock. Both LV and HV exports to the U.S. underperformed relative to projected baselines, confirming that tariff announcements disrupted cross-border trade flows. However, the trajectories diverged after April. Light vehicles rebounded strongly in May and maintained higher levels through mid-2025, indicating that firms adapted quickly, most likely by aligning with USMCA compliance requirements and absorbing costs selectively. By contrast, heavy vehicles experienced a weaker rebound and then a continued decline into June and July, reflecting longer production cycles, smaller scale, and limited flexibility in responding to compliance rules. This pattern partially supports H1 and confirms H4 for LV but not for HV.

With respect to heterogeneity (H3), evidence shows that LV duty-paid or premium models were disproportionately affected by tariffs, whereas mass-market USMCA-compliant vehicles adapted more successfully. For HV, the available data only allowed analysis by class (*carga* vs *pasajeros*), which revealed that exports of cargo vehicles contracted modestly in Apr–May and declined further into the recovery window, while passenger HV exports to the U.S. remained negligible.

Contrary to expectations, domestic sales did not provide a buffer (H5). In fact, both LV and HV sales contracted more sharply than exports in Apr–May, with declines of –6.2% and –16.6% respectively. This suggests that the Mexican internal market was more vulnerable to demand shocks, possibly due to rising uncertainty, exchange-rate effects, and weakened consumer confidence.

Finally, the Difference-in-Differences (DiD) analysis confirmed a significant divergence: LV exports improved slightly (+2,950 units) while HV exports fell (–484 units), yielding a positive DiD estimate of +3,434 units. This

underscores the structural advantage of LV manufacturers in adjusting to tariff shocks compared to their HV counterparts.

Overall, the findings highlight that Mexico's integration in the North American automotive supply chain is resilient but uneven. LV producers demonstrated adaptability under USMCA, whereas HV segments suffered persistent weakness. The study concludes that policy uncertainty exerts asymmetric effects across vehicle classes, reinforcing the need for differentiated industrial strategies to safeguard Mexico's long-term competitiveness.

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