Economic Importance of Trade & the Ports to Southern California

Phase I Report: Baseline Economic & Fiscal Impacts

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Prepared by

Center for Jobs & the Economy

California Center for Jobs & the Economy

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EXECUTIVE SUMMARY

California Center for Jobs & the Economy | California Business Roundtable

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Phase I Report: Baseline Economic & Fiscal Impacts

Overview

The Ports of Long Beach (POLB) and Los Angeles (POLA) are the core of the largest trade complex in North America. More than **3 million jobs nationwide** are supported by the two ports and nearly 230,000 jobs in the region. Direct, indirect, and induced effects from activities at the ports supported $2.78 billion in state and local taxes in 2022, plus an additional $4.73 billion in federal taxes. The ports are the base of the region's overall Trade Cluster, which in 2022 generated more economic output than the State of Utah. Beyond this direct impact, the ports also provide additional payments to their respective cities and support various community reinvestment programs. This report quantifies the importance of the ports to the economy and the millions who rely on the ports for well-paying jobs.

The Ports of Long Beach and Los Angeles are indispensable assets that deliver extensive economic benefits, fostering job creation, income generation, and overall economic vitality. Their continued success is essential not just for the prosperity of Southern California but for maintaining the United States' position in the global trade network. The ports' activities bolster the wider Trade Cluster, enriching the economic fabric of the region by supporting a vast array of businesses and providing a steady stream of middle-class wage jobs, particularly for those with minimal formal education. This, in turn, has played a critical role in uplifting the socio-economic position of diverse communities within the region. Additionally, the ports' commitment to community investment and environmental initiatives showcases a sustainable approach to economic development, aligning with broader goals of prosperity and well-being.

Key Jobs and Economic Findings

- **One out of every 51 jobs** nationwide is supported by the Ports of Long Beach and Los Angeles.
- The regional Trade Cluster supported **1.85 million jobs** and accounted for **15.9 percent of all regional jobs**.
- The Southern California Trade Cluster produced **$47.81 billion in state and local tax revenue in 2022**.
- The Trade Cluster is the **second-largest source of jobs for Latinos in the region**, and a significant source of middle-class wage jobs for lower-skilled workers (2/3 of jobs in this cluster only require a high school diploma or less).
- **41.5 percent of Trade workers in 2022 were immigrants** (naturalized and noncitizen), compared to an overall average of 34.6 percent in the region.
- Trade jobs has help **lead to an uptick in the share of middle-class households in the region**, following decades of decline.

Read the Report

About this Report

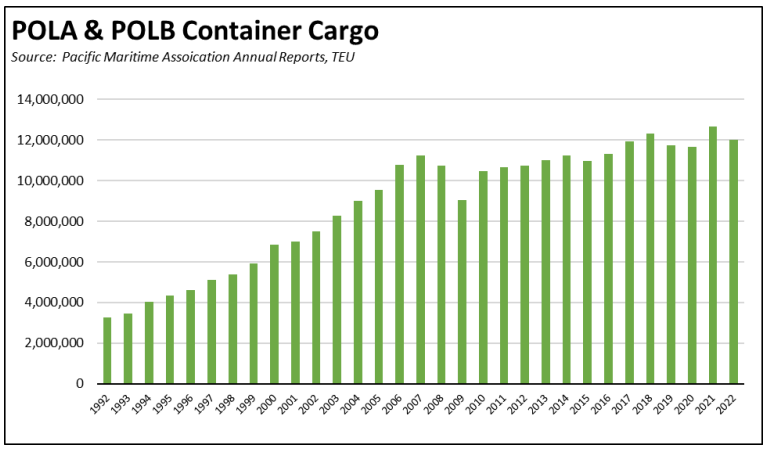
This report is part of a continuing series by the Center looking at key components of the California economy and how they are being shaped—for good and bad—by state and local policies. As assessed in previous analyses by Los Angeles Economic Development Corporation (LAEDC), Trade is the largest industry cluster in both Los Angeles County (LAEDC 2020) and Southern California (LAEDC 2017). The Ports of Long Beach and Los Angeles (Ports) are at the base of this cluster, but overall activity through this trade complex risks being affected under pending regulations from South Coast Air Quality Management District (SCAQMD) through its indirect source regulations for the ports (Ports ISR).

The report is being completed in two parts. Part I provides an overview of the economic contributions made by the Ports and the overall Trade cluster in Southern California, including a review of previous economic studies, details on the Trade workforce, and an updated assessment of the baseline economic and fiscal impacts using more current 2022 data. Part II will then assess the effects of the SCAQMD draft rule once it is released.

However, shifting markets, the impact of state and regional policy decisions (especially the rising cost of electricity), the ongoing threat of cargo theft, and other factors, have greatly affected traffic through the ports, leading to lost job and tax revenue to cities, other local agencies, the state, and nation. The ports' market share for containerized cargo peaked in 2006-07 at 29.9 percent of total U.S. trade. As a result of the factors listed above, U.S. market share was down to 22.9 percent in 2022.

The Ports Are an Economic Powerhouse

Trade has become an increasingly important component of the US economy. In 2022 (World Trade Organization, 2023) excluding intra-EU trade, the US was the third largest exporter ranked by the value of merchandise trade ($2.065 trillion compared to China at $3.594 trillion and extra-EU exports at $2.704 trillion) and the largest importer ($3.395 trillion compared to extra-EU at $3.155 trillion and China at $2.714 trillion). On this basis, the US accounted for 10.1% of global merchandise exports and 15.8% of merchandise imports. Although the projections were prepared prior to the current weakness shown in the China and EU economies and challenges to Suez Canal trade routes, WTO expected global trade to grow 1.7% in 2023 and recover to 3.2% in 2024, compared to an overall average of 2.6% in the 12 years following the Great Recession.



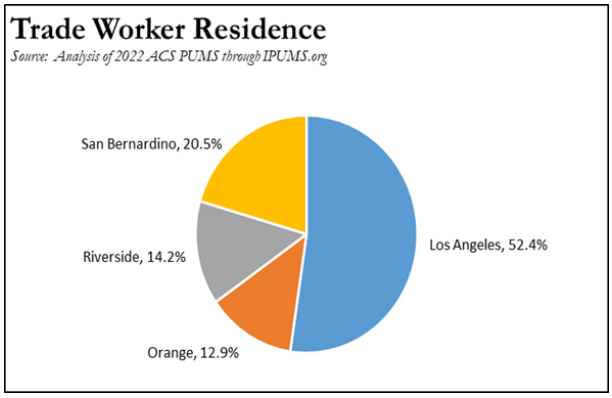
The nation's ports are critical infrastructure supporting this growing share of the economy. In 2021, waterborne vessels were the leading trade transport mode in the US, accounting for 41.1% of total trade by value (US Department of Transportation, 2023). The remainder was carried by air and by rail and truck from Canada and Mexico.

Ranked by total TEU throughput, combined activity at POLA and POLB placed them as the largest container port complex in North American and the 9th largest worldwide in 2022. Total traffic through the two ports was 19.045 million TEU in 2022 and 16.648 million TEU in 2023. Activity at the next 4 largest US ports in 2022: New York-New Jersey with 9.494 million TEU, Savannah with 5.892 million, Houston with 3.975 million, and Virginia at 3.718 million.

The number of TEUs handled by the two Ports rose rapidly from 1992 through 2007, at an average annual rate of 8.6%, as trade with China expanded combined with the rapid shift to container mode. Using numbers from the Ports, total loaded TEUs at 10.8 million were down 9.4% in 2023—and total TEUs (loaded and unloaded) at 16.6 million in 2023 down 12.6%—outpacing the overall drop in global trade activity.

In 2022, just over half of workers with a primary job in Trade lived in Los Angeles County. San Bernardino County was the second highest with one-fifth of all Trade workers in the region.

By Ethnicity & Race, Trade is a relatively larger source of jobs for Latinos, at 46.7% of Trade jobs compared to 41.7% of all private jobs in Southern California in 2022. Non-Latino Whites had a much lower share (28.7% of Trade jobs vs. 34.3% of total jobs), while the other categories show much smaller differences.



Factors Affecting the Ports' Competitiveness

The Ports became the dominant conduit for Pacific Rim trade as the result of leveraging their advantages as the first port of landing, under which cargo owners consider not only the time and cost of moving goods across oceans but also how quickly goods can be moved to/from land transportation nodes and their ultimate markets and production centers. Continued investments in the port facilities have kept them competitive as vessel sizes have grown larger. An extensive transportation, warehouse, and support industry network facilitates movement of goods to and from the Ports. Two Class 1 railroads provide competitive rail service to the interior US markets. The Clean Air Action Plan maps the investments required to maintain this economic activity while contributing to the region's environmental goals and minimizing the shift—rather than a reduction—of the associated emissions to other ports and regions not having to face the same standards and costs of attaining them. As a result, under normal operating conditions, goods can be moved more quickly from East Asian originations to their final destinations using POLA and POLB rather than the East and Gulf Coast ports.

Interacting with these geographic and infrastructure advantages are a number of factors affecting market share and consequently jobs within the region related to the Ports. Many of these factors are reflected in the higher costs of shipping through POLA and POLB which in a rising number of instances have offset the time advantages they offer.

Key Competitiveness Factors

All ports are in competition for discretionary intermodal cargo moving beyond the coasts into the interior markets in US and Canada. This component makes up about 33% of all cargo handled by POLA and can be affected by factors such as capacity of rail routes and the competing water routes.

- **Regulatory costs.** According to a POLA analysis: *"Paying for mandated air pollution reduction infrastructure, equipment and other measures may become a significant portion of the Port's capital budget and operating budget."*
- **Limited expansion options.** The ability of POLA and POLB to compete for increased market share is constrained by relatively more limited space for expansion at the Ports, more costly and lengthy regulatory approvals, and increasing opposition to new warehouses in the region coming from state and local sources.
- **Canada.** The Canadian Pacific Coast ports are also a source of competition due to the fact they are closer in sailing time to the Asian ports, have a shorter rail time to Chicago and other Midwest markets, have lower vessel and container charges due to the fact that they do not charge the Harbor Maintenance Tax applied in all US ports and avoid the Alameda Corridor Transportation Authority transit fee applied at POLA and POLB, and have invested in capacity expansion in recent years.
- **Supply chain capacity.** The Ports' competitive edge comes from not only their ability to handle cargo efficiently at water's edge but also through efficient movement of those goods to and from the point of final use and production. The congestion experienced through mid-2022 spotlighted capacity limits throughout the supply chain, including container storage yards, warehouses, and both truck and rail links.
- **Shifts in manufacturing.** As discussed in this report, even at reduced levels Southern California retains a significant manufacturing base that relies on the Ports both for access to export markets and as a conduit for required parts, components, and materials. Nationally, however, this trade is shifting to the East and Gulf coasts. Between the low in 2010 and 2022, US Bureau of Labor Statistics data shows that 38% of manufacturing jobs expansion in the US was in 7 Southeastern states, and this trend will accelerate as the electric vehicle and battery plants now under construction move to full operation and as their supply and support networks relocate to this region. Parts, component, and material freight routes will also follow this shift.
- **Regulatory uncertainty.** Intermodal supply chain components are capital-intensive operations involving long-term investments and leases. Uncertainty in the regulatory environment throughout the supply chain has effects on the costs of operation and has the potential to dampen overall investments in Southern California across all supply chain sectors, ironically reducing investments in the infrastructure necessary to facilitate environmental improvements and higher deployment levels of zero emission equipment. The net result is to shift these investments away from Southern California and to more certain investment environments in other states, moving capital spending more to other regions and affecting the overall competitiveness that leads shippers to consider other port options.

Closer Look: Energy Costs

State and local energy policies have produced the highest or near the highest energy prices among the states. The average estimated commercial electricity rate in the region in 2022 was 72% higher than the average for all states other than California. The estimated average industrial rate in the region was 121% higher. The table above shows energy costs in the region compared to the states with the other top 5 ports.

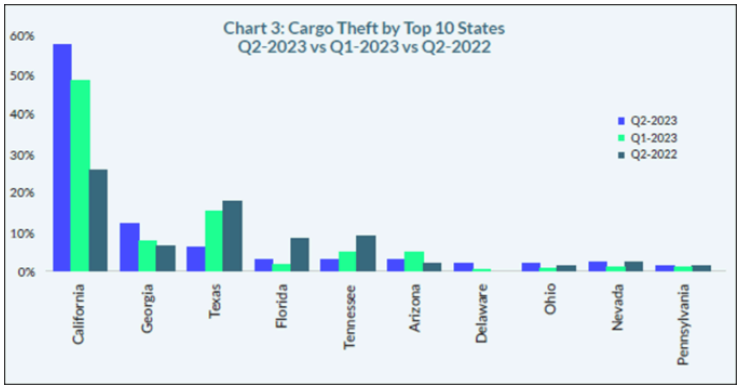
Average Energy Costs, 2022

Source: Calculations from US Energy Information Administration & GasBuddy.com

	Electricity (cents per kWH)		Diesel
	Commercial	*Industrial*	(per gallon)
Southern California	19.93	17.40	$6.06
US other than California	11.57	7.89	$5.01
Georgia	12.10	8.65	$4.79
New Jersey	13.75	12.12	$5.51
New York	18.19	7.55	$5.65
Texas	9.05	7.13	$4.47
Virginia	9.66	7.99	$5.12

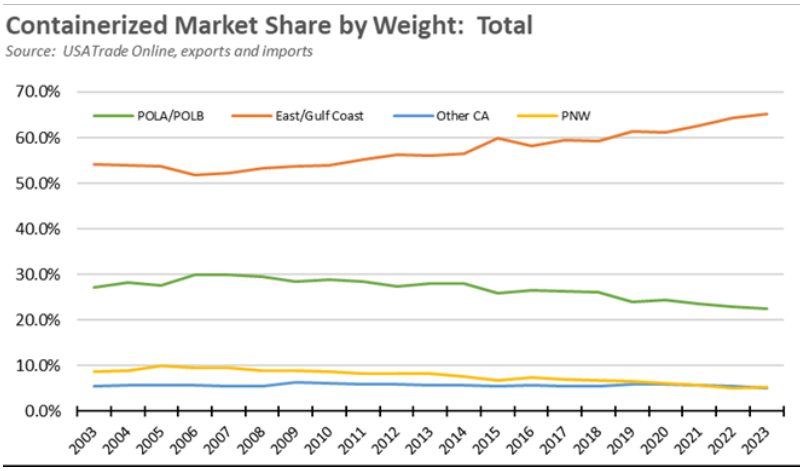
Closer Look: Cargo Theft

Cargo theft has become an increasing risk. Nationally, the number of reported incidents nearly doubled between 2019 and 2023. In one accounting, California experienced 58% of the nation's cargo theft volume in the second quarter of 2023, compared to 49% during the same period in 2022. The primary California targets were electronics (44% of total), clothing and shoes (10%), and home and garden (10%).



Impacts of Reduced Market Share

The loss of market share by the ports since 2006 equates to cargo volumes that would be 23 percent higher in 2022. This reduced market share is especially concerning as the Southern California Trade Cluster-centered on the ports-led the transformation of Southern California's economy following the steep decline of manufacturing and aerospace jobs in the 1990s. In fact, the total number of jobs in Trade surpassed manufacturing in the region in 2017.



Impacts from this reduced market share—the opportunity costs to the region compared to the prior containerized cargo market share with the East Asia economies—include:

- Jobs are lower by 45,400 annually in Southern California compared to the outcomes had the Ports retained their market share.
- Jobs in the region in the total Trade Cluster are an estimated 77,000 lower.
- In 2022, labor income is $3.86 billion lower in Southern California. Using the average value, cumulative income losses to the Southern California economy (in 2022 dollars) since 2006 are an estimated $30.9 billion.
- In 2022, value added is $5.48 billion lower in Southern California and $5.59 billion lower in the entire state. Cumulative losses to the regional economy since 2006 are an estimated $43.8 billion.
- In 2022, output is $9.67 billion lower in Southern California. Cumulative losses to the regional economy since 2006 are an estimated $77.4 billion.

Economic Loss from Reduced Market Share

Source: IMPLAN 2022 data for regions shown

	Employment	Labor Income ($ bil)	Value Added ($ bil)	Output ($ bil)
Southern California				
Direct	-21,000	-$2.16	-$2.50	-$4.56
Indirect	-11,100	-0.81	-1.35	-2.47
Induced	-13,400	-0.88	-1.62	-2.65
Total	-45,400	-$3.86	-$5.48	-$9.67
Rest of California				
Indirect	-300	-$0.03	-$0.06	-$0.11
Induced	-400	-0.03	-0.05	-0.08
Total	-700	-$0.06	-$0.11	-$0.19
Total				
Direct	-21,000	-$2.16	-$2.50	-$4.56
Indirect	-11,300	-0.84	-1.41	-2.58
Induced	-13,800	-0.91	-1.68	-2.73
Total	-46,100	-$3.92	-$5.59	-$9.87

Closer Look: Lost Tax Revenue

The associated state and local tax loss is $560.9 million to the state and local governments in Southern California. Cumulative losses to state and local governments since 2006 are an estimated $4.5 billion. The associated federal tax revenue loss is $935 million in 2022, or an estimated cumulative loss of $7.5 billion since 2006.

About the Center for Jobs

The Center for Jobs and the Economy provides an objective and definitive source of information pertaining to job creation and economic trends in the United States. The Center is a 501(c)(3) public benefit corporation with governance consisting of a board of directors, board of governors and a research advisory council. Learn more at www.centerforjobs.org.

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Introduction & Summary

The Ports of Long Beach (POLB) and Los Angeles (POLA) are the core of the largest trade complex in North America, serving as the gateway to Pacific Rim trade and securing the base of Southern California's primary middle class job growth center. As an economic asset, these facilities underpin a significant share of jobs, incomes, and tax revenues in the region and serve as the conduit for consumer goods and industrial components essential to the broader state and national economies.

While this report is focused on the impacts made by the Ports and the overall Trade Cluster to the Southern California economy specifically, the context for these economic impacts cannot be separated from the Ports' position as nationally and globally significant assets. Ranked by TEU throughput, combined activity at POLA and POLB placed them as the largest container port complex in North America and the 9th largest worldwide in 2022. Total container traffic in 2022 was nearly the same as the combined volume of the next three largest US ports. Trade volumes through the Ports support exports and imports in every other state in the US.

Combining total (direct, indirect, and induced) impacts within California with related direct jobs supported by the use and sale of imports and production of exports shipped through the Ports:

- POLA and POLB combined supported 3.1 million jobs nationally in 2022, or 1 out of every 51 jobs in the US.

- At this level, 1 job was supported for every 4 loaded TEUs handled through the Ports. Other studies estimate the total national effects at higher levels.

- Not including the related jobs effects, the direct, indirect, and induced effects within California supported 226,000 jobs that year.

Total market share of container cargo, especially for the discretionary portion associated with other commercial centers in the US, has been affected by a number of factors. These include several that have affected the costs and reliability of shipping through POLA and POLB, offsetting for an increasing share of discretionary cargo the time savings otherwise possible by shipping through the Ports:

- Compared to competing ports, POLA and POLB have less land available for expansion, and investment risks are further affected by the length and costs of the permit and subsequent litigation processes. Ports along the East and Gulf Coasts instead have invested aggressively in both port capacity and intermodal links.

- Pandemic-era congestion exposed bottlenecks and capacity constraints throughout the supply chain, including container storage yards, warehouses, and both truck and rail links. As an economy, California is not responding to these capacity constraints on the supply chain in the warehousing and distribution centers by developing and investing in new capacity at the same rate and scale as competitor states. In Southern California in particular new warehouse and distribution center developments are being actively discouraged by local regulators.

