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Economic Risks of Tariff Escalation for California Almond Producers

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California's almond industry faces increasing economic uncertainty from trade policy shifts and potential tariff retaliation. This report evaluates the trade risks associated with seven trade policy scenarios using trade elasticity estimates and historical trade data. The findings indicate that broad-based tariff measures could significantly reduce export demand, with Fresno, Kern, and Stanislaus counties experiencing the largest losses. These potential disruptions underscore the need for strategic planning, including market diversification and policy adaptations, to mitigate risks and sustain the industry's global position.

California is the world's leading almond producer and exporter, supplying nearly two-thirds of the global market. In 2024, the state's almond exports were valued at approximately $4.8 billion, underscoring their significance to both the U.S. agricultural sector and global trade (U.S. Census Bureau Trade, 2025). The European Union (EU) has historically been the largest export destination, accounting for roughly one-third of shipments between 2020 and 2023. Other major markets include China, which held a 9.5% share, followed by Canada at 5.3% and Mexico at 2.1% (California Department of Food and Agriculture). The industry's heavy reliance on international markets makes it particularly vulnerable to trade policy shifts, especially those involving tariffs and retaliatory measures.

Escalating trade tensions and evolving trade policies have introduced new uncertainties for California's almond producers. Drawing from past trade disputes—particularly the 2018 trade war, when U.S. agricultural exports faced retaliatory tariffs—this report assesses potential economic risks under seven trade policy scenarios. These scenarios reflect a range of possible retaliatory tariff escalations, from country-specific measures to broader trade restrictions that could impact multiple key markets.

The first three scenarios focus on trade policy proposals introduced in 2024, which included heightened trade barriers targeting China and potential global import restrictions. In Scenario 1, the U.S. imposes tariffs on China, prompting a retaliatory 30% tariff on U.S. almonds. Scenario 2 considers a broader approach, with the U.S. implementing a 10% tariff on all imports, placing California almonds at the center of a global trade dispute due to their strong presence in markets like the EU and India. Scenario 3 represents a more aggressive stance, with the U.S. imposing a 60% tariff on Chinese goods and a

10% tariff on imports from all other countries, likely triggering widespread trade disruptions and retaliatory tariffs.

Scenarios 4 through 7 examine potential retaliatory tariffs in 2025, reflecting recent trade policy shifts and tariff measures implemented by the U.S. government. These include a 25% ad valorem tariff on all Canadian imports and a 10% tariff on energy exports, both of which were initially scheduled for early 2025 but later postponed before taking effect in March. Similarly, a 25% tariff on all Mexican imports was enacted, while a 10% tariff on all Chinese imports proceeded as planned.

In response, Canada, Mexico, and China have signaled the possibility of retaliatory tariffs on a broad range of U.S. agricultural products. Scenario 4 assumes Canada imposes a 25% tariff on U.S. almond exports, while Scenario 5 models a similar response from Mexico. Scenario 6 evaluates the impact of a 10% ad valorem tariff from China, consistent with previous trade disputes, and Scenario 7 envisions all three countries imposing retaliatory tariffs simultaneously, amplifying trade tensions and economic risks for U.S. exporters.

Table 1. Summary of 2025 Trade Policy Scenarios.

Scenarios	China's Response	China's total tariff on Almond	Other Countries' Response
Scenario 1	Extra 30% import tariff increase on U.S. almonds.	55%	None.
Scenario 2	Extra 10% import tariff increase on U.S. almonds.	35%	ROW: Extra 10% import tariff increase on U.S. almonds.
Scenario 3	Extra 20% import tariff increase on U.S. almonds.	45%	ROW: Extra 10% import tariff increase on U.S. almonds.
Scenario 4	None.	25%	Canada: Extra 25% import tariff increase on U.S. almonds.
Scenario 5	None.	25%	Mexico: Extra 25% import tariff increase on U.S. almonds.
Scenario 6	Extra 10% import tariff increase on U.S. almonds.	35%	None.
Scenario 7	Extra 10% import tariff increase on U.S. almonds.	35%	Canada & Mexico: Extra 25% import tariff on U.S. almonds.

Note. The table summarizes the seven potential trade policy scenarios. Based on historical actions from the Chinese and foreign governments, we assume tit-for-tat retaliations on U.S. almond exports.