- Regulatory uncertainty, especially the related costs and potential operating constraints under a potential Port ISR (indirect source rule), undermines the long-term investment and leases required to keep POLA and POLB competitive with the growing ports on the East and Gulf Coasts.

- Energy costs have soared in California compared to the other states. Even as state and local regulations mandate a shift to essentially 100% electricity use, commercial electricity rates in the region in 2022 were 72% higher and industrial rates 121% higher. Electrification under the Clean Air Action Plan and Air Resources Board regulations assumes adequate energy supplies, and just as critically, reliability of those supplies as the Air Board rules move every other part of the California economy to reliance on this one energy source in the same timeframe.

- Cargo theft along the supply chain has increased nationwide, but California has seen as much as 58% of the nation's cargo theft volume.

- Cargo owners are diversifying their supply chains across multiple gateways in order to minimize exposure to the risks that have been associated with localized congestion and port traffic disruptions. For instance, extended labor negotiations in 2002, 2008, and 2014 introduced periods of uncertainty affecting volumes at the Ports on the US West Coast and led to diversification of some cargo and distribution centers to the East and Gulf Coasts.

- E-commerce operations are a growing share of total retail sales and have become a driver of trade activity. As these distribution centers have dispersed to other regions of the country, the associated trade has followed to other ports.

- While Southern California for now remains the nation's leading manufacturing center, this industry has been shifting and will continue to shift in the foreseeable future to the Southeast states as are the associated parts, component, material, and export cargo.

- Manufacturing and import flows globally are also shifting, as production diversifies away from China and to countries in Southeast and South Asia with shorter shipping times to the East and Gulf Coasts.

- Consumer markets and their associated trade are changing. Southern California's population dropped 1.5% between 2018 and 2023, and is projected to remain largely unchanged through the end of the decade. In contrast, the Southeastern states grew by 5.4 million (4.6%) in this period, the equivalent of the combined populations of Orange and San Bernardino Counties.

- Inventory practices at US businesses are still going through change, moving from just-in-time prior to the pandemic, to just-in-case in response to pandemic congestion, and now back to something in between due to inventory overbuilds. These practices and their resulting effects on cargo volumes and timing have yet to gel.

- The outlook for global trade is now uncertain, with growth in both China and the EU expected to slow. The Ports face declining market share on top of overall declining total trade volumes, resulting in implications to regional jobs and income. In terms of trade units, California container cargo volumes (TEUs) through the Ports peaked in 2006. In constant dollars, the total value of container cargo through the Ports peaked in 2018. The total real dollar value of the Ports trade for 2023 was essentially back to the 2014 level, the year the Ports' market share by value began an accelerated decline.

- Recent recessions including the sustained period during the 1990s, the Great Recession, and the recent pandemic recession have been both deeper and longer lasting in Southern California than elsewhere in the country.

POLA/POLB market share for containerized cargo measured in TEUs peaked at an average of 29.9% in 2006-07 for total US trade, and for China at an average of 50.7% in 2006-08. As the result of these factors, US market share by 2022 was down to 22.9%, and China down to 41.5%. Market share continued declining for the whole of 2023, but showed some signs of picking up in the final months as uncertainty shifted to the East and Gulf Coast ports due to their ongoing labor negotiations combined with disruption of trade routes through the Panama Canal from drought and through the Suez Canal from terrorist attacks in the Red Sea and off the Somali Coast.

Even with this diminished market share, however, the Ports remain an important source of jobs and income to the Southern California economy.

- Combining direct, indirect, and induced effects, operations directly related to the Ports in 2022 supported an estimated 226,000 jobs, $19.93 billion in labor income

(compensation including benefits), $27.69 billion in value added contributions to the regional economy, and $48.47 billion in total output (sales).

- In 2022, the Ports supported $2.78 billion in state and local taxes to state and local governments in Southern California. The associated federal tax revenues were $4.73 billion.

- The Ports do not receive any of these tax revenues. Instead, both support operations of the respective city governments, with combined payments for city services and POLB's contribution to the Long Beach budget at an additional $143 million that year.

In addition, both Ports provide funds to reinvest in their local communities. POLA's FY 2023-24 budget includes $1.3 million under its Community Investment Grant Program, and the Port maintains a Trade Connect program to expand export opportunities for local businesses. POLB in 2016 revised its Community Grants Mitigation to provide $46.4 million in grant funds over the subsequent 12-15 years, with $5.1 million allocated in its FY 2024 budget for this purpose along with $2 million to support local nonprofits and additional funding for cooperative efforts with area schools on internships, scholarships, and workforce development for trade related jobs. Other local investments include coastal access enhancements—including POLA's multi-year $253.1 million plan for public access—and clean air projects under the respective capital spending plans.

The Ports have the potential to contribute more to the regional economy.

- If the Ports had instead maintained their peak containerized market share with the East Asia economies, cargo volume in 2022 would have been 23% higher, at an additional 4.4 million TEU.

- This added volume would have created an additional (direct, indirect, induced) 46,100 jobs, $3.92 billion labor income, $5.59 billion value added, and $9.87 billion output.

- These higher economic levels would have produced an additional $561 million in state and local tax revenue in Southern California and $935 million in federal tax revenue.

These are significant numbers capable of moving the region's currently higher unemployment rate by half a percentage point. These numbers represent the opportunity costs to the Southern California economy from the factors that have eroded the Ports competitiveness. Although these opportunity costs accumulated over time, the total also illustrates the potential effects of future market share cuts stemming from higher costs or other negative effects from future regulation such as the pending Ports ISR.

The full economic importance of the Ports is broader. They help form the foundation for the wider Trade Cluster in Southern California. While this Cluster would still be significant without the Ports given the size of the local market, it is much larger and a more consistent generator of middle-class wage jobs due to the role the Ports play in global trade.

- In 2022, the regional Trade Cluster comprised a network of local businesses supporting 1.85 million jobs, $150.71 billion labor income, $269.61 billion value added, and $472.68 billion output.

- At these levels, the Trade Cluster produced 15.9% of all regional jobs, 16.9% of regional labor income, 18.1% of regional GDP, and 18.7% of regional output.

- The Southern California Trade Cluster in 2022 was just slightly larger than the total economy of Utah or Kentucky, and produced $47.81 billion in tax revenues to the state and to local governments in Southern California.

The breadth of businesses and consequent jobs are much larger at each level of this Cluster due to the volumes generated through international trade. The number of levels is also much deeper due to the agglomeration economies that have produced a higher concentration of trade related businesses in the region along with related resources such as research and training assets in the region's universities and schools. This level of concentration is not permanent. Incremental changes over time risk undermining the economic rationales for businesses to remain in the region either wholly or through decisions to shift parts of their operations over time to other areas, just as the region has seen in the past in other industries that once helped shape the Southern California economy such as aerospace. The question is at what point does such a tipping point occur for Trade. While the precise tipping point is still uncertain, separate analysis in this report indicates that every percentage point of containerized market share (by value) handled by the Ports underlies 8,000 total jobs in the region's Trade Cluster. The 9.6% percentage point market share loss since 2006 consequently equates to the Trade Cluster being 77,100 jobs lower.

The Trade Cluster—centered on the Ports—led the transformation of the Southern California economy following the steep decline of manufacturing and aerospace in the 1990s. Northern California followed a path of creating high wage jobs for workers with college and advanced degrees. Southern California instead focused on Trade, with its creation of middle-class wage jobs especially for workers with a high school diploma or less.

- The total number of jobs in Trade surpassed manufacturing in the region in 2017.

- While other jobs remained closed under state rules, Trade was the largest source of new jobs during the pandemic, producing 53% of net jobs growth in the region between 2019 and 2022 and creating those jobs at an average middle-class wage in 2022 of $76,800.

- The recent strength of Trade jobs has in fact helped lead to an uptick in the share of middle-class households in the region following decades of decline.

The restructuring of the Southern California economy, especially as it has been affected by the pandemic era, raises the question of, if not Trade, then what? The broader Trade industry made possible by the Ports in particular has helped further regional goals related to wages, income, and housing affordability.

- The Trade Cluster is the second largest source of jobs for Latinos in the region, and a significant source of middle-class wage jobs for lower skilled workers—two-thirds of jobs in this Cluster have entry level requirements of only a high school diploma or less.

- Trade is also a significant gateway job for immigrants—41.5% of Trade workers in 2022 were immigrants (naturalized and non-citizens) compared to an overall average of 34.6% in the region.

In looking at comparable skill levels and the capacity to absorb large numbers of additional workers, the only current alternative in the Southern California economy is Food Services & Drinking Places. This industry, however, has average annual wages that are 61% lower than in the Trade Cluster, and the degree of future jobs availability is now in question as these businesses adjust operations and job numbers in advance of the new state minimum wage law.

Clean energy/green jobs are often touted as a potential jobs substitute particularly in regulatory proceedings that threaten the viability of existing Trade jobs. Yet, at least 15 years of studies attempting to estimate the scope of these jobs has never resulted in numbers that vary much from 500,000 for the entire state. And even these estimates incorporate substantial portions that are temporary jobs and jobs that are simply reclassified from ones that have existed for decades. For example, the most recent estimate from US Department of Energy shows 527,700 clean energy jobs in California in 2022, down from a comparable 548,300 in their estimates from 2016. In the 2022 numbers, 42% of the total covers temporary construction jobs. Another 122,649 are motor vehicle repair and maintenance jobs reclassified into the clean energy category.

Other effects discussed in qualitative terms:

- Declines in cargo volumes also have the potential to affect what remains of manufacturing in the region. Even at reduced levels, Southern California remains the nation's leading manufacturing center and does so in part due to the availability of the Ports for parts, components, and materials and for product exports. In 2022, 13% of total manufacturing production in California was for export markets. Imports in 2022 provided 23% of total manufacturing intermediate goods inputs. Nationally, this industry is shifting to the Southeastern states which now provide comparable export and import access and access at a lower cost.

- The ready availability of imported goods has been one of the few if only factors countering the continued rise in the cost of living in the region. The pandemic periodic, however, provided a case study of how rising transportation costs can still add significantly to goods inflation. As regulatory costs boost the already relatively higher cost of shipping through the Ports, this one bright spot may dim.

- The Ports also play a major role in state and local environmental goals. Achieving the net zero goals depends on materials and equipment that is produced overseas, often at near-monopolistic levels. The Ports now account for a major share of US imports for many of these goods, and likely will also do so in instances such as China's current plans to become a major exporter of the lower cost electric vessels essential to meeting the state's zero emission goals. As local recycling programs struggle with declining material flows, they have become even more dependent on their remaining revenue streams including export of recycled materials through the Ports.

- The impact assessments used in this report are good tools to estimate the number of employed or unemployed that will result from specific economic activities. They do not, however, assess the full effects from unemployment. The Great Recession and the more recent pandemic recession were unfortunate examples of the effects long-term unemployment can have, especially in reduced life-time wages, income potential, and connections with the labor force. Unemployment also has well documented public health effects that are generally not addressed in regulatory risk assessments, including increased risks of mortality, suicide, substance abuse, mental health issues, and decreased use of healthcare services.

Background

This report is part of a continuing series by the Center looking at key components of the California economy and how they are being shaped—for good and bad—by state and local policies. As assessed in previous analyses by Los Angeles Economic Development Corporation (LAEDC), Trade is the largest traded industry cluster[1] in both Los Angeles County (LAEDC 2020) and Southern California (LAEDC 2017). The Ports of Long Beach and Los Angeles (Ports) are at the base of this cluster, but overall activity through this trade complex risks being affected under pending regulations from South Coast Air Quality Management District (SCAQMD) through its indirect source regulations for the ports (Ports ISR).

The report is being completed in two parts. Part I provides an overview of the economic contributions made by the Ports and the overall Trade cluster in Southern California, including a review of previous economic studies, details on the Trade workforce, and an updated assessment of the baseline economic and fiscal impacts using more current 2022 data. Part II will then assess the effects of the SCAQMD draft rule once it is released. Details on the methodologies used in this report are contained in a separate section in order to simplify the text.

Unless otherwise noted, the analyses consider the Southern California region as defined by Los Angeles, Riverside, San Bernardino, and Orange Counties. This region contains the SCAQMD area but also includes portions of the first three counties that lie outside its boundaries. In 2022, US Bureau of Economic Analysis data indicates this region contained 44.9% of the state's population. Because the industry and jobs structure in Southern California has taken a different path from the higher wage base produced by the Tech industry in the Bay Area, this region generates a somewhat lower share at 40.2% of the California GDP (nominal), and 40.6% of total personal income.

History & Structure of the Ports

The dual Ports of Los Angeles (POLA) and Long Beach (POLB) have been an important driver of the Southern California economy, beginning with establishment of a relatively shallow port for Los Angeles in San Pedro Bay by Phineas Banning in the 1850s.

After beating out a competing proposal to locate a port in Santa Monica, construction of the federal breakwater in San Pedro began in 1897. The Los Angeles Board of Harbor Commissioners was founded in December 1907, followed by annexation of Wilmington

[1] Traded industry clusters are interrelated businesses that sell goods and services outside a region and consequently provide a source of long-term economic growth and development. They are distinct from local clusters that are primarily local serving and whose long-term growth depends on the outcomes in the traded clusters.

and San Pedro in 1909 and creation of the Port as an official department in the City of Los Angeles. Development of the Port of Long Beach began in 1905, and the first shipment landed in 1911. The Board of Harbor Commissioners was formed in 1917.

Dredging and widening of the Ports' navigational channels first began in 1912 and has continued since as the Ports have sought to remain competitive for ever larger classes of cargo carriers, especially following the opening of the Panama Canal in 1914 and its widening in 2016.

World War II saw a shutdown of most commercial activity through the ports, but this was replaced by military operations employing up to 90,000 workers especially in shipbuilding that saw a major modernization of the ports' facilities.

The shift to containerized cargo began with the arrival of Matson's *Hawaiian Merchant* at Los Angeles in 1958. While bulk cargo handling remains a component of both Ports' operations for certain products such as for petroleum and petroleum products, gypsum, and cement, the subsequent shift to containers significantly reduced vessel dwell time and thereby greatly expanded port capacity, and accelerated inter-modal transport operations as containers are quickly transferred to and from both rail and truck.

Both Ports manage granted state tidelands as a trustee of the State of California, and both are organized as city agencies rather than as special districts:

- The Los Angeles Harbor Department governs the Harbor District through a 5-member Board of Harbor Commissioners, with operational responsibility under an Executive Director appointed by the Board. All revenues are associated with port operations, and the Department does not receive any revenue from taxes although it does get some state and federal grant funds for certain specific projects. In FY 2022 and FY 2023, the Harbor Department paid an average of $46.7 million to the City of Los Angeles for services, in particular for fire protection, museum and park maintenance, and legal services. An additional average of $31.2 million was paid to the City for water and electricity.[2] In FY 2022 and 2023, the Port had average operating revenues of $642.1 million and operating expenses before depreciation and amortization of $276.7 million. The operating margin largely supports ongoing bond and other debt payments and supports the extensive capital investments required to keep the port competitive and meet its ongoing Clean Air Action Plan commitments.

- The Long Beach Harbor Department operates the Harbor District through a similar structure of a 5-member Board of Harbor Commissioners that appoints an Executive Director. In FY 2022 (federal fiscal year), the Port transferred $26.2 million to the City in accordance with the City Charter, and paid $38.7 million for

[2] Port of Los Angeles, Comprehensive Annual Financial Report, for FY 2022 and 20243.

interdepartmental services. POLB has also generated additional payments to the state through sharing of tidelands oil revenues. As with Los Angeles, the Department does not receive any revenues from taxes but does receive some state and federal grant funds on a project basis. In FY 2022, the Port had operating revenues of $479.6 million and operating expenses (before depreciation) of $166.5 million. As with POLA, the operating margin largely supports ongoing bond and other debt payments and supports the extensive capital investments required to keep the port competitive and meet its ongoing Clean Air Action Plan commitments.

In addition to direct payments made to their respective cities, indirect payments from associated taxes and non-port fees generated by activities at both ports instead accrue to the appropriate local, state, and federal government. For example, while the ports themselves do not pay property taxes, all port tenants pay substantial possessory interest taxes based on the value of their leases, some of which stretch for decades at valuations in the billions of dollars. Port tenants also pay local property tax on any owned improvements and personal business property. Based on County Assessor parcel information and current tax rates, this property tax component produced an additional $6.8 million in 2022/23 for the two cities, county, schools, and other special districts.

Port facilities are summarized in the table below. Both ports maintain long-term capital improvement plans to improve and expand these facilities. These include POLB's current development of the Floating Offshore Wind Staging and Integration facility (Pier Wind) as an additional terminal/staging area for the assembly of offshore wind turbines to help meet the state's goal of producing 25 gigawatts of offshore wind power by 2045.

	Los Angeles	Long Beach	Total
Harbor District			
Land	4,300 ac	3,520 ac	7,820 ac
Water	3,200 ac	4,600 ac	7,800 ac
Waterfront	43 mi	31 mi	74 mi
Main Channel			53 foot depth
Cranes	82	72	154
Terminals			
Container	7	6	13
Break Bulk	4	5	9
Dry Bulk	3	6	9
Liquid Bulk	7	5	12
Auto	1		1
Passenger	2		2
Muiti-Use	1		1
Berths	270	80	350
Marinas	15	1	16

Figure 1: Ports Facilities

Additional capital investment is encompassed in the Ports' Clean Air Action Plan (POLA and POLB, November 2017), with incentives for or purchases of equipment such as zero-emission trucks treated as operating expenses and infrastructure under the Plan treated as capital expenditures. A preliminary estimate of the costs under this Plan through 2030 put the total of both cost elements at $6.2 billion to $12.7 billion in 2017 (EnSafe, July 2017), on top of the nearly $2 billion previously spent on clean air measures in the period 2006 to 2014. An update by Starcrest Consulting in 2020 put the Ports' total at $17.3 billion through 2030, of which about $5.4 billion had already been spent. The revised estimate, however, assumes available battery electric replacements for heavy duty trucks and cargo handling equipment in this timeframe. The responsibility for each item varies across the ports and their marine terminals, carriers, and trucking companies, but the eventual payer will be the beneficial owner of cargo and subsequently consumers through higher rates to support these costs.

Clean Air Action Plan, Selected Item Costs, 2017
Source: EnSafe, July 2017; $ billion

	Low Est.	High Est.
Zero-Emissions Terminal Equipment	$0.91	$2.10
Infrastructure To Support Terminal Equipment	2.20	2.20
At-Berth Emission Reduction Control Systems	0.14	0.14
Cleaner Trucks	2.90	8.30
Total	$6.16	$12.74

Figure 2: Clean Air Action Plan Costs

This total covers the incremental cost of zero emission equipment, including consideration of replacing equipment prior to the end of its useful life and estimates where specific equipment was not yet commercially available. The figures in the table also cover the equipment fleet numbers operating at the ports at that time. The estimates do not cover all of the measures included in the Plan, including items such as the proposed higher port rates for older ships beginning in 2025 as well as changes in operating costs that may occur due to uncertain repair schedules for much of the new equipment and continually rising electricity rates in the region. These latter two factors would affect the overall cost structure built into the impact model used in this report in future years, as discussed later, but would have less effect on the 2022 impact runs.

Treatment of these costs for impact assessment does not follow the traditional consideration of capital investments which generally are made to expand capacity both directly or by improving efficiency. The investments under the Plan instead for the most part take currently operating equipment and replace it with another type. From this perspective, there are positive economic effects from the purchase and installation of the equipment, but these have to be balanced against the opportunity costs as households face higher prices for goods. From another perspective, however, the South Coast Air District is one of only two regions in the country currently in extreme nonattainment for the

federal Clean Air Act ozone standard and one of only three regions in serious nonattainment for the PM 2.5 standard.[3] While the climate change aspects of the Clean Air Plan measures remain wholly a state issue, failure to plan for attainment of the federal standards—through submittal of a plan incorporating measures to reach those standards rather than meeting the standards themselves—runs the risks of future sanctions or yet another attempt at a Federal Implementation Plan, such as the one that was proposed by US EPA in the 1990s that would have directly affected the transportation links critical to port operations.

In addition to facilities within the harbor districts, the Alameda Corridor Transportation Authority is a joint powers authority formed by the Cities of Los Angeles and Long Beach, with a 7-member Board representing the two cities, both ports, and the Los Angeles County Metropolitan Transportation Authority. The Authority constructs and operates a 20-mile rail corridor connecting the Ports to railyards near downtown Los Angeles, including the Mid-Corridor Trench and other grade separation elements to minimize traffic and neighborhood conflicts. In 2022, the Authority handled 4.7 million TEUs.[4] Revenues to cover operating expenses and revenue bond payments come from use fees, container charges, and maintenance-of-way charges paid by Union Pacific and BNSF Railway Company. The ultimate guarantors of this revenue bond financing are the Ports.

Both Ports also contain other types of commercial activities. While these are not directly related to Trade, they derive from the Ports' Public Trust responsibilities associated with their grants of tidelands properties, especially requirements to provide opportunities for coastal dependent commerce and recreation. Activities related to these provisions are consequently incorporated into the impact analysis. In general, the public trust responsibilities require the grant holders to provide for water-dependent activities, including commerce, fisheries, navigation, ecological preservation, and recreation. The City of Los Angeles responsibilities have been further detailed through amendments to its tidelands grant and SB 278 (Dills, 1970) which expanded on these to specifically include for non-Port parts of the City Tidelands grant: commercial and industrial purposes, construction of commercial and industrial buildings, public buildings, parks, meeting places, restaurants, motels, cafes, protection of wildlife, and other purposes of statewide interest or benefit. AB 2769 (A. Lowenthal, 2002) extended the allowable uses of the tidelands related revenues from just harbor development at the Port of Los Angeles to include these commercial activities as well.

Both Ports also provide funds to reinvest in their local communities. POLA's FY 2023-24 budget includes $1.3 million under its Community Investment Grant Program, and the Port maintains a Trade Connect program to expand export opportunities for local businesses. POLB in 2016 revised its Community Grants Mitigation to provide $46.4 million in grant funds over the subsequent 12-15 years, with $5.1 million allocated in its FY 2024 budget for

[3] US EPA Green Book, 8-Hour Ozone (2015 Standard) and PM-2.5 (2012 Standard).
[4] Alameda Corridor Transportation Authority, The Alameda Corridor Monthly TEU and Revenue History.

this purpose along with $2 million to support local nonprofits and additional funding for cooperative efforts with area schools on internships, scholarships, and workforce development for trade related jobs. Other local investments include coastal access enhancements—including POLA's multi-year $253.1 million plan for public access—and clean air projects under the respective capital spending plans.

Trade Activity through the Ports

Trade has become an increasingly important component of the US economy. In 2022 (World Trade Organization, 2023) excluding intra-EU trade, the US was the third largest exporter ranked by the value of merchandise trade ($2.065 trillion compared to China at $3.594 trillion and extra-EU exports at $2.704 trillion) and the largest importer ($3.395 trillion compared to extra-EU at $3.155 trillion and China at $2.714 trillion). On this basis, the US accounted for 10.1% of global merchandise exports and 15.8% of merchandise imports. Although the projections were prepared prior to the current weakness shown in the China and EU economies and challenges to Suez Canal trade routes, WTO expected global trade to grow 1.7% in 2023 and recover to 3.2% in 2024, compared to an overall average of 2.6% in the 12 years following the Great Recession.

The nation's ports are critical infrastructure supporting this growing share of the economy. In 2021, waterborne vessels were the leading trade transport mode in the US, accounting for 41.1% of total trade by value (US Department of Transportation, 2023). The remainder was carried by air and by rail and truck from Canada and Mexico.

Ranked by total TEU throughput, combined activity at POLA and POLB placed them as the largest container port complex in North American and the 9th largest worldwide in 2022.[5] Total traffic through the two ports was 19.045 million TEU in 2022 and 16.648 million TEU in 2023. Activity at the next 4 largest US ports in 2022: New York-New Jersey with 9.494 million TEU, Savannah with 5.892 million, Houston with 3.975 million, and Virginia at 3.718 million.

Based on cargo reported by Pacific Maritime Association members and as measured by weight,[6] containerized cargo is the dominant type of cargo handled by the Ports at 91.6% of the total in 2022. Bulk cargo (5.3%), autos and trucks (2.0%), general cargo (1.1%), and logs and lumber (0.1%) made up the remainder. Illustrating the extent of the shift to the more efficient container traffic, the comparable shares in 2000 were: containerized 82.2%, bulk 9.6%, general 4.3%, autos and trucks 3.8%, and logs and lumber 0.1%. In 1992, the distribution was: containerized 71.2%, bulk 16.6%, general 6.9%, autos and trucks 4.9%, and logs and lumber 0.4%. Adding in all cargo handled through the Ports—primarily adding in all petroleum and product shipments—USATrade Online data indicates containerized cargo made up 59.8% of total cargo flows by weight in 2022.

[5] Lloyd's List, One Hundred Ports 2023. Individually, the ports ranked 16th (POLA) and 19th (POLB).
[6] Weight for containerized cargo is based on 17 tons per TEU.

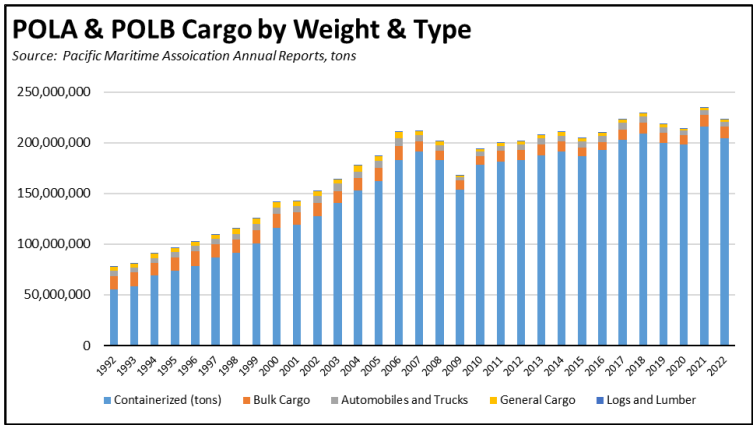


Figure 3: Ports Cargo by Type

The predominant flow of cargo through the Ports comes from foreign trade. Domestic traffic in particular to Hawaii and Guam and crude oil from Alaska make up a smaller share. Measured by tonnage, total domestic cargo has been relatively constant at about 12% since 2013, down from 21% in 2003 due to higher shipments of oil from Alaska. By TEU, the domestic containerized (loaded and empty) portion was 2.1% of the total handled by the Ports in 2021, down slightly from 2.5% in pre-pandemic 2019 due to the surge in imports.

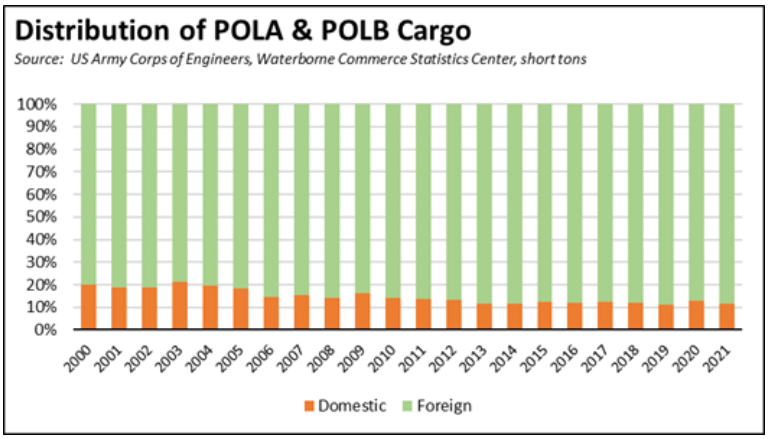


Figure 4: Ports Cargo by Geography

The number of TEUs handled by the two Ports rose rapidly from 1992 through 2007, at an average annual rate of 8.6%, as trade with China expanded combined with the rapid shift to container mode. In the period after 2007 through 2022, TEU growth slowed to an average annual rate of 0.4%. This period saw a sharp drop in activity during the Great Recession and at the beginning of the Pandemic, followed by the surge in imports during 2021 and beginning of 2022 as businesses sought to counter shortages in finished goods and parts and components. The numbers in Figure 5 (through 2022) are based on data

from Pacific Maritime Association. Using numbers from the Ports, total loaded TEUs at 10.8 million were down 9.4% in 2023—and total TEUs (loaded and unloaded) at 16.6 million in 2023 down 12.6%—outpacing the overall drop in global trade activity.

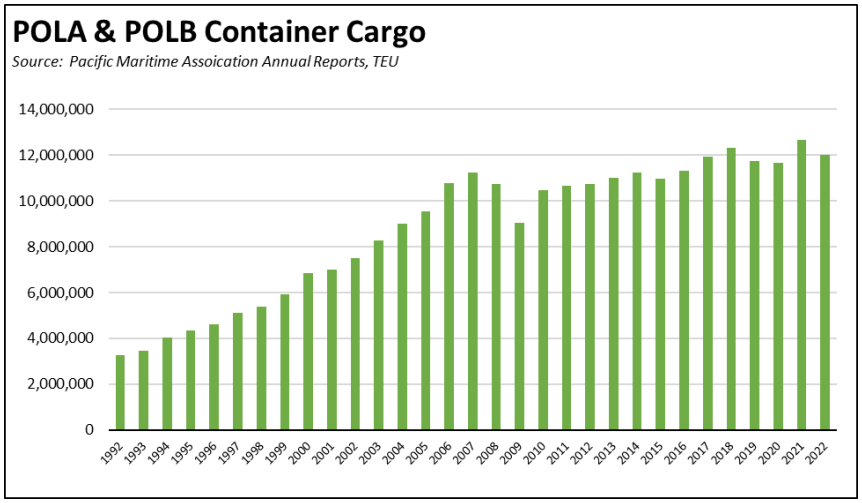


Figure 5: Ports Container Numbers

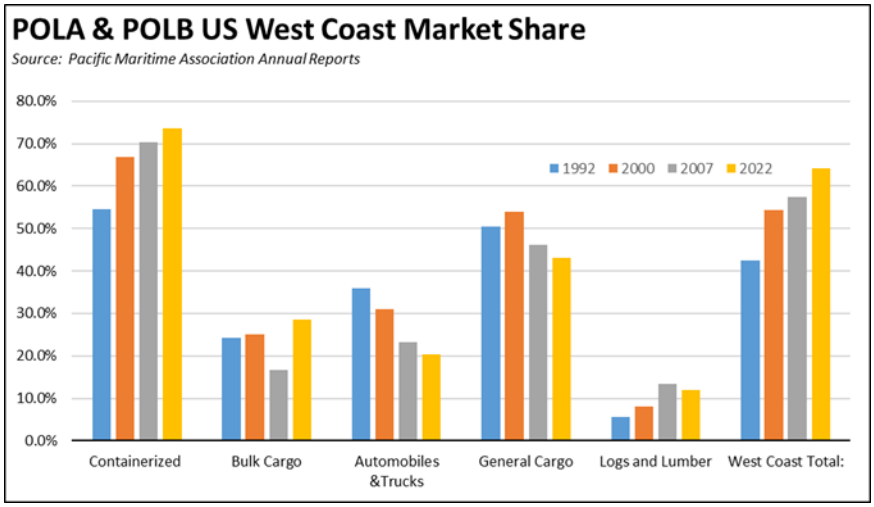


Figure 6: Ports Market Share by Cargo Type

The two ports, however, remain the dominant transit points for containerized cargo on the West Coast of the US, and this importance has increased even as the number of containers has been affected by a series of events as discussed below. Market share for other cargo types, in particular cars and trucks and general cargo, has weakened, but these components comprise a much smaller share of overall cargo activity.

Due to the high imbalance between imports and exports, empty containers make up a significant portion of the overall traffic flow. In 2022, POLA and POLB handled a total of

19.045 million TEUs. Of these, 11.9 million (63%) carried cargo, and the remainder (37%) were empty and predominantly shipped overseas to be reused and refilled. In all, the Ports handled 80% of all empty containers shipped through the West Coast US ports. While these containers by themselves do not carry goods adding to economic activity, handling them is a part of the overall cost function for port and related trade operations and an element in the overall economic impact from port activities.

Ports Market Share

Looking at the containerized cargo, the Ports total market share by weight peaked in the period 2006 (30.0%) and 2007 (29.9%), while market share of the predominant cargo flows associated with China (including Hong Kong and Macau) reached a relatively stable but lower level in this period as well before entering into an accelerated long-term decline starting in 2014 (Figure 8). The leveling off of the Ports activity levels after 2007 arose as they came under increasing competition from port investments in other regions and in recent years as trade flows have begun to shift in response to businesses seeking to diversify their sourcing due to the various factors discussed later in this report.

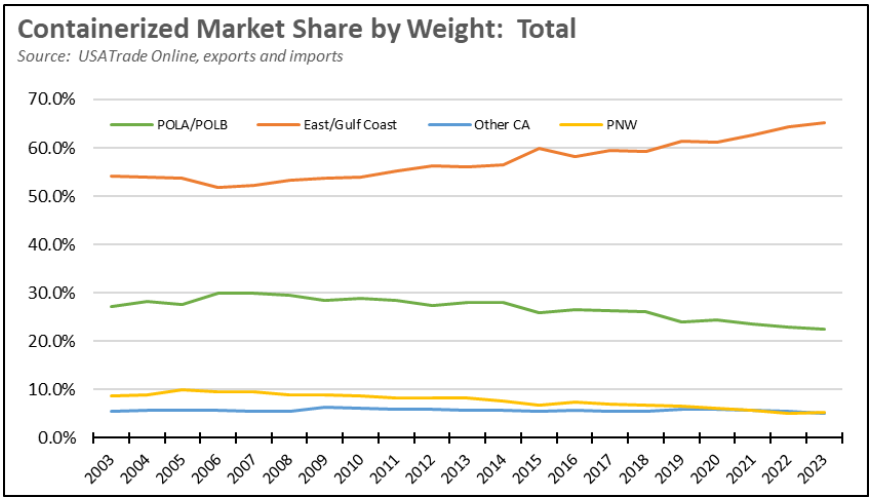


Figure 7: Ports Containerized Cargo Market Share, Total

Some of this market share loss has been offset as companies moved manufacturing into other Asian countries. Production moving into the South Asian countries, however, increased the focus on trade routes through the Suez Canal to the East and Gulf Coast ports, although this shipping has been affected recently by terrorist attacks in the Red Sea and off the Somali coast.

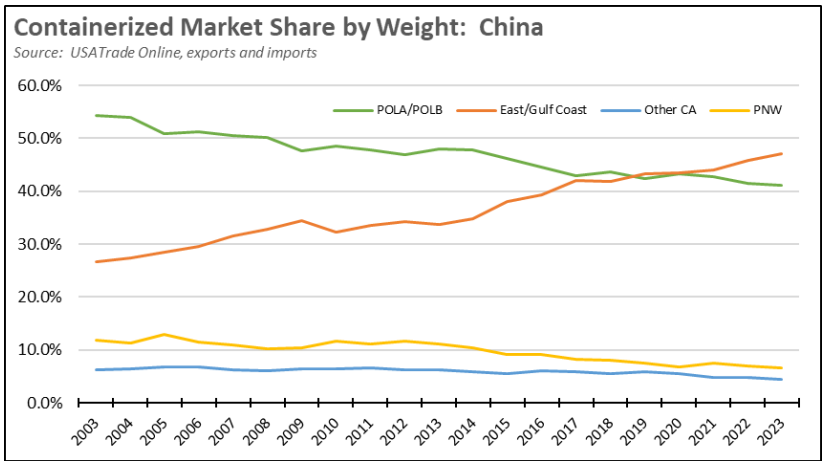


Figure 8: Ports Containerized Cargo Market Share, China

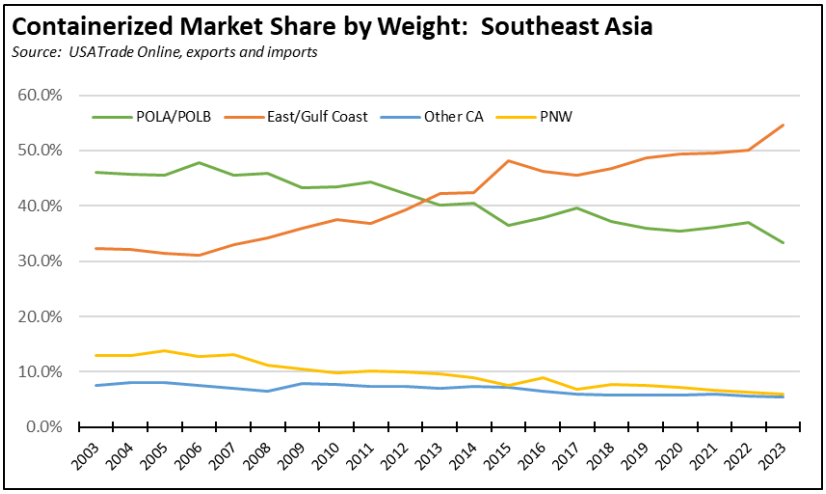


Figure 9: Ports Containerized Cargo Market Share, Southeast Asia

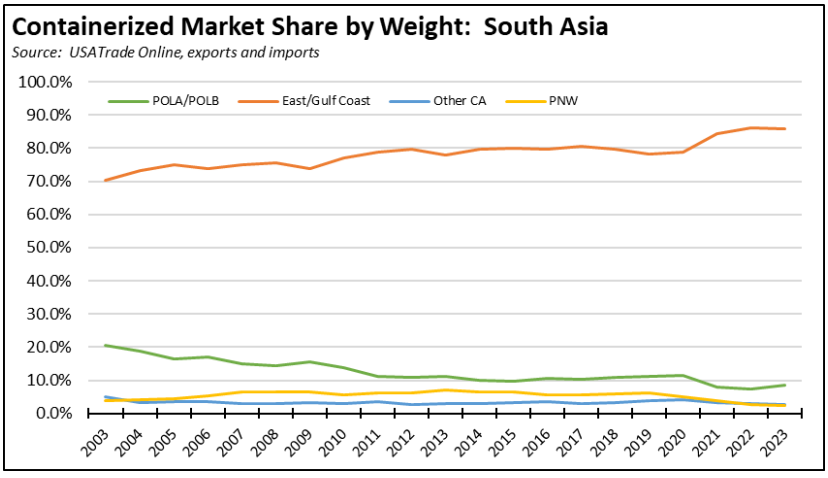


Figure 10: Ports Containerized Cargo Market Share, South Asia

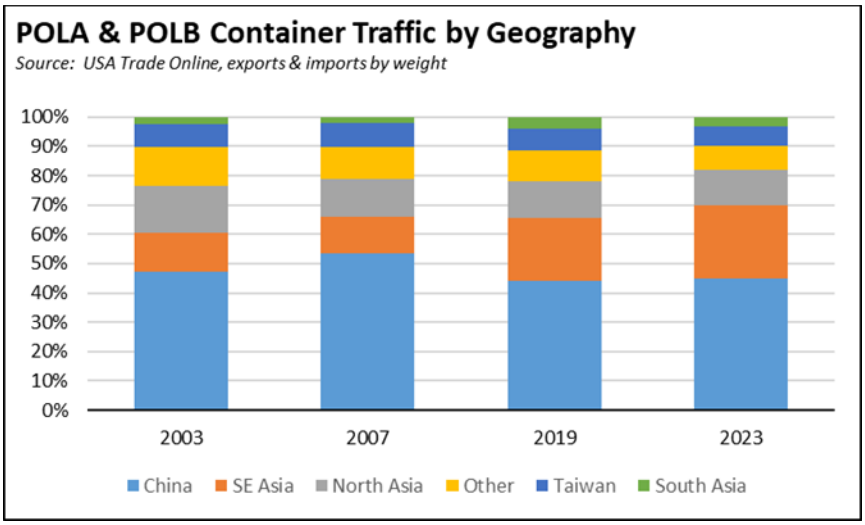


Figure 11: Ports Containerized Cargo Distribution by Region

Production moving into Southeast Asia has provided some of an offset to the Ports' China market share loss due to the overall growth in this trade source, although at least a portion of traffic increase coming from Vietnam in particular appears to be due to a redirection of cargo from China in order to bypass US tariffs.[7] While much of this traffic is oriented towards the East and Gulf Coast ports, POLA/POLB have seen drops in this segment's market share but an increase in the absolute quantity. Southeast Asia traffic has replaced the lost China flows as has been the case for other ports in the country. The relative shares of total Ports cargo for the other primary cargo drivers including North Asia (Japan and South Korea), Taiwan, and South Asia have been more stable.