Potential Risks to California Almond Producers

Table 2 presents the potential trade risk for California almond producers from retaliatory tariffs targeting U.S. agriculture.[1] We estimate seven scenarios. In addition to the retaliatory tariff assumptions for each country, we use three different factors for the estimations:

- Baseline projection for 2025: We first project 2025 almond export values using a first-order autoregressive model with a stochastic component to account for expected volatility. We utilize data

[1] These classifications represent commodity groups rather than individual products. For instance, almonds encompass HS code 080212 (Almonds, shelled) and HS code 080211 (Almonds, in shell). However, HS code 200819 is not included in this categorization. Definitions for product groups can be found here: https://apps.fas.usda.gov/gats/ProductGroup.aspx?GROUP=BICO-HS6.

covering the period from 1995 to 2022. From 2005 to 2022, we sourced information from the California Agricultural Exports Report published by the CDFA. From 1995 to 2005, we obtained data from the Agricultural Issues Center of the University of California, Davis.

- Tariff elasticities: We use product-level tariff elasticity from Grant et al. (2021). To reflect potential outcomes within a reasonable range, we incorporate the estimated standard errors from the source, establishing lower and upper bounds with a 90% confidence interval.[2] Using the estimated coefficient and data on tariff increases for U.S. almond exports, we first estimate the trade elasticity for each percentage increase in tariffs during the 2018 trade war. Since tariffs are imposed at a more granular level (HS-10), we aggregate the total tariff increase for almonds under the relevant HS-BICO 6 groups, where the coefficients were estimated. We then calculate the trade elasticity for each percentage tariff increase by averaging these increases.[3]
- Import share: Lastly, we account for each retaliating country's import share for U.S. almonds using the CDAF agricultural export statistics reports from 2020 to 2023.

In Scenario 1, where China imposes a 30% retaliatory tariff on U.S. almonds—accounting for 9.5% of California's almond export market—exports could decline by up to 2% globally, or approximately $92 million. Scenario 2 presents a more severe impact, assuming a global retaliatory response against California almonds. In this case, with an assumed 10% tariff imposed by multiple trading partners, exports could decline by 7%, resulting in a $323 million loss. If China were to increase its tariff to 20% while other countries maintained a 10% tariff (scenario 3), the decline could reach $385 million.

In Scenario 4, a 25% retaliatory tariff on U.S. almonds from Canada could reduce global exports by $43 million. A similar tariff from Mexico would result in a $17 million decline, while a 10% tariff from China could lead to a $31 million loss. If all three countries imposed these tariffs simultaneously, as outlined in Scenario 7, California's almond exports could decline by 2%, amounting to a $91 million loss in global markets.

Figure 1 shows the potential long-term effects of various retaliatory tariff scenarios on California's almond exports. We compare the projections with a baseline scenario that assumes no tariff increase, represented by a black dashed line. In Scenarios 1, 4, 5, 6, and 7, where retaliatory tariffs are imposed by specific countries such as Canada, China, or Mexico, the impact remains moderate but still disruptive—particularly if multiple countries take action against U.S. almonds.

The more severe scenarios pose a significantly greater risk by 2033. If global trade tensions escalate, as assumed in Scenarios 2 and 3, California's almond industry could face sustained challenges, including shrinking export markets and declining revenues, fundamentally altering the sector's trajectory for years to come.

[2] $CI = \bar{x} \pm \left(1.645 \times \frac{s}{\sqrt{n}}\right)$

[3] We weigh these retaliatory tariff increases by the import share of retaliating countries for two types of almonds recorded under the BICO-HS6 classification using historical bilateral trade data from the BACI (2024) dataset.

Table 2. Potential Almond Export Losses for California

	Baseline Projection	$4,539 mil.		
		Lower Bound	Point Estimate	Upper Bound
Scenario 1	mil. $	-30.64	-91.67	-137.50
	%	-0.68%	-2.02%	-3.03%
Scenario 2	mil. $	-108.10	-323.39	-485.08
	%	-2.38%	-7.12%	-10.69%
Scenario 3	mil. $	-128.53	-384.50	-576.75
	%	-2.83%	-8.47%	-12.71%
Scenario 4	mil. $	-14.45	-43.23	-64.85
	%	-0.32%	-0.95%	-1.43%
Scenario 5	mil. $	-5.59	-16.72	-25.09
	%	-0.12%	-0.37%	-0.55%
Scenario 6	mil. $	-10.21	-30.56	-45.83
	%	-0.23%	-0.67%	-1.01%
Scenario 7	mil. $	-30.26	-90.51	-135.77
	%	-0.67%	-1.99%	-2.99%

Note. Predictions are for 2025, representing California almond export losses to global markets. Upper and lower bounds for each scenario are established using a 90% confidence interval.