The Ports have lost market share in all categories, however.

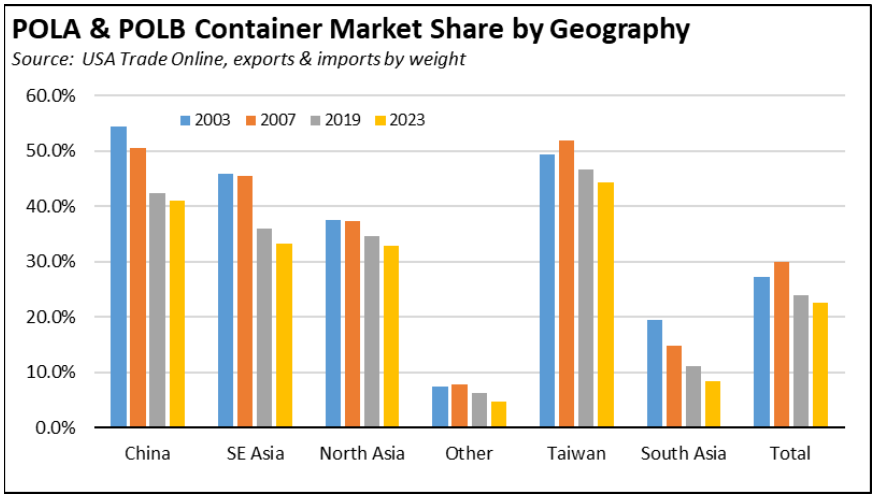


Figure 12: Ports Containerized Cargo Market Share by Region

[7] How Trump and Biden Have Failed to Cut Ties with China, The Economist, February 27, 2024.

Trade Value

By nominal value, combined trade (exports and imports) through POLA and POLB along with total trade flows by all modes through the region peaked, respectively, at $432.9 billion and $533.4 billion in 2022 in line with the upsurge in imports during the pandemic period. Containerized vessel cargo accounted for 64.3% of the total through the region in 2022, while air covered another 26.1%.

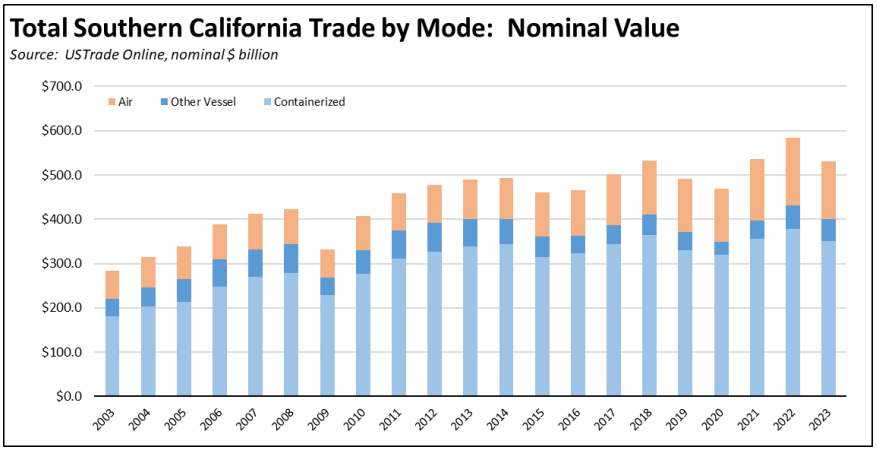


Figure 13: Southern California Total Trade by Mode, Nominal Value

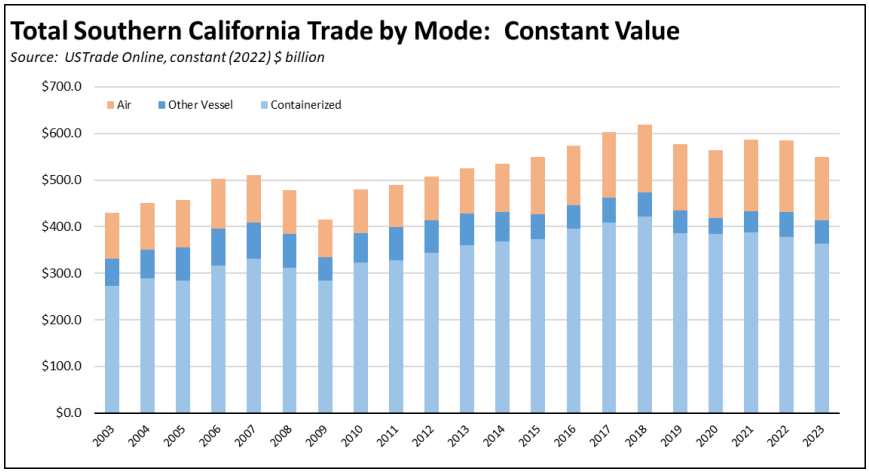


Figure 14: Southern California Total Trade by Mode, Constant Value

However, the region along with the rest of the country has gone through an upsurge in inflation in recent years. Measured instead in constant (2022) dollars, both the combined value of containerized trade through POLA and POLB and total trade through the region peaked in 2018. The constant value of containerized trade in 2023 was essentially back to the 2014 level. This outcome follows the drop in containerized market share, especially

the trend beginning in 2014. Diversion of cargo during the recent period of high congestion and uncertainty arising from the extended labor negotiations saw the region's share of international trade by value drop from a relatively constant average of 12.6% of the US total in the period 2008 to 2020, to 10.5% in the 2023 results.

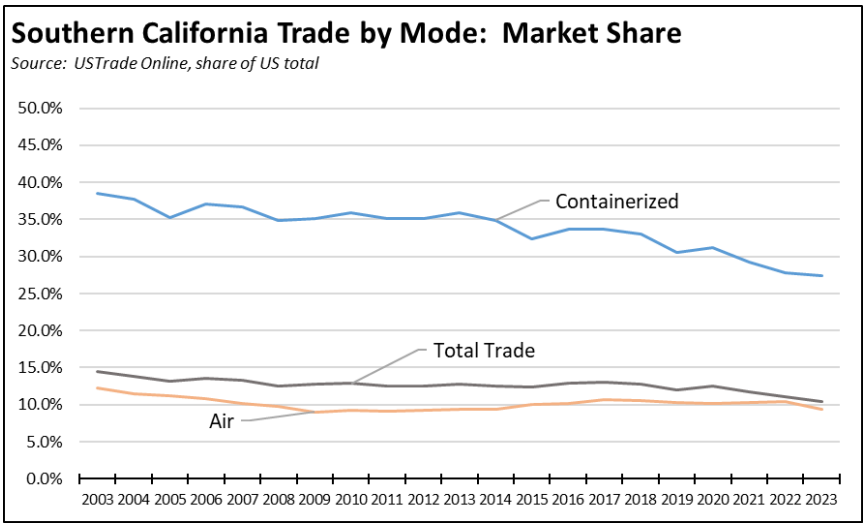


Figure 15: Southern California Total Trade Market Value

Trade by Origin & Destination

As detailed in the various prior impact studies discussed below, imports coming through the Ports follow one of three paths along the subsequent supply chain:

- Local destination cargo moves by truck from the ports to distribution centers or end users such as regional manufacturers and processors, and largely is consumed and used within the region.

- Transload cargo moves to regional facilities to be broken down and reloaded into domestic containers and trailers which are then sent by rail and truck to distribution centers and end users outside the region and to other states.

- Intact intermodal containers are loaded directly onto rail and moved through the Alameda Corridor to their final destination.

Export cargo follows similar patterns, with cargo shipped by truck or rail directly to the Ports, or shipped first to local freight consolidator operations who load the cargo into containers for shipment overseas.

The local traffic largely serves the Southern California market and at current cost points is generally inelastic in the face of potential competition from other ports. The National

Transportation Research Center's Freight Analysis Framework data shows that in 2022, 78% of all waterborne foreign imports destined for Southern California entered through the region's ports, and in total, 92% came through California ports. Only 8% originated from ports in other states. The size of the regional market and secondary transportation costs largely ensure that local cargo owners will continue to use the local gateways absent extraordinary conditions. Rising costs of using the Ports, however, could offset this local advantage, just as the Ports' previous cost advantages made Southern California the gateway of choice for many local cargo owners in the other 49 states.

Additional cargo also moves from the Ports by truck to other regions of California and adjoining states. This portion of regional cargo is also less elastic with respect to port competition at current cost points than purely discretionary cargo due to the economics and distances involved, combined with the Ports time advantages as the first port of landing. This portion of the Ports' market share, however, is not immune to other gateway developments in North America or to cargo origin shifts away from China and towards Southeast and South Asia.

Source: Jones Lang LaSalle Research in
Fulfillment Center Warehouse Jobs Give New Life to Sleepy Towns, NBC News, July 26, 2007

Figure 16: National Distribution Centers

The portions of traffic that currently are more susceptible to competition are those purely discretionary containers that are being moved to other states, in particular the intact intermodal component that can move through any other port in the US with proper intermodal rail links. A good percentage of this traffic has already shifted away from POLA/POLB, as reflected in the declining market shares. The Ports success in providing efficient cargo movement, especially for the major component coming from China, relied on cargo owners viewing the developed Southern California gateway as the primary West Coast distribution center. Other major centers are found in Dallas, Chicago, and throughout the Eastern states. And while these are served by rail links with the Ports, investments in the Gulf and East Coast ports closer to these centers are a source of increasing competition especially as their lower costs begin to outweigh any differences in

total shipping times for an expanding share of goods that are less time sensitive either due to the nature of the goods or as the result of shifting inventory practices.

The previous impact studies discussed below have made estimates of the discretionary cargo portion subject to this competition. Martin (2023) estimated that discretionary cargo moved through the Ports accounted for 33% of total containerized imports in 2021. This level is down substantially from Martin (2007) which estimated that 60% of all containerized cargo (exports and imports) came from or was sent to other states.

As used in some of the Martin studies, the steady decline in discretionary cargo at the Ports can be seen in the Alameda Corridor transit data. After showing a relatively steady average of 5 million TEUs annually between 2010 and 2021, ACTA transits fell to their lowest level to date at 4 million in 2023 as the result of cargo diversions to other ports. As a share of total containers handled by the Ports, the ACTA portion was at its lowest level of 24.0% in 2023, compared to 29.6% in 2019 and the peak of 39.6% in 2006.

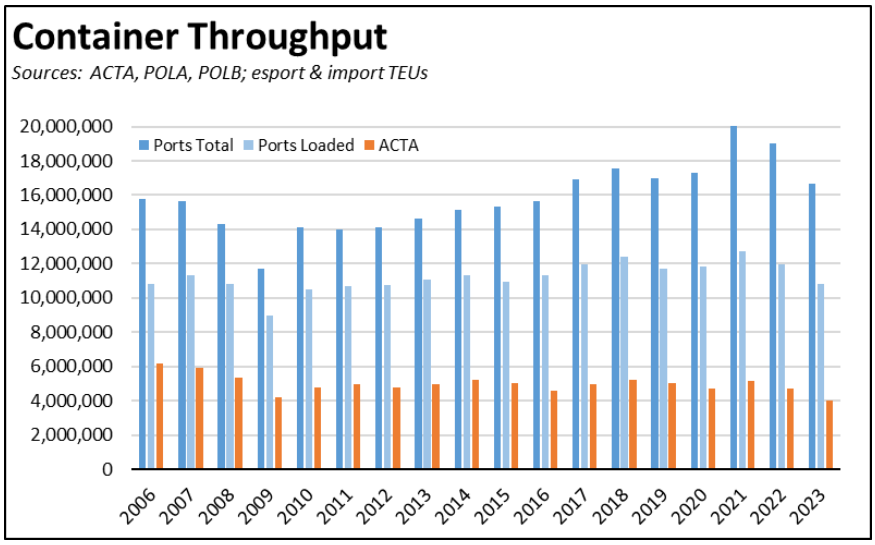


Figure 17: Ports/ACTA Container Volumes

The results have varied by container type in the ACTA data. Exports have seen less of a change, while imports have shown the most sustained drop as the Ports have lost market share for goods coming from China. Note that while total TEU numbers are available through 2023 (Figure 17), the breakdowns shown in Figure 18 are currently available in ACTA's annual performance report only through 2021.

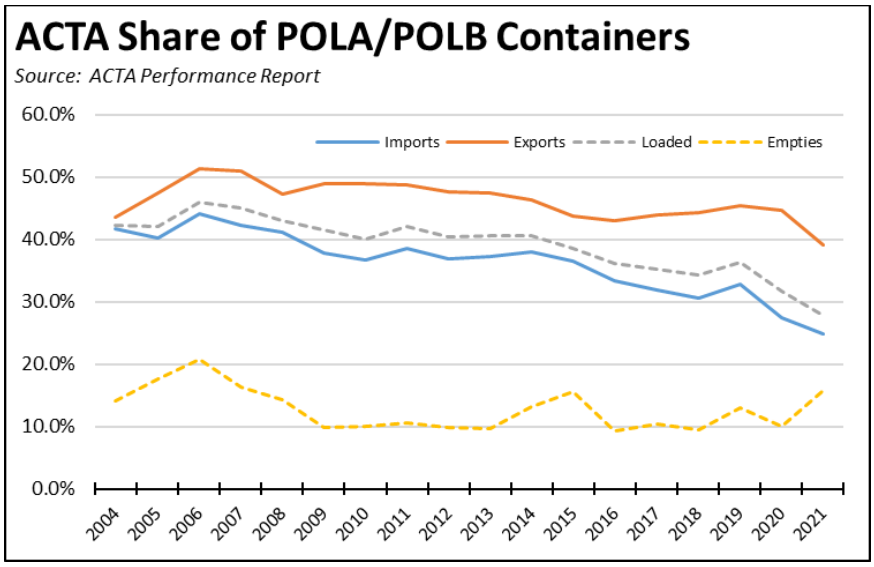


Figure 18: ACTA Share of Ports Containers

For this report, another estimate of the discretionary share is developed through the National Transportation Research Center's Freight Analysis Framework. In the tables below, the estimates cover all shipments except for natural gas, petroleum, and petroleum products, while the previous Martin estimates concentrate on containerized cargo. Measured by value, the share of total trade associated with the Other States shrank by 5 percentage points between 2019 and 2022, while the share in the Eastern and Southeastern states presenting the greatest competition from local ports also dropped by a comparable amount.

Southern California Ports Trade Origination/Destination, Other than Oil & Gas

Source: Freight Analysis Framework; see methodology

		Southern California	Other California	Other States	East/SE States
By Value					
Imports	2019	26%	27%	47%	36%
Exports	2019	23%	19%	59%	40%
Total	2019	25%	26%	49%	36%
Imports	2022	27%	30%	43%	32%
Exports	2022	29%	21%	50%	33%
Total	2022	27%	28%	44%	32%
By Weight					
Imports	2019	26%	27%	46%	35%
Exports	2019	20%	19%	61%	38%
Total	2019	24%	24%	52%	36%
Imports	2022	28%	29%	42%	31%
Exports	2022	23%	21%	56%	38%
Total	2022	26%	27%	47%	33%

Figure 19: Ports Trade Origination/Destination by Region

Considered by state, the Ports' performance—measured by state trade (exports and imports) through the Ports as a share of total origin/destination waterborne foreign trade in each state—was mixed in 2022, maintaining market share in the nearest states while losing ground elsewhere:

- POLA/POLB share of total waterborne trade in the adjacent states—including the Rest of California—was generally stable or showed gains.

- In the Other States, market share dropped in 9, rose in 2, and remained within 1% of the 2019 share in the other 5.

- Treating the New England states as a whole, market share dropped in 12 of the East and Southeastern States, rose in only 2, but stayed within 1% of the 2019 share in the other 12.

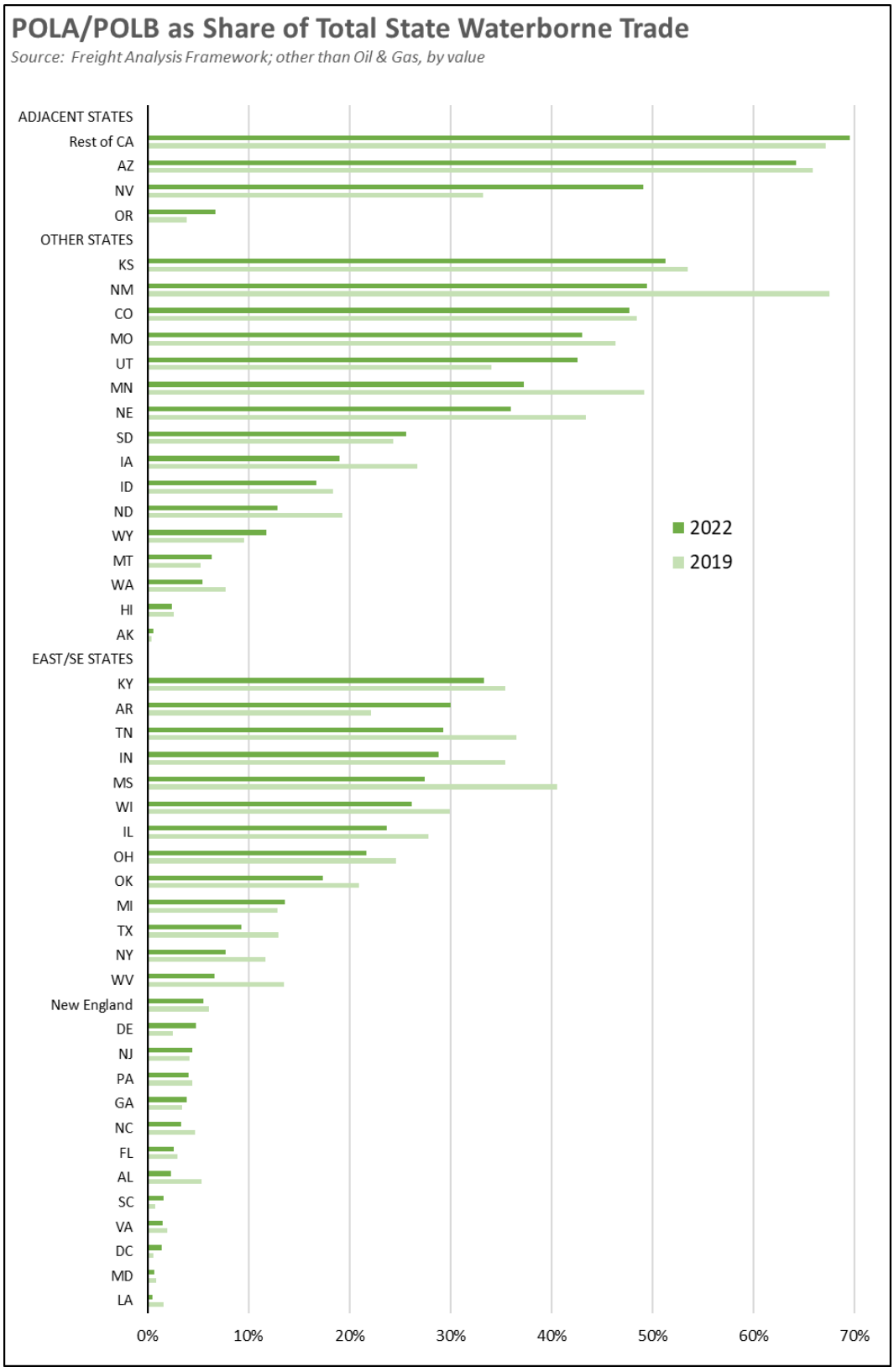


Figure 20: Ports Share of Waterborne Trade by State

Factors Affecting the Ports' Competitiveness

The Ports became the dominant conduit for Pacific Rim trade as the result of leveraging their advantages as the first port of landing, under which cargo owners consider not only the time and cost of moving goods across oceans but also how quickly goods can be moved to/from land transportation nodes and their ultimate markets and production centers. Continued investments in the port facilities have kept them competitive as vessel sizes have grown larger. An extensive transportation, warehouse, and support industry network facilitates movement of goods to and from the Ports. Two Class 1 railroads provide competitive rail service to the interior US markets. The Clean Air Action Plan maps the investments required to maintain this economic activity while contributing to the region's environmental goals and minimizing the shift—rather than a reduction—of the associated emissions to other ports and regions not having to face the same standards and costs of attaining them. As a result, under normal operating conditions, goods can be moved more quickly from East Asian originations to their final destinations using POLA and POLB rather than the East and Gulf Coast ports.

Interacting with these geographic and infrastructure advantages are a number of factors affecting market share and consequently jobs within the region related to the Ports. Many of these factors are reflected in the higher costs of shipping through POLA and POLB which in a rising number of instances have offset the time advantages they offer.

Financial Risks

As required, the most recent financial statements from both POLA (POLA, December 2023) and POLB (POLB, March 2023) discuss factors that may affect their operations and consequently present a future financial risk to their ability to remain competitive with other ports. The POLB discussion is more condensed but addresses similar issues discussed in more detail by POLA. These key risks stem from the port's loss of market share as competing shipping options for discretionary cargo expand. The competitive position is also likely to be affected as regulatory costs increase the operating costs that must be passed on to shippers. The POLA analysis addresses the following factors:

- Shippers have more options. Significant competition for container traffic among the North American ports has resulted in competing options at competitive prices. The creation of shipping alliances in particular has created conditions under which shipping lines are able to route cargo to terminals that are not owned by them, but by their alliance partners.

- Competition focuses on discretionary cargo. All ports are in competition for discretionary intermodal cargo moving beyond the coasts into the interior markets in US and Canada. This component makes up about 33% of all cargo handled by

POLA and can be affected by factors such as capacity of rail routes and the competing water routes.

- Regulatory costs are likely to increase the port's operating expenses: "Paying for mandated air pollution reduction infrastructure, equipment and other measures may become a significant portion of the Port's capital budget and operating budget. Such expenditures may be necessary even if the Port does not undertake any new revenue-generating capital improvements."

- Extended contract negotiations in the past have led to uncertainty and cargo moving to other ports including the Gulf and East Coasts. And "[o]nce it moves to other gateways, it becomes challenging to regain market share."

More Limited Expansion Options

The ability of POLA and POLB to compete for increased market share is constrained by relatively more limited space for expansion at the Ports, more costly and lengthy regulatory approvals, and increasing opposition to new warehouses in the region coming from state and local sources. The competing East and Gulf Coast ports generally have more available room for expansion along with permitting and regulatory processes with substantially lower transaction costs and time delays. New York-New Jersey recently completed several rail enhancements improving intermodal flows and was able to use a network of temporary container yards to accommodate cargo surges during the pandemic, as did the Port of Savannah. Through investments between 2019 and 2020, Virginia expanded its capacity by another 1 million TEU. The Georgia Ports Authority accelerated completion of a 1.7 million TEU expansion to mid-2022 along with a channel deepening project completed in March 2022 and announced plans to expand capacity by another 1.8 million TEU by 2025 and another 2.5 million TEU in the next 10 years.[8] Additional longer-term investments expanding capacity and intermodal rail also are underway in the other East and Gulf Coast ports.

Canadian Ports

The Canadian Pacific Coast ports are also a source of competition due to the fact they are closer in sailing time to the Asian ports, have a shorter rail time to Chicago and other Midwest markets, have lower vessel and container charges due to the fact that they do not charge the Harbor Maintenance Tax applied in all US ports and avoid the Alameda Corridor Transportation Authority transit fee applied at POLA and POLB, and have invested in capacity expansion in recent years. However, the larger port—Vancouver—specializes more in bulk and general cargo which made up 86% of total cargo by weight in 2022. The Canadian ports reported a total of 3.8 million TEUs (loaded and empty) in 2023, down from

[8] Georgia Ports Authority, Port of Savannah to Grow Capacity by 60 Percent, press release, February 24, 2022; GPA Will Move from a 7.0 Millio TEU Capacity Port to 12 Million TEU in Less than a Decade, press release, April 23, 2024.

4.6 million in both 2022 and 2019. Adding these numbers into the US West Coast statistics, POLA and POLB had a 63.8% market share of all Pacific Coast container cargo by total TEU in 2022, up from 60.7% in pre-pandemic 2019. This shift reflects the conditions under which expansion of the Canadian ports has had more of an effect on traffic through Seattle and Tacoma rather than POLA and POLB.

East & Gulf Coast Water Route Risks Rising

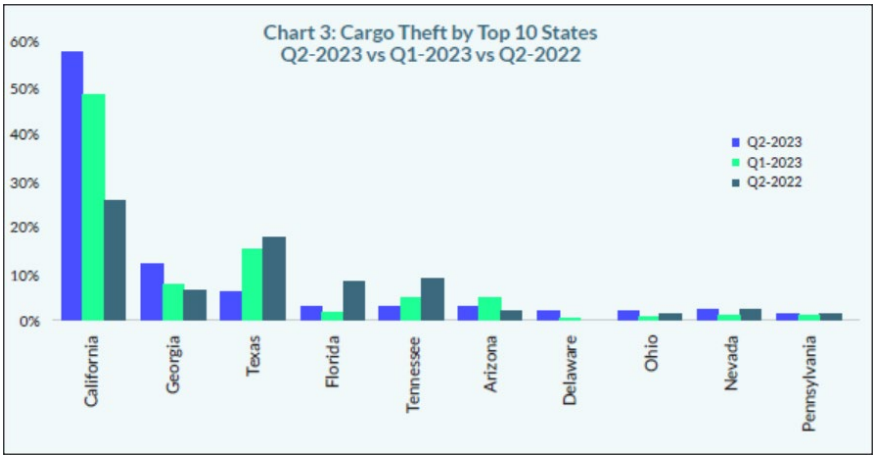
Continuing drought has limited daily capacity of the Panama Canal. Terrorist attacks on Red Sea traffic[9,10] have affected the number of vessels using the Suez Canal, the primary route between Asia, in particular Southern and Southeastern Asia, and the East and Gulf Coasts, while that diverted traffic also now faces an upsurge in piracy off the Somali coast.[11] These issues are especially problematic as they came at the same time that overall shipping rose as companies sought to replenish their stocks ahead of the Lunar New Year holiday closures in Asia.[12]

Supply Chain Capacity

The Ports' competitive edge comes from not only their ability to handle cargo efficiently at water's edge but also through efficient movement of those goods to and from the point of final use and production. The congestion experienced through mid-2022 spotlighted capacity limits throughout the supply chain, including container storage yards, warehouses, and both truck and rail links. Congestion of this type affected goods movement throughout the US and worldwide but was the most pronounced in Southern California. Sufficient ongoing capital investment will be required to ensure these associated supply chain issues will not reoccur in the future, but these investments will continue to be constrained in the region due to ongoing regulatory and litigation challenges and the diversion of capital spending from capacity to regulatory compliance. De-bottlenecking the nation's supply chains consequently is just as likely to expand the alternative options available to shippers. Trade infrastructure is not a static feature. Other ports in the nation continue to invest in port facilities and intermodal rail required to move cargo to regional distribution centers, providing competition for the discretionary cargo that previously went through the Ports.

[9] Red Sea Activity Down Nearly 20% After Containership Exodus, Lloyd's List, January 4, 2024.
[10] Up To 1.7M TEU Containership Capacity Could Be Needed for Red Sea Rerouting, Lloyd's List, December 18, 2023.
[11] Somali Pirates Are Back on the Attack at a Level Not Seen in Years, Adding To Global Shipping Threats, CNBC, February 6, 2024.
[12] California's Long-Embattled Ports Are Winning Back Imports, Wall Street Journal, January 16, 2024.

Supply Chain Security



Source: Overhaul, United States Q2-2023 Cargo Theft Report

Figure 21: Cargo Theft by State

Cargo theft has become an increasing risk. Nationally, the number of reported incidents nearly doubled between 2019 and 2023.[13] In one accounting,[14] California experienced 58% of the nation's cargo theft volume in the second quarter of 2023, compared to 49% during the same period in 2022. The primary California targets were electronics (44% of total), clothing and shoes (10%), and home and garden (10%).

Additional resources have been allocated to track down these crimes, including the Cargo Criminal Apprehension Team at the Los Angeles County Sheriff and California Highway Patrol's Cargo Theft Interdiction Program. Prosecution, however, has in many cases been missing due to the low priority placed by some county District Attorneys on this type of crime. For example, Union Pacific Railroad stated in a December 2021 letter that the level of theft combined with the lack of prosecution was causing both them and their customers to consider "serious changes to our operating plans to avoid Los Angeles County."[15]

Energy Costs

State and local energy policies have produced the highest or near the highest energy prices among the states. Even as the Ports' Clean Air Action Plan commits to zero emission operations and as regional warehousing moves in this direction as well, costs of the electricity required to run this equipment have been soaring both in the state and in the region. The average estimated commercial electricity rate in the region in 2022 was 72% higher than the average for all states other than California. The estimated average

[13] Cargo Theft Has Nearly Doubled Since 2019, MSN, February 6, 2024.
[14] Overhaul, United States Q2-2023 Cargo Theft Report.
[15] UP InsideTrack, UP Addresses Los Angeles Cargo Thefts; Problem Requires Collective Effort, January 16, 2022.

industrial rate in the region was 121% higher. The table below shows energy costs in the region compared to the states with the other top 5 ports.

Average Energy Costs, 2022

Source: Calculations from US Energy Information Administration & GasBuddy.com

	Electricity (cents per kWH)		Diesel (per gallon)
	Commercial	*Industrial*	
Southern California	19.93	17.40	$6.06
US other than California	11.57	7.89	$5.01
Georgia	12.10	8.65	$4.79
New Jersey	13.75	12.12	$5.51
New York	18.19	7.55	$5.65
Texas	9.05	7.13	$4.47
Virginia	9.66	7.99	$5.12

Figure 22: Southern California Average Energy Costs vs. Other States

And even as the ports and related Trade operations move to zero emission equipment under the Plan and Air Resources Board regulations, diesel will remain a primary fuel during the transition. In 2022, the estimated average diesel price in the region was 21% higher than the average for all states other than California and as much as 36% higher than the lowest cost state.

Electrification under the Plan and Air Resources Board regulations assumes adequate energy supplies and just as critically reliability of those supplies as the Air Board rules move every other part of the California economy to reliance on this one energy source in the same timeframe. In order to meet its broader clean energy goals—including the vehicle sales mandate—California will have to triple its current clean electricity generation capacity by 2045[16] and increase total peak generation capacity by 60%.[17] This required generation and storage capacity has yet to be identified and built. Most studies conclude that sufficient transmission capacity is likely but by no means certain to exist, but more importantly shortages of distribution equipment are already occurring[18] and are expected to become worse as major upgrades to distribution will be required as the state moves closer to its zero emission vehicle and Net Zero goals.

Growth of E-Commerce

E-commerce operations are a growing share of total retail sales, and due to the nature of these operations have become a driver of trade activity at various ports. They are more warehouse intensive and require close access to ports for the primary component of their

[16] California Energy Commission, Air Resources Board, and Public Utilities Commission, 2021 SB 100 Joint Agency Report, Achieving 100 Percent Clean Electricity in California: An Initial Assessment, September 2021.
[17] San Diego Gas & Electric, The Path to Net Zero, April 2022.
[18] US Department of Energy, The Supply Chain Crisis Facing the Nation's Electric Grid, February 2022.

goods flows. Greater logistics space is also required as these operations consolidate functions typically carried out in stores, cover a broader range of goods and associated inventory levels, and must accommodate additional fulfillment operations including the handling of returns. The growth of these sales consequently have shifted the nature of the warehouse infrastructure required to support retail sales in the US. The regional dispersion of these facilities has shifted the associated port traffic as well.

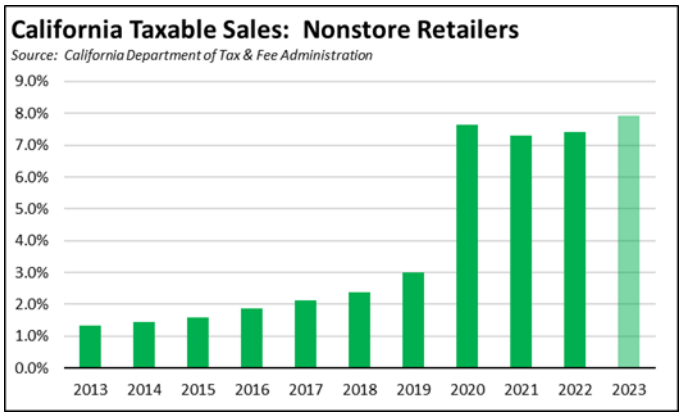


Figure 23: California Taxable Sales: Nonstore Retailers

After California began taxing Amazon and other online sales in 2012, nonstore retail sales rose from 1.2% of taxable sales in 2013 to 3.0% in 2019. These sales then jumped during the pandemic, rising to a peak of 7.9% for the first three quarters of 2023. The numbers used in the chart are adjusted for the portion of total taxable sales covered by services and cover only final goods sales. These numbers do not account for all e-commerce but only for those retailers such as Amazon relying solely on warehouse-based sales and not those that ship through a combination of warehouses and retail locations. For comparison, US Department of Commerce estimates put all e-commerce sales at 15.6% of total US retail sales in the third quarter of 2023.

Shifts in Manufacturing

As discussed in this report, even at reduced levels Southern California retains a significant manufacturing base that relies on the Ports both for access to export markets and as a conduit for required parts, components, and materials. Nationally, however, this trade is shifting to the East and Gulf coasts. Between the low in 2010 and 2022, US Bureau of Labor Statistics data shows that 38% of manufacturing jobs expansion in the US was in 7 Southeastern states, and this trend will accelerate as the electric vehicle and battery plants now under construction move to full operation and as their supply and support networks relocate to this region. Parts, component, and material freight routes will also follow this shift. In contrast, California as a whole contained only 7% of total manufacturing jobs expansion in this period, while Southern California jobs in this industry shrank by 40,500 (-6.6%).

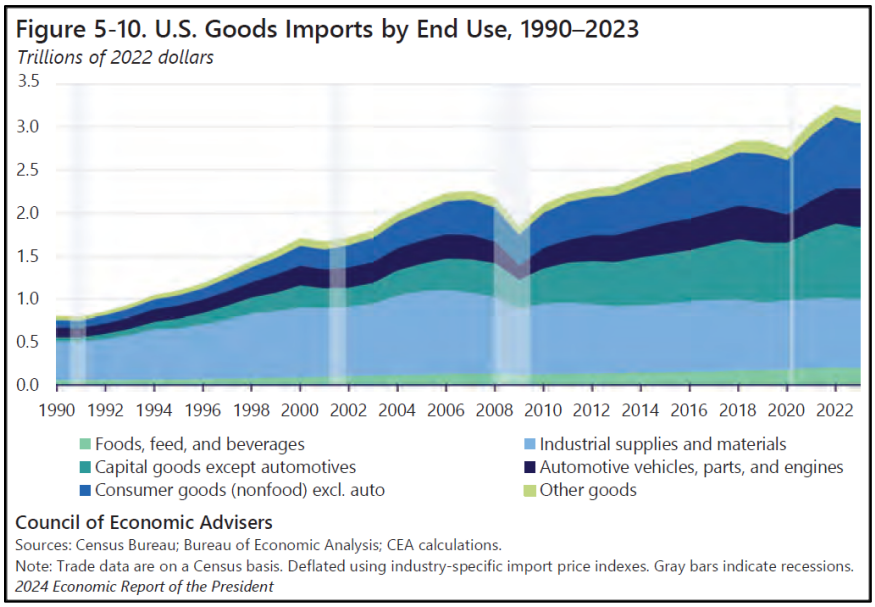


Figure 24: National Goods Imports by End Use

Ready access to ports is a critical factor underlying the ability of the remaining manufacturing base to continue competitive operation in Southern California. Combining US Census Bureau[19] data on the value of exports manufactured in the state with the IMPLAN output data, an estimated 13% of California manufacturing production in 2022 was for export markets. Goods manufactured in California made up 62% of all origin exports shipped from the state that year. These numbers cover only finished products from regional manufacturers and do not include parts and components produced locally and destined for export products finished elsewhere.

On the other side of the production equation, industrial supplies and materials and capital goods (except automobiles) made up 52% of all US imports in 2022 (50% in 2023).[20] Using the national input-output data components,[21] imports provided 23.3% of the intermediate goods inputs required for manufacturing production in 2022. Competitive economic access to these production inputs is essential for the continued operation of the remaining manufacturing base in the region.

Internationally, shifts in manufacturing are also affecting overall imports flows. Companies are now seeking to reduce their exposure risk in China by diversifying their sourcing to other low cost locations such as India and Southeast Asia, both of which are closer by shipping distance to the East and Gulf Coast ports and their rail links to interior

[19] US Census Bureau, U. S. Exports of Goods by State, ZIP Code Based, by NAICS-Based Product Code Groupings, Not Seasonally Adjusted: 2022.
[20] Economic Report of the President, March 2024.
[21] US Bureau of Economic Analysis, Input-Output Accounts Data, Import Matrix, After Redefinitions and The Use of Commodities by Industries – Sector, 2022.

market centers. Large scale shifts to India, however, have been stymied in the past and will face some constraints in the future by the pace of required regulatory and legal reforms. The USATrade Online data in contrast show Southeast Asian containerized trade by weight doubling from 8.2% of the US total in 2007, to 16.8% in 2023. As discussed previously, the Ports have been able to capture increasing volumes of the Southeast Asian trade as the overall total has grown, but have seen their associated market share go into a steep decline as more of that trade flows through the East and Gulf Coast ports.

Shifts in Consumer Markets

Between the peak in 2018 and 2023 (as of July 1 each year), California Department of Finance estimates that population in Southern California dropped by 268,000 (-1.5%), and expects the current numbers to remain largely unchanged through the end of the decade. These results are largely confirmed in the just released numbers in the Department's January 1 estimate series, showing regional population grew by only 0.2% between 2023 and 2024. In contrast, the US Census Bureau estimates the Southeastern states grew by 5.4 million between 2018 and 2023 (4.6%), or the equivalent of the combined populations of Orange and San Bernardino Counties. Consumer markets and the shipping to supply them are shifting accordingly.

Shifts in Inventory Practices

Inventory practices at US businesses are still undergoing reconsideration and will likely continue to change in the near future. The accelerated development of efficient goods movement in the first two decades of the 2000s enabled most businesses to shift to a just-in-time inventory model, substantially reducing the costs to maintain high inventory levels and mitigating much of the effect inventory changes previously had on national business cycles. Supply chain congestion during the pandemic exposed weaknesses in this approach, causing many to turn instead to a just-in-case model with its consequent effects of increasing overall trade levels and shifting the timing of trade flows. The subsequent inventory buildups then led to substantial write-downs by some businesses who had mis-timed markets or saw the underlying markets for these goods weaken. The current situation remains in flux, and the eventual inventory patterns and their consequent effect on trade flows have yet to settle in.[22]

This factor is also affecting the inland portions of the supply chain. The shift to just-in-case inventories and its increased trade flows caused additional strains on Southern California's tight warehouse vacancy rates. Other regions instead responded to this demand through development of additional distribution and other types of warehousing. For instance, Walmart opened a 3 million square foot Distribution Center[23] near the Port of Charleston in April 2022, that is expected to create 1,300 full-time jobs and increase the

[22] Retailers Return to Bringing in Inventory 'Just in Time,' Wall Street Journal, January 24, 2024.
[23] Walmart Opens Up Its New SC-based Import Distribution Center, Logistics Management, April 27, 2022.

port's volume by 5% while shifting that volume away from the discretionary cargo handled by other ports including POLA and POLB as the company adjusted its national sourcing strategies. In contrast to California's lengthy project approval and litigation processes, this facility was announced, permitted, constructed, and opened within 21 months.

Extended Contract Negotiations

Extended contract negotiations combined with past events have at times led to uncertainty over the reliability of port access, leading to diversions of discretionary cargo to other regions including actions that saw large retailers to diversify away from reliance on a primary distribution center in Southern California to centers spread across the West and East Coasts. And as indicated in the Financial Risks discussion above, once cargo flows move to another port, it becomes difficult to recover it again.

Regulatory Uncertainty & Regulatory Friction

Intermodal supply chain components are capital-intensive operations involving long-term investments and leases. Uncertainty in the regulatory environment throughout the supply chain has effects on the costs of operation and has the potential to dampen overall investments in Southern California across all supply chain sectors, ironically reducing investments in the infrastructure necessary to facilitate environmental improvements and higher deployment levels of zero emission equipment. The net result is to shift these investments away from Southern California and to more certain investment environments in other states, moving capital spending more to other regions and affecting the overall competitiveness that leads shippers to consider other port options.

This capital intensity can also result in heightened application of regulatory friction, which tends to operate in a manner which is the functional opposite of regulatory uncertainty. In California, both the state and local regulatory agencies have moved away from standards setting that allows flexibility in compliance, to more proscriptive mandates or standards that are so strict as to essentially require single compliance choices. In these situations where California's rules are unique, stringent, or specific, there is no capacity for businesses, investors, or institutions to make the most cost-effective, efficient, or optimal investments in order to maximize business operations and jobs while meeting the environmental goals.

As a case in point, the California ports are now essentially served by a "California fleet" with vessels equipped with the necessary environmental components including those related to shore power and fuels. With the recent disruptions to traffic through the Suez and Panama Canals, shippers are filling the available capacity in that fleet, but the Ports are not seeing unplanned redeployments of other vessels as they have in the past, likely due to the long-term planning required—on the order of 9 to 12 months—to equip them properly to use the Ports' facilities. The same capacity issues now extend throughout the California economy as regulations have become more strict, including California-only

requirements for gasoline and diesel, California-only standards for milk, and California-only rules for lawn equipment, appliances, and an increasing array of consumer products. The standards may be met, but the costs of single compliance paths mean consumers and employers are often faced with cost premiums for products sold only in the California market, and unplanned shortages when those dedicated supply chains face stress.

Global Trade Uncertainty

As discussed above, China is the primary generator of both exports and imports through the Ports, but its economy remains sluggish. In January, manufacturing was down for the fourth month in a row[24] but in more recent data has shown modest growth.[25] The recent bankruptcy of Evergrande reflects a long-simmering property bubble that could restrain growth for some time to come, comparable to Japan's experience with a "lost decade" of growth in the 1990s.

Global trade levels will also be affected by weak economic conditions in the EU. The most current European Central Bank projections expect real GDP to grow by only 0.8% in 2024, and by 1.5% in 2025 and 2026.

Economic Downturns Affect the Region More Deeply

The Great Recession was sparked by a collapse of the housing market, which felt its greatest effects in Southern California. This recession was both deeper and longer lasting in California than in the rest of the US, affecting the portion of goods movement associated with local demand in the region. After plunging beginning in 2008, housing prices in most areas of California did not recover until around 2017.

[24] China's Manufacturing Activity Contracts for Fourth Month as Economic Recovery Lags, The Financial Times, January 31, 2024.
[25] China's Factory Activity Keeps Growing but Loses Some Steam, Wall Street Journal, April 29, 2024.

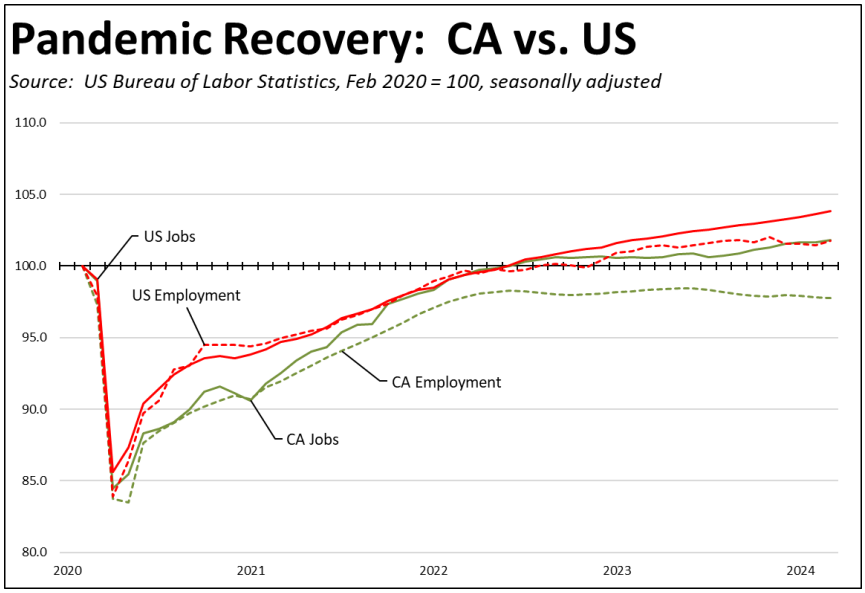


Figure 25: California vs. US Recovery from Pandemic

Similarly, the job closures during the pandemic were more widespread and longer lasting in California than in the other states. Under the recently released data revisions, nonfarm wage and salary jobs have underperformed the overall US recovery, and total employment has never recovered to pre-pandemic levels. Total California employment dropped in 9 of the last 10 months through March 2024, while the latest unemployment rate at 5.3% is the highest among the states and DC.

California in fact experienced recessionary conditions in 2022 and the first half of 2023. US Bureau of Economic Analysis data shows California Real GDP was down compared to the fourth quarter in 2021 until recovering in the third quarter of 2023. Total state Personal Income followed a similar trajectory through the second quarter.

Trade & the Southern California Middle Class

The history of the California economy is one of continuous change and reinvention. Beginning with mining, the state has often led the nation in birthing industry innovations as well as entirely new industries such as in agriculture, oil production, film and subsequent advancements in Information and in Arts, Entertainment & Recreation, aerospace, electronics, biotechnology, other manufacturing, and web-based businesses and other high tech. The evolution of each new industry came from the assets built by the previous ones including a trained and available labor force and an entrepreneurial core coming from the technical and professional occupations. Among the results of this pattern was a succession of jobs supporting a large and stable middle class in the state even in the face of continuous shifts in competitive advantages, especially a middle class that was open to workers with less than a college education. While cities in the eastern part of the US often went into decline after losing a major industry, urban regions in California instead often saw creation of yet another new one.

Due to rising levels of regulation, the increasing costs of living for their employees and increasing costs of operating a business in the state along with the lengthy process required to permit, construct, and equip new ventures threaten this economic dynamic in the state. Examples such as High Tech have continued this jobs evolution through the largely unregulated, knowledge-based components of this industry, but the ancillary manufacturing and other support activities have gone to other states and other nations rather than spreading out as in the past to other regions of our state. In the past few decades, Trade in Southern California is the one stand-out exception to this pattern.

Southern California Became the Nation's Manufacturing Center

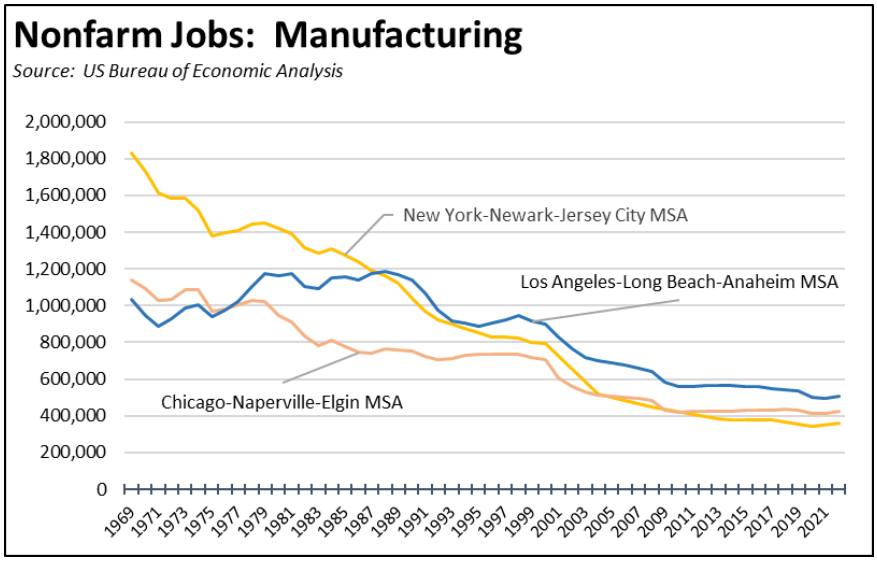


Figure 26: Southern California Manufacturing vs. Next Two Largest Centers

Particularly starting during World War II and the post-war period, Manufacturing was the key driver of middle-class opportunity both through direct employment and the array of support and supply industries forming the state's industrial base. This expansion was particularly strong in Southern California. As measured by total (wage and salary and proprietor) full- and part-time jobs, US Bureau of Economic Analysis (BEA) data shows Los Angeles-Long Beach-Anaheim MSA (Los Angeles and Orange Counties) overtaking New York as the nation's manufacturing center in 1988 and maintaining that position ever since even as the number of jobs has declined.

This underpinning of a more balanced income distribution in the state and the region began a steep decline following defense restructuring after the end of the Cold War and movement of factory jobs to lower cost production countries and regions of the US. High costs, taxes, and increasing regulation saw Manufacturing jobs (BEA data) plunge by 51% in Southern California from the peak in 1988 to 2022, but by 14% in the rest of the state during this period.

Middle Class Shrank as Manufacturing Declined

The loss of these manufacturing jobs had a major effect on income distribution within Southern California. As the primary jobs base diminished, the share of middle-class income households dropped from just over half in 1980 (50.2%) to 46.6% by 2000, and to a low of 43.9% in 2014 as the region still struggled economically from the Great Recession. As with the rest of the state, movement out of the middle class, however, was primarily into the upper income levels. The share of households with less than a middle-class

income was relatively level—30.5% in 1980 and 30.7% in 2000 (30.2% in 2022). The shift instead is emblematic of the overall jobs development picture in the region, going from a concentration of growth in the middle wage range jobs to a pattern increasingly shaped by growth primarily at the lower and upper wage levels that is increasingly defined by educational attainment. Jobs supporting the middle class and providing the transition platform for income advancement and upward economic mobility diminished as manufacturing moved out of the region.

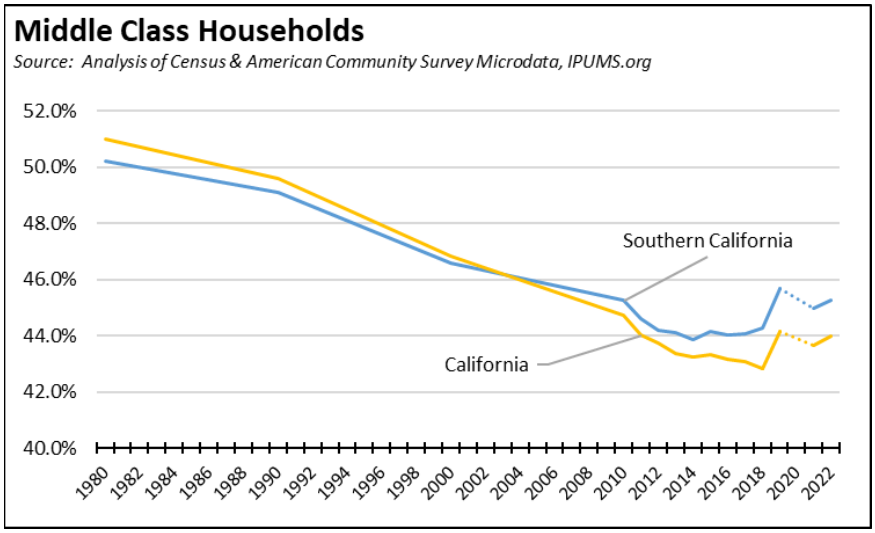


Figure 27: Southern California Share of Middle Class Households

Growing Cost of Living

As detailed in the Methodology section, the definition of middle-class used in this report is based on a national standard tied to US median household income in each year. The results consequently do not reflect regional costs of living under which even households earning well above $100,000 a year may be hard pressed to consider themselves as middle class given how far that income is stretched in the face of high housing costs and surging costs for basics such as utilities, commuting, and food. Industries such as Trade providing relatively higher wages especially to workers with a high school diploma or less become all the more important in the face of this overall cost structure.

As measured by US Bureau of Economic Analysis' Regional Price Parity series, California became the highest cost state in the US in 2022, with overall prices 12.5% higher than the US average and 29.9% higher than the most affordable state. Housing (housing services) were 60.2% higher than the US average and 197.2% higher than the most affordable state. Utilities were 47.1% higher than the US average and 121.5% higher than the most affordable state. In contrast, Goods—due in part to the flow of Trade through the state—showed some moderation at 8.3% higher than the US average and 17.6% higher than the lowest price state.

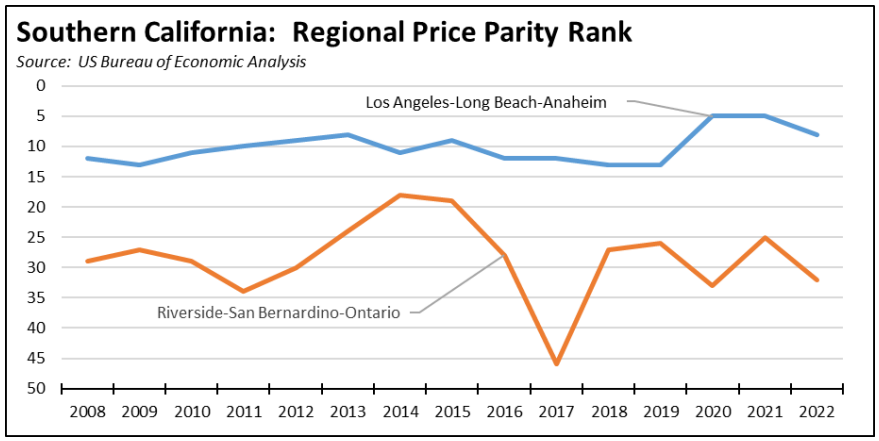


Figure 28: Southern California Relative Cost of Living

For the two MSAs making up Southern California, Los Angeles-Long Beach-Anaheim was the 8th most costly out of the 384 urban areas in the US in 2022, down only marginally from 5th highest the previous two years. Riverside-San Bernardino-Ontario was at 32nd highest, down from as much as 18th highest in 2014.

Growth of Trade Jobs

Following the defense spending realignments in the early 1990s, regions in the state followed different paths as their economies underwent change. The Bay Area shifted to High Tech, and entered a period dominated by growth in high wage jobs generally requiring a college degree. Southern California instead drew on its geographical advantages and turned to Trade, producing a jobs base for a broader range of wage and educational levels. This outcome was particularly critical given the high level of immigrants with less than a college education and many with less than a high school diploma or equivalent moving into the region.

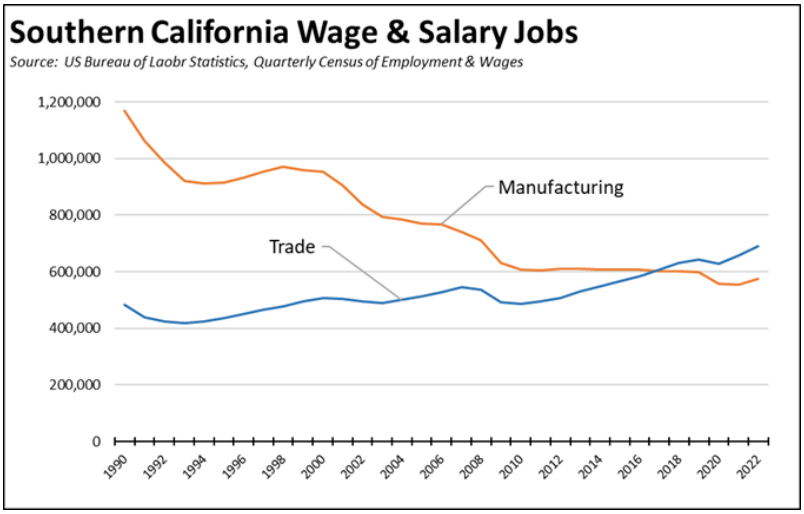


Figure 29: Southern California Trade Cluster Jobs vs. Manufacturing

As Pacific Rim trade expanded, wage and salary jobs in Trade replaced a sizeable portion of those being lost in Manufacturing. Between 2000 and 2022, wage and salary jobs in Trade grew by an estimated 198,700, covering more than half of the 379,400 jobs lost in Manufacturing during this period.

As with any industry, wages vary by Trade sub-industry, occupation, and tenure. By sub-industry, annual wage for wage and salary workers in 2022 averaged from $51,507 (NAICS 4883, Support Activities for Road Transportation, 1.3% of Trade workers), to $140,176 (NAICS 4883, Support Activities for Water Transportation, 2.4% of Trade workers). Annual wages paid to the West Coast terminal registered workforce averaged $136,500 in 2022, along with benefits averaging 68% of wages.[26] Overall average annual wages in the Trade cluster, however, have posted above the regional levels. As a blue-collar middle-class substitution option, wages in Trade have differed by about 10% from those in Manufacturing and have been consistently above the average for the non-durable manufacturing component making up 36% of that regional industry.

Southern California Average Annual Wage by Industry

Sources: Quarterly Census of Employment & Wages with estimates

Industry	2000	2019	2022
Total, All Industries	$37,578	$61,358	$71,825
Manufacturing	$39,783	$73,829	$86,749
Durables	$44,634	$82,187	$97,428
Non-Durables	$32,124	$58,872	$68,117
Trade	**$43,640**	**$67,273**	**$76,777**

Figure 30: Southern California Average Annual Wage by Industry

In the period 2000 to 2019 prior to the pandemic, jobs providing less than a middle-class wage were responsible for 63.5% of net jobs expansion in the region, further cementing the two-tier development pattern of jobs creation primarily at the lower and higher wage levels. Trade in contrast produced the second highest level of middle-class wage jobs, behind only Health Care, and helped drive the gradual rise in middle class households seen in the previous chart above.

[26] Pacific Maritime Association, Annual Report 2022.

Southern California Jobs by Industry

Sources: Quarterly Census of Employment & Wages with estimates

	Job Change 2000-2019	Job Change 2019-2022	Average Annual Wage 2022
Health Care	286,168	18,122	$73,077
Trade	**153,070**	**45,658**	**$76,777**
Professional & Technical Services	96,223	21,657	$117,880
Other Government	84,422	-23,968	$84,132
Administrative & Waste Services	79,548	11,871	$52,161
Construction	72,268	6,460	$79,328
Arts, Entertainment, & Recreation	61,047	-11,457	$98,011
Educational Services	54,807	7,630	$62,396
Real Estate & Rental & Leasing	28,998	1,710	$86,432
Utilities	-478	568	$135,410
Finance & Insurance	-792	-15,660	$149,306
Mining, Quarrying & Oil & Gas Extraction	-1,759	-19	$107,186
Information	-23,200	23,251	$140,041
Management of Companies & Enterprises	-36,650	-1,901	$140,928
Manufacturing	-354,905	-24,465	$86,749
Subtotal, Middle Class Wage	***498,767***	***59,457***	
Social Assistance	337,956	32,036	$25,660
Food Services & Drinking Places	275,352	-14,801	$30,083
Retail Trade	78,293	-17,964	$47,694
Accommodation	18,791	-15,152	$31,958
Other Transportation	18,493	19,626	$47,239
Agriculture, Forestry, Fishing & Hunting	-15,130	-1,529	$42,846
Other Services	-18,811	-866	$48,901
Subtotal, Less than Middle Class Wage	***694,944***	***1,350***	
Total, All Industries	1,093,787	85,807	$71,825

Figure 31: Southern California Jobs by Industry

While Health Care is expanding organically in concert with the aging of the population, a substantial portion of its growth in this period came from government funding and expansion of public health care. Continuation of regional job levels will require continuation of those funding levels as well, even as the state enters a period of substantial projected deficits[27] and as the federal deficit and debt balloon to unprecedented levels. The largest growth center in this period—very low wage Social Assistance—is also dependent on government funding as expansion has been heavily dominated by government-funded, minimum wage In-Home Supportive Services (IHSS) workers.

[27] Dan Walters, Will Gavin Newsom Confront California's Structural Budget Problems or Leave Them to His Successor?, CalMatters, January 16, 2024.

Moving to the pandemic and post-pandemic period from 2020 to 2022, Trade was the primary jobs growth center for the region, producing 53.2% of net jobs expansion. Trade in fact produced more jobs than higher wage Professional & Technical Services and Information combined, two of the few other industries that due to a shift to telecommuting managed to increase jobs during the pandemic while other lower wage jobs remained closed.

Potential Substitutes for Trade Jobs

Typical Entry-level Educational Requirement

Source: US Bureau of Labor Stattistics

Industry	High School or Less	Some College or Degee	Job Change 2000-2022	Average Annual Wage 2022
Food Services & Drinking Places	97.6%	2.4%	260,551	$30,083
Agriculture, Forestry, Fishing & Hunting	91.7%	8.3%	-16,659	$42,846
Accommodation	91.7%	8.3%	3,639	$31,958
Other Transportation	90.2%	9.8%	38,119	$47,239
Retail Trade	88.3%	11.7%	60,329	$47,694
Arts, Entertainment, & Recreation	79.7%	20.3%	49,590	$98,011
Real Estate & Rental & Leasing	78.4%	21.6%	30,708	$86,432
Construction	77.2%	22.8%	78,728	$79,328
Administrative & Waste Services	77.0%	23.0%	91,419	$52,161
Manufacturing	74.8%	25.2%	-379,370	$86,749
Mining, Quarrying & Oil & Gas Extraction	72.4%	27.6%	-1,778	$107,186
Social Assistance	68.8%	31.2%	369,992	$25,660
Trade	66.3%	33.7%	198,728	$76,777
Utilities	62.8%	37.2%	90	$135,410
Other Services	55.8%	44.2%	-19,677	$48,901
Government	51.7%	48.3%	60,454	$84,132
Finance & Insurance	45.3%	54.7%	-16,452	$149,306
Health Care	33.7%	66.3%	304,290	$73,077
Information	30.6%	69.4%	51	$140,041
Management of Companies & Enterprises	29.9%	70.1%	-38,551	$140,928
Professional & Technical Services	24.1%	75.9%	117,880	$117,880
Educational Services	22.5%	77.5%	62,437	$62,396

Figure 32: Southern California Jobs by Industry, Entry Level Skills & Wage

The pattern of jobs growth in Southern California since 2000 also raises the question of, if not Trade what else? As indicated in the table below using national data, two-thirds of jobs by occupation in the Trade cluster require only a high school diploma or less for entry-level jobs. While other industries have a larger share of jobs classified by this metric, only two (Social Assistance and Food Services & Drinking Places) show jobs growth capable of absorbing any portion of the Trade workforce in this period, but both of these pay average

annual wages that are a third to 40% lower. Construction has somewhat lower educational requirements than Trade while paying on average nearly the same, but has created only 40% as many jobs in the region over the past 22 years. Health Care has shown a higher jobs expansion, but has significantly higher educational requirements for those positions.

Job skill level is a critical factor in the long term economic, income, and housing goals of the region. In the 2022 ACS data, 17.8% of adults age 25 and older in the region had less than a high school diploma, compared to an overall average of 10.4% that year for the US and putting the region 29th worst among the 392 urban areas in this indicator. The goals cannot be achieved without providing better paying job opportunities for this section of the population.

Figure 32 shows a comparison for all industries in the region ranked by entry-level educational requirement. The red shaded cells indicate those falling below Trade in both labor absorption capacity (jobs change 2000-2022) and average annual wage. As indicated by this shading, all other industries fell below Trade on one or both of these criteria.

While clean energy or "green" jobs are often touted as a potential replacement for existing blue-collar jobs, the various estimates also consistently show a low potential for absorbing sizeable numbers of workers at these skill levels. The exact scope is uncertain as estimates vary widely depending on what jobs are classified under this category:

- There is little detailed data on these jobs. The QCEW (Quarterly Census of Employment & Wages) data shows current regional employment in Wind & Solar Electrical Generation (NAICS 221114 and 221115) at only 957 in 2022 but with average annual wages of $146,275. Employment Development Department occupational data estimates there are only 5,200 Solar Photovoltaic Installers in the entire state, earning an average annual wage equivalent to $55,500 full time. Other occupations such as roofers and electricians also do this work, but the data does not show any further disaggregation.

- A recent report from US Department of Energy[28] puts total clean energy jobs for the state at 527,696 in 2022. This number, however, substantially overrepresents the number of jobs actually being created in the state:

  - ✓ The number includes a significant number of temporary positions. Construction alone makes up 42% of the jobs estimate.

  - ✓ The numbers include workers engaged both full-time and only working partially on clean energy products and services. In our analysis of the previous Department of Energy estimates for 2016, correcting for this factor resulted in

[28] US Department of Energy, 2023 U.S. Energy and Employment Report (USEER), June 2023.

only 222,000 equivalent full-time positions compared to the 373,807 mostly part time jobs reported that year for the "solar-related work" component. While this factor affects any jobs data, it rarely does to this extent. For comparison, US Bureau of Labor Statistics reports that all private workers in Los Angeles-Long Beach-Anaheim MSA worked an average of 35.0 hours a week in 2022. The solar-related numbers are equivalent to workers spending only an average of 23.8 hours a week on clean energy tasks.

- ✓ The estimate covers both direct and indirect jobs, including many support industries that would exist under any economic base jobs expansion in the region. The Trade cluster used in this report in contrast covers only those directly engaged in trade activities. Indirect job numbers supported by this base are instead estimated in the impact sections later in this report.

- ✓ As with all other estimates of this type, a significant portion covers jobs that are reclassified as "clean energy" from jobs that have existed in the state and region for a significant period of time and have existed regardless of state policy. The 527,696 number does not include reclassified jobs under traditional transmission and distribution but does include other reclassified components such as 122,637 jobs under motor vehicle repair and maintenance.

- Regardless of these caveats, these estimates show little change in clean energy jobs since this type of estimate has been prepared. Adjusting the 2016 Department of Energy estimate to match their 2022 categories results in a clean energy job number of 548,300 that year, or a drop of 20,600 clean energy jobs through 2022. The comparison is not exact, but it illustrates the fact that these estimates along with others produced by various other studies going back to at least 2007 have rarely varied in their conclusions that there are about 500,000 green/clean energy jobs, and these are estimates for the entire state. Jobs that are now available and jobs that will be created moving forward will only cover a portion of this total in the region.

- A previous detailed breakdown of the various estimates by the Center[29] included a separate calculation of the number of direct green jobs (including construction specialties dedicated to clean energy and green tech but not temporary project construction jobs) in California. The result was 361,300 direct jobs in 2016 if reclassified jobs were included, and 171,300 if they were not. In contrast, an equivalent 432,440 direct jobs—including reclassified jobs—were estimated in the comparable Department of Energy report for 2016. A similar study[30] using the same methodology and consultant as Energy estimated 519,540 that year.

[29] California Center for Jobs & the Economy, California Green Jobs, An Updated Review: Phase I Estimates, May 2018.
[30] E2, Clean Jobs America, A Comprehensive Analysis of Clean Energy Jobs in America, March 2016.

Particularly on the last point above, the difference shows the extent to which green/clean energy job estimates are dominated by temporary, partial, indirect, and reclassified job counts, further diminishing the potential for this sector to produce long-term substitutes for existing blue-collar jobs. Just as critically, the numbers above are for the state, and they have varied little from the 500,000 level in the different studies produced over the last 15 years. The number of jobs has not changed, just the definitions used in the studies in order to generate this expected 500,000 level. Jobs stemming from the state's current energy transition may be capable of absorbing some workers, but primarily for temporary construction and installation slots and nowhere at the same level as being done by the growth of permanent Trade jobs in the region.

Trade Workers

The discussion in this section draws primarily on two data sources, each giving a somewhat different perspective. The Quarterly Workforce Indicators (QWI) reports data is based on jobs in the Trade cluster located in the region but with more limited cross-tabulations. The American Community Survey (ACS) instead reports data for the Trade workers living in the region.

Residence

Trade Worker Residence

Source: Analysis of 2022 ACS PUMS through IPUMS.org

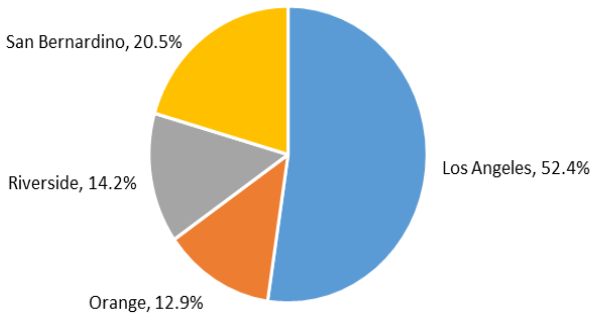


Figure 33: Southern California Trade Workers by County

In 2022, just over half of workers with a primary job in Trade lived in Los Angeles County. San Bernardino County was the second highest with one-fifth of all Trade workers in the region.

City data is less available as the 1-year ACS survey results are only reported for places that are 65,000 or more. Of these, Los Angeles and Long Beach were home to just over a quarter of all Trade workers in 2022. Overall, however, worker homes are dispersed throughout the region.

Trade Worker Residence by City

Source: Analysis of 2022 ACS PUMS through IPUMS.org

	Trade Workers
Los Angeles	109,100
Long Beach	21,000
East Los Angeles	10,000
Pomona	9,500
Rancho Cucamonga	7,300
Inglewood	6,200
Santa Clarita	5,500
Downey	5,400
Glendale	4,700
Pasadena	3,400
Other	504,100

Figure 34: Southern California Trade Workers by City

Demographics: Ethnicity & Race

Southern California Workers: Race & Ethnicity, 2022

Source: QWI

	Employment		Average Annual Wage		New Hires	
	Total Jobs	*Trade Jobs*	*Total Jobs*	*Trade Jobs*	*Total Jobs*	*Trade Jobs*
Latino	41.3%	46.7%	$49,258	$56,277	42.7%	47.7%
White	34.3%	28.7%	$87,845	$103,884	32.8%	26.5%
Asian	14.9%	15.9%	$80,653	$85,008	11.1%	12.3%
African-American	7.0%	6.4%	$50,415	$57,293	10.6%	10.8%
Other	2.5%	2.3%	$66,373	$75,042	2.9%	2.7%
Total	100.0%	100.0%	$67,691	$75,011	100.0%	100.0%

Figure 35: Southern California Workers by Race & Ethnicity

By Ethnicity & Race, Trade is a relatively larger source of jobs for Latinos, at 46.7% of Trade jobs compared to 41.7% of all private jobs in Southern California in 2022. Non-Latino Whites had a much lower share (28.7% of Trade jobs vs. 34.3% of total jobs), while the other categories show much smaller differences.

Trade Workers by Occupation, Ethnicity & Race

Source: Analysis of 2022 ACS PUMS through IPUMS.org

	Total	Latino	White	Asian	African-American	Other
Management, Business, and Financial Occupations	13.2%	6.9%	21.8%	27.8%	5.5%	22.2%
Computer, Engineering, and Science Occupations	1.9%	0.8%	3.3%	5.2%	0.7%	1.2%
Education, Legal, Community Service, Arts, and Media Occupations	1.1%	0.5%	1.9%	2.4%	0.5%	1.5%
Service Occupations	1.9%	2.4%	0.5%	1.0%	3.1%	1.8%
Sales and Related Occupations	13.4%	9.6%	24.0%	17.0%	7.0%	14.8%
Office and Administrative Support Occupations	14.2%	13.8%	12.1%	17.7%	15.3%	15.0%
Farming, Fishing, and Forestry Occupations	0.6%	0.8%	0.0%	0.4%	0.0%	1.3%
Construction and Extraction Occupations	0.3%	0.3%	0.8%	0.0%	0.0%	0.5%
Installation, Maintenance, and Repair Occupations	2.1%	2.1%	2.6%	1.8%	0.1%	4.0%
Production Occupations	4.4%	6.1%	1.2%	2.0%	5.5%	1.8%
Transportation and Material Moving Occupations	46.9%	56.7%	31.7%	24.6%	62.3%	35.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Figure 36: Southern California Trade Workers by Occupation, Ethnicity & Race

In all, Trade was the second largest employer of Latino workers in the region in 2022, providing 11.3% of all Latino private sector jobs, behind Retail Trade at 12.7% and ahead of Health Care and Food Services at 10.3% each. At 9.1%, Trade was the 4th largest source of African-American jobs in the region, behind Administrative & Waste Services (12.7%), Social Assistance (12.3%), and Health Care (11.6%).

The pattern for 2022 New Hires is similar to the results for jobs. Trade was relatively more likely to hire Latinos in 2022 compared to total jobs in the region (47.7% vs. 42.7%), while

non-Latino Whites were lower (26.5% vs. 32.8%). The other categories show less significant differences.

While the totals show a range of differences among the different ethnic/racial groups, the relative differences in the Trade wages are close to the pattern for all jobs in Southern California. In Trade, the average annual wage for Latinos in 2022 was 54.2% of the average for non-Latino Whites vs. 56.1% for all private jobs in the region. For African-Americans, the comparable numbers were 55.2% in Trade vs. 57.4% for all private jobs.

This wage distribution in particular stems from differences in occupation and skills level as determined by education level. By occupation, both Latino and African-American Trade workers were more likely to be employed in a Transportation and Material Moving occupation compared to the overall Trade industry average.

By education level, about three-quarters of Latinos with a primary job in Trade completed a high school diploma or less, while just over half of the African-American workers are at this point. Note that this table covers the highest grade level completed by all Trade workers, including those still enrolled or anticipating further educational advancement. The results differ from the subsequent educational attainment table presented below which shows the highest level completed for workers age 25 and older.

Trade Workers by Education Level, Ethnicity & Race

Source: Analysis of 2022 ACS PUMS through IPUMS.org

	High School Diploma or Less	Some College or Degree	Total
Latino	73.9%	26.1%	100.0%
White	36.7%	63.3%	100.0%
Asian	28.0%	72.0%	100.0%
African-American	53.2%	46.8%	100.0%
Other	38.7%	61.3%	100.0%
Total Trade	57.7%	42.3%	100.0%

Figure 37: Southern California Trade Workers by Education, Ethnicity & Race

Taking into account the differences in occupations (Figure 36) and skill levels (Figure 37) average annual wages, however, were still higher in Trade for all the ethnic/racial categories compared to all private jobs in the region. In particular, the average annual wage in all jobs for African-Americans was $50,415 in 2022, just barely above the $49,800 lower threshold for middle-class incomes that year, while the average annual wage in Trade was 13.6% higher at $57,293. The average annual wage for Latinos was below the middle-class threshold at $49,258 for all jobs in Southern California, but 14.2% higher in Trade at $56,277.

Demographics: Educational Attainment

Consistent with the discussion in the previous section on entry-level job requirements, the education levels in Trade showed a somewhat higher incidence of workers with a high school diploma or lower (46.3% of workers in Trade vs. 43.4% in all jobs for workers age 25 and older). This pattern is also reflected in New Hires in 2022, although with smaller differences from all jobs in the region. Average annual wages were higher for Trade in all categories, with workers with a high school diploma or less earning 14.5% more than the overall industry average for the region.

Southern California Workers: Education, 2022

Source: QWI

	Employment		Average Annual Wage		New Hires	
	Total Jobs	*Trade Jobs*	*Total Jobs*	*Trade Jobs*	*Total Jobs*	*Trade Jobs*
High School Diploma or Less	43.4%	46.3%	$54,762	$62,684	47.2%	48.9%
Some College or Degree	56.6%	53.7%	$86,570	$93,545	52.8%	51.1%
Sub-Total, Age 25 and Above	89.0%	91.1%	$72,773	$79,253	75.7%	77.8%
N/A, Age 24 and Below	11.0%	8.9%	$26,513	$32,029	24.3%	22.2%
Total, All Ages	100.0%	100.0%	$67,703	$75,011	100.0%	100.0%

Figure 38: Southern California Workers by Education

Demographics: Sex & Age

In 2022, Southern California Trade cluster workers were more likely to be male compared to the overall private sector workforce, at 63.0% for Trade compared to 52.1% for all industries. This pattern also applied to New Hires in 2022. Average annual wages were higher for both males and females compared to the overall industry averages in the region. Positions held by females had average annual wages that were 75% as large as for those held by males in Trade, compared to 70% for all industries in the region.

Southern California Workers: Sex & Age, 2022

Source: QWI

	Employment		Average Annual Wage		New Hires	
	Total Jobs	*Trade Jobs*	*Total Jobs*	*Trade Jobs*	*Total Jobs*	*Trade Jobs*
Sex						
Male	52.1%	63.0%	$78,993	$82,639	52.0%	61.8%
Female	47.9%	37.0%	$55,391	$62,080	48.0%	38.2%
Total	100.0%	100.0%	$67,703	$75,019	100.0%	100.0%
Age						
Youth	1.6%	0.6%	$15,548	$21,767	5.5%	3.3%
Young Adult	9.3%	8.3%	$28,405	$32,760	18.8%	18.8%
Prime Working	64.0%	66.2%	$71,936	$75,763	60.2%	64.0%
Age 55+	25.0%	24.9%	$75,000	$88,588	15.5%	13.8%
Total	100.0%	100.0%	$67,700	$75,022	100.0%	100.0%

Figure 39: Southern California Workers by Sex & Age

Workers in Trade show a slightly higher share in the Prime Working Age group (age 25 to 54), at 66.2% of Trade vs. 64.0% of total jobs, reflecting the fact that Trade continued growing during the pandemic shutdowns while this age group sustained relatively heavier effects as other industries closed jobs. New Hires in 2022 show a higher incidence of Young Adults in both Trade and total jobs (18.8% of all new hires vs. shares of total jobs that less than half this level), but Trade also continued to be a somewhat better option for Prime Working Age workers seeking jobs, with New Hires in this cohort at 64.0% for Trade vs. 60.2% for all jobs. Average annual wages were higher across all age groups compared to total jobs in the region, ranging from 5% higher for prime working ages to 40% higher for youth.

Demographics: Nativity

The Trade cluster is also a significant source of gateway jobs for immigrants. Immigrants (both naturalized citizens and non-citizens) held 41.5% of the primary jobs in Trade compared to 34.6% for the region as a whole.

Southern California Workers: Nativity

Source: Analysis of 2022 ACS PUMS through IPUMS.org

	All Industries	Trade
Native Born	65.4%	58.5%
Foreign Born	34.6%	41.5%
Total	100.0%	100.0%

Figure 40: Southern California Workers by Nativity

Economics: Income

Southern California Workers: Household Income

Source: Analysis of 2022 ACS PUMS through IPUMS.org

	All Industries	Trade
Median Household Income	$108,100	$103,400
Average Household Income	$141,100	$130,300

Figure 41: Southern California Workers, Household Income

As measured by both the estimated median and average income, household income for workers with a primary job in Trade was somewhat lower than the results for all industries in the region. Reflecting the wage levels in Trade, however, both measures put households containing Trade workers firmly in the middle class.

Economics: Unemployment

Workers reporting primary employment in Trade and in all industries both had unemployment rates below the overall average for the region. The difference for Trade workers with a high school diploma or less was more substantial, at 4.9% compared to the overall rate of 6.6% for this education level in the region.

Trade Workers by Labor Force Status

Source: Analysis of 2022 ACS PUMS through IPUMS.org

	High School Diploma or Less	Some College or Degree	Total
Unemployment Rate			
Trade	4.9%	4.1%	4.6%
All Industries	5.2%	4.0%	4.5%
All Persons, 16 and Over	6.6%	4.6%	5.4%
Labor Force Participation Rate			
Trade	87.9%	89.7%	88.7%
All Industries	85.8%	88.0%	87.1%
All Persons, 16 and Over	56.1%	72.4%	64.6%

Figure 42: Southern California Trade Workers, Labor Force

Labor force participation rates are much higher in both cases as well, meaning workers identifying with a primary industry continued to work or seek employment in this period at a high rate. The most substantial is for workers with a high school diploma or less.

Economics: Health Insurance Coverage

Southern California Employed Workers: Health Insurance
Source: Analysis of 2022 ACS PUMS through IPUMS.org

	All Industries	Trade
No Insurance	9.5%	11.4%
With Insurance:	90.5%	88.6%
Insurance through Employer/Union	62.3%	62.0%
Insurance Purchased Directly	12.7%	12.3%
Public Health Insurance	22.8%	21.9%

Figure 43: Southern California Workers, Health Insurance

Health insurance coverage for employed workers with a primary job in Trade differs little from the overall averages for the region. Total workers covered in Trade are only slightly lower (88.6% vs. 90.5%), with the difference even smaller for workers covered by their employer or union (62.0% vs. 62.3%). Note that the categories are not additive in the table. Workers may be covered by more than one source. Coverage may also be through a spouse or parent. Public health insurance covers all such sources including VA, Medicare, and Medi-Cal.

Economics: Housing

Workers with a primary job in Trade show no significant differences in housing tenure compared to all industries in the region. While a sizeable portion rent, Trade provides the wage levels that still enable a majority to own their own home.

Southern California Workers: Housing Tenure
Source: Analysis of 2022 ACS PUMS through IPUMS.org

	All Industries	Trade
Owner	54.7%	54.5%
Renter	45.3%	45.5%
Total	100.0%	100.0%

Figure 44: Southern California Workers, Housing Tenure

Housing affordability is generally measured as the share of household income spent on total housing expenses, including rent/mortgage, utilities, property taxes, insurance, and other direct housing costs. Households spending more than 30% of their income on housing are considered cost burdened. Those spending more than 50% are considered severely cost burdened.

Renters with an affordability indicator of 30% or less and 50% and above are slightly better for Trade than for all industries, but overall, households with a worker having a primary job in Trade do not show substantial affordability differences compared to workers in all industries.

Southern California Workers: Housing Affordability

Source: Analysis of 2022 ACS PUMS through IPUMS.org

	All Industries	Trade
Owner Affordabiliity		
0 to 30%	75.0%	75.6%
to 50%	15.3%	15.0%
Above 50%	9.7%	9.4%
Renter Affordability		
0 to 30%	53.9%	55.7%
to 50%	25.3%	24.9%
Above 50%	20.9%	19.4%

Figure 45: Southern California Workers, Housing Affordability

This distribution is important due to the fact that as the share of income spent on housing rises, so does the risk of homelessness in particular the risks associated with losing a job. The most comprehensive study done to date on the causes of homelessness in California was released last year by the Benioff Homelessness and Housing Initiative.[31] In their results, the most common reason (21%) cited by leaseholders (persons with their name on a lease or mortgage) for losing their last housing was loss of income. Loss of a job consequently can have a significant effect on both affordability and the risk of homelessness, particularly if that job loss is in a downsizing industry producing fewer replacement job opportunities at a similar wage. Households in Southern California previously went through this experience in the case of manufacturing. Comparable outcomes are possible in the event the current trajectory in the substituting Trade jobs turns negative.

[31] Toward a New Understanding, The California Statewide Study of People Experiencing Homelessness, Benioff Homelessness and Housing Initiative, University of California, San Francisco, June 2023.

Trade Worker with High School Diploma or Less: Effects from Industry Downsizing

Source: Analysis of 2022 ACS PUMS through IPUMS.org

	Homeowner	Renter
Base Case: Estimated Average Values, 2022		
Household Income	$133,400	$72,700
Housing Costs	$25,200	$20,400
Housing as a Share of Income	19%	25%
Case 1: Lose Trade Job/Uenmployment Insuarance		
Household Income	$83,100	$32,100
Housing Costs	$25,200	$20,400
Housing as a Share of Income	30%	64%
Case 2: Lose Trade Job/Substitute Job		
Household Income	$103,300	$52,300
Housing Costs	$25,200	$20,400
Housing as a Share of Income	24%	39%

Figure 46: Southern California Trade Workers, Trade Downsizing & Housing Affordability

These effects can be seen by using the housing affordability calculations. In the table above, the Base Case uses the estimated average income and housing costs for homeowning and renting Trade workers with a high school diploma or less, the Trade workers with fewer substitute job options at comparable wages given the current trends in job growth in the region. In the results, both affordability measures fall within the range of what is considered affordable, although renters are closer to the 30% threshold.

Case 1 shows the absolute effect of the Trade worker losing their job using the QWI wage data and instead relying on unemployment insurance payments during the year (26 weeks of payments). In this case, homeowners would move onto the edge of the cost burdened category. Renters, however, would only be able to stave off homelessness through available savings or moving to much lower cost housing.

Case 2 shows the effect of a substitute job. As discussed in the previous section, the primary Southern California growth industry for workers with a high school diploma or less is Food Services & Drinking Places. However, under new state law, the minimum wage for fast food workers is scheduled to rise to $20 an hour beginning in April, a wage level that consequently is likely to spread to other parts of that industry given current labor conditions in the region. The affected businesses are already making changes to staffing in anticipation of this rise through automation and operational changes[32] that would affect the availability of these jobs as a substitute. Putting this issue to one side and again using the QWI wage data, homeowners remain in the affordable category due to other household

[32] For example, Pizza Hut to Lay Off More Than 1,000 Delivery Drivers in California Ahead of Wage Hike, CNN, December 28, 2023; Fatburger Owner to Raise Prices, Trim Hours as California Hikes Minimum Wage, New York Post, January 16, 2024.

income sources if they are able to secure this type of job. Renters on the other hand become more cost burdened, nearing the level at which even temporary income disruptions can lead to homelessness.

Economic Effects of the Ports

The economic effects are addressed through three levels of analysis. The first estimates the overall economic footprint of the Trade Cluster within the region. The second addresses the current economic impacts of the Ports and directly related business activities that are at the base of this wider jobs center. Third, impacts specific to lost market share at the Ports are estimated both as a measure of the opportunity costs coming from past factors affecting the Ports' competitiveness as well as an indication of the potential scale of costs associated with future factors such as the pending Ports ISR. Finally, the relationship between activity through Ports and employment within the broader Trade cluster are investigated, including estimates of what shifts in the Ports market share mean for this broader blue-collar middle-class jobs base.

Economic Contributions of the Southern California Trade Cluster

To provide a context for the economic discussion related to POLA and POLB, the analysis first assesses the economic effects of the entire Trade Cluster in Southern California. Trade is the largest source of blue-collar, middle-class jobs in the region, and it has achieved this status in large part due to the key assets provided by the Ports. No other region in the US has comparable port assets of this scale and prominence in global trade, and this asset has been a catalyst in the expansion of regional businesses and jobs into broader Trade activities. Without the Ports, Trade would still be a significant employer in the region given the size of the local market, but it would be nowhere as large given its national and international significance with the Ports. Understanding the size and ability of the Trade Cluster to sustain a major part of the Southern California middle class is important in assessing the full implications of the Ports' broader economic effects.

Economic Contribution of Southern California Trade Cluster

Source: IMPLAN 2022 data for regions shown

	Employment	Labor Income ($ bil)	Value Added ($ bil)	Output ($ bil)
Southern California				
Direct	822,600	$79.67	$148.69	$266.77
Indirect	524,800	$37.74	$60.18	$107.42
Induced	469,200	$30.06	$55.10	$88.81
Total	1,816,600	$147.47	$263.97	$463.00
Rest of California				
Indirect	16,400	$1.93	$3.23	$5.88
Induced	17,600	$1.30	$2.42	$3.80
Total	34,000	$3.24	$5.65	$9.68
Total				
Direct	822,600	$79.67	$148.69	$266.77
Indirect	541,200	$39.67	$63.41	$113.30
Induced	486,800	$31.36	$57.52	$92.61
Total	1,850,600	$150.71	$269.61	$472.68

Figure 47: Southern California Trade Cluster Economic Contributions

The analysis was done as an industry contribution assessment under IMPLAN using the component industries of the Trade Cluster, as detailed in the Methodology section. This type of assessment does not measure the impacts of the Trade Cluster as in a typical input-output study, for instance the total effects on the regional economy if the Cluster were somehow to vanish overnight. Instead, this analysis describes the overall footprint of the Cluster within the region, both the component industries directly engaged in trade along with their support and supply sources in other regional industries. The results describe the full network of trade-related jobs and income in the region, rather than the broader effects of the jobs and income they produce.

Economic Contribution of Southern California Trade Cluster: State & Local Taxes

Source: IMPLAN 2022 data for regions shown; $ billion

	Employers	Households	Total
State			
Corporation Income Tax	$3.23	$0.00	$3.23
Personal Income Tax	0.00	6.18	6.18
Sales & Excise Taxes	15.10	0.00	15.10
Other	2.81	0.52	3.33
Total	$21.14	$6.70	$27.84
Counties			
Property Tax	$1.73	$0.01	$1.75
Sales & Excise Taxes	0.33	0.00	0.33
Other	0.43	0.00	0.43
Total	$2.50	$0.01	$2.51
Cities			
Property Tax	$3.56	$0.02	$3.59
Sales & Excise Taxes	3.07	0.00	3.07
Other	1.42	0.00	1.42
Total	$8.05	$0.02	$8.07
Schools & Special Districts			
Property Tax	$6.86	$0.05	$6.91
Sales & Excise Taxes	2.23	0.00	2.23
Other	0.25	0.00	0.26
Total	$9.34	$0.05	$9.39
Total State & Local	$41.02	$6.78	$47.81

Figure 48: Southern California Trade Cluster, Southern California State & Local Taxes

In 2022, the Southern California Trade Cluster supported:

- 1.8 million jobs within Southern California and 1.9 million within the entire state. Using the IMPLAN data, the Southern California portion represented 15.9% of all jobs (wage and salary and proprietors) in the region.

- $147.47 billion in labor income (wages, salaries, proprietor income, benefits) in Southern California and $150.71 billion in the entire state, or 16.9% of total regional labor income.

- $263.97 billion in value added in Southern California and $269.61 billion in the entire state, or 18.1% of the Southern California economy. The Trade Cluster in 2022 was just slightly larger than the total economy of Utah or Kentucky.

- $463.00 billion in Southern California output and $472.68 billion in the state, or 18.7% of total regional output.

As indicated in comparing the regional results, the Trade Cluster has built its overall structure primarily within the region, accounting for 98% of the direct and indirect jobs. Put into another context, the earlier discussion indicated that direct wage and salary jobs in the Trade Cluster have replaced 64% of the middle-class wage jobs the region has lost in manufacturing since 2000. Incorporating the indirect jobs in the related supply and support industries in the region, Trade has replaced 86% of those lost jobs and counting.

The Trade cluster is also a significant source of state and local tax revenues, amounting to $47.81 billion to state and local governments in Southern California. The associated federal tax revenues are an additional $38.2 billion.

Taxes shown in the table are those related to the Southern California portion of the analysis. Personal income tax payments include those portions related to pass-through business types including partnerships, LLCs, S-Corps, and sole proprietorships. Because of the way they are paid, sales and excise taxes are allocated to the employers' component.

Baseline Impacts: POLA & POLB

Economic Impact of the Ports

Source: IMPLAN 2022 data for regions shown

	Employment	Labor Income ($ bil)	Value Added ($ bil)	Output ($ bil)
Southern California				
Direct	102,300	$11.22	$12.46	$22.32
Indirect	52,000	3.90	6.42	11.69
Induced	68,200	4.51	8.26	13.47
Total	222,600	$19.63	$27.13	$47.48
Rest of California				
Indirect	1,400	$0.15	$0.28	$0.56
Induced	2,000	0.15	0.27	0.43
Total	3,400	$0.30	$0.55	$0.99
Total				
Direct	102,300	$11.22	$12.46	$22.32
Indirect	53,500	4.05	6.70	12.25
Induced	70,200	4.66	8.53	13.90
Total	226,000	$19.93	$27.69	$48.47

Figure 49: Ports Economic Impacts

The economic effects of the Ports were assessed through an impact analysis looking at related operations directly tied to the Ports, including the Ports and ACTA, terminal operations, transportation operating to and from the Ports, maritime services at the Ports, terminal operations, warehousing for transload operations and for distribution warehouses tied to and located near the Ports rather than the broader warehouse industry in the region, and various professional services provided directly to vessel trade. This range of activities

basically covers the goods flow from when goods are collected and sent to the Ports (exports) and from the point they are sent out for distribution after coming through the Ports (imports). The results describe the effects of the Ports and their directly related operations on the region and California.

Economic Impacts of the Ports: State & Local Taxes

Source: IMPLAN 2022 data for regions shown; $ billion

	Employers	Households	Total
State			
Corporation Income Tax	$0.24	$0.00	$0.24
Personal Income Tax	0.00	0.83	0.83
Property Tax	0.03	0.00	0.03
Sales & Excise Taxes	0.64	0.00	0.64
Other	0.08	0.11	0.19
Total	$0.99	$0.94	$1.93
Counties			
Property Tax	$0.07	$0.00	$0.08
Sales & Excise Taxes	0.01	0.00	0.01
Other	0.02	0.00	0.02
Total	$0.11	$0.00	$0.11
Cities			
Property Tax	$0.15	$0.00	$0.15
Sales & Excise Taxes	0.13	0.00	0.13
Other	0.06	0.00	0.06
Total	$0.34	$0.00	$0.34
Schools & Special Districts			
Property Tax	$0.29	$0.01	$0.30
Sales & Excise Taxes	0.09	0.00	0.09
Other	0.01	0.00	0.01
Total	$0.40	$0.01	$0.40
Total State & Local	$1.83	$0.95	$2.78

Figure 50: Ports Economic Impacts, Southern California State & Local Taxes

In 2022, the Ports produced:

- 222,600 jobs within Southern California and 226,000 within the entire state.
- $19.63 billion in labor income (wages, salaries, proprietor income, benefits) in Southern California and $19.93 billion in the entire state.
- $27.13 billion in value added in Southern California and $27.69 billion in the entire state.
- $47.48 billion in Southern California output and $48.47 billion in the state.

As with the Trade Cluster, the Ports' impacts remain largely within the region as a local-based jobs generator. In all, 98% of the jobs supported by the Ports remain in the region, and the remainder in the rest of the state.

Total state and local tax revenues related to the Ports are estimated at $2.78 billion in 2022, coming from the direct, indirect, and induced impacts in Southern California. Federal tax revenues are an additional $4.73 billion.

Baseline Impacts: Related Jobs

In addition to the jobs supported by activities at the Ports themselves, jobs throughout the US rely on goods flows through the Ports for exports of US-made products and for imports destined as intermediate production inputs and final goods sales. These related jobs are supported by trade volumes through the Ports from the production and use of the export and import goods themselves. For a significant portion if not all of these trade goods, these related jobs have ready alternatives through other ports in the US and Canada, but currently rely on POLA and POLB due to a balancing of the current total cost level with the shorter transportation timelines possible by shipping through these facilities.

Determining the number of related jobs nationally that are reliant on the Ports is less straight forward than the previous analysis, and as discussed later varies widely in the previous related studies. Almost all industries in the US depend to some extent on imported components and export sales, but also have a far greater degree of both input and final sales substitution options due to the size of the US economy than industries in other countries. At the other extreme, total production and consequently jobs within an industry may be dependent on imports of a single commodity regardless of their total import use. For example, vehicle producers during the Pandemic were forced to curtail production due to persistent chip shortages. Recognizing this range of factors, most of the previous related studies along with this report rely on average import content and export levels to estimate this impact component.

As previously illustrated in Figure 20, the national importance of the Ports is reflected in the fact that their trade volumes reach to all 50 states. These exports and imports in 2022 supported an estimated total of 2.9 million direct related jobs. Combined with the results from the previous section, the Ports supported a total of 3.1 million jobs nationally. Using the US Bureau of Economic Analysis total job numbers, the Ports consequently supported 1 out of every 51 US jobs that year.

Total Job Impacts of the Ports

Source: see Methodology

	California	US	Total
Ports: Direct, Indirect & Induced