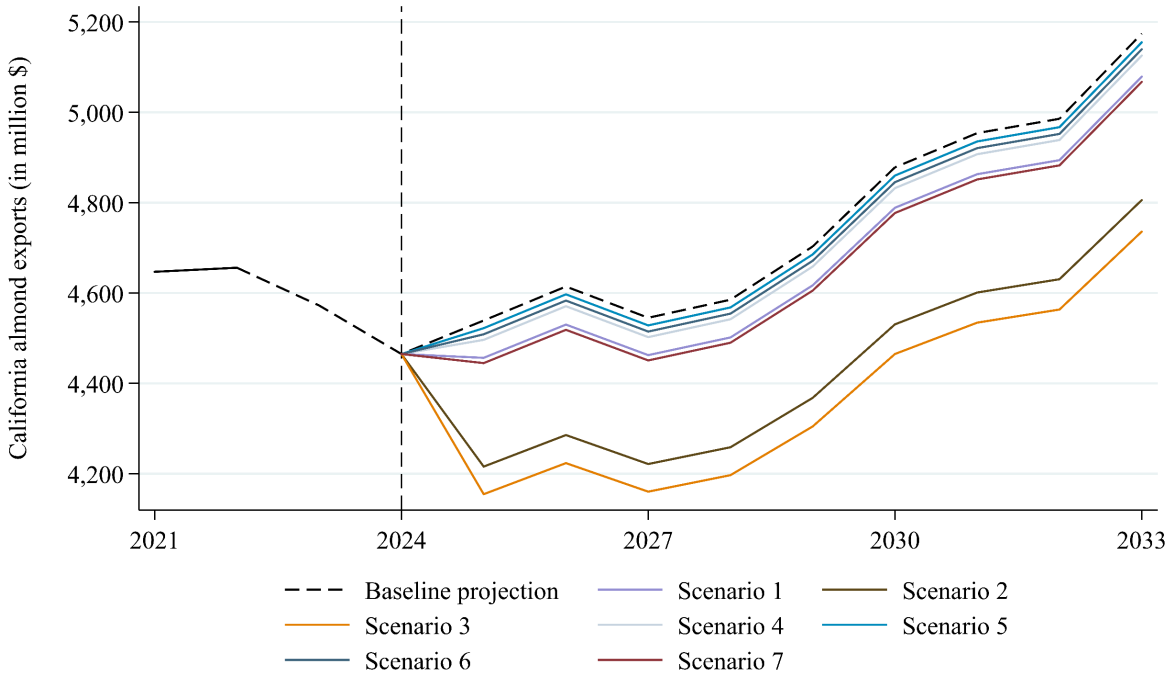


Figure 1. Long-Term California Almond Export Projections

County Level Projections

Figure 2 on the following pages maps the projected almond trade effects at the county level across the different scenarios. We calculate the county-level impact by applying the projected trade effects to each county's 2022 almond production data, sourced from the USDA's National Agricultural Statistics Service (2025). The interior region of California is expected to bear the largest almond trade effects, with Fresno County projected to be the most affected. Across all scenarios, Fresno's estimated losses range from $3 million (Scenario 5) to $73 million (Scenario 3). Other counties facing significant declines include Kern, Stanislaus, Merced, Madera, and San Joaquin.

Conclusion

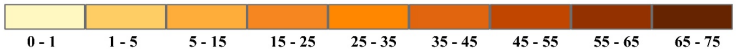
California's almond industry faces growing uncertainty as trade policies evolve and the risk of retaliatory tariffs increases. While some scenarios suggest moderate disruptions, broader tariff measures affecting multiple trading partners could lead to long-term challenges, including reduced export demand and financial strain on producers. The regional impact is expected to be most significant in key almond-producing counties such as Fresno, Kern, and Stanislaus, where trade risks could be substantial.

To navigate these potential disruptions, industry stakeholders may need to explore strategies such as market diversification, risk management approaches, and adjustments to supply chain operations. The future of California's almond trade will depend on how effectively producers and exporters adapt to shifting trade policies and global market conditions.

Scenario 1

Scenario 2

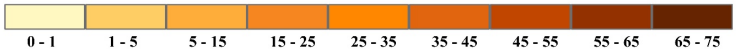
Million $



Scenario 3

Scenario 4

Million $



Scenario 5

Scenario 6

Million $

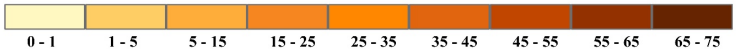


Figure 2. Projected County-Level Almond Trade Effects.

Disclaimer

This report is intended to inform discussions on trade policy and its potential impact on California's almond industry. While it may be shared and referenced, the authors assume full responsibility for errors or omissions. The findings and conclusions presented are based on available data and economic modeling and do not necessarily reflect the views of any institution or organization. Readers are encouraged to use this analysis as a reference while considering additional sources and expert insights for policy and business decisions.

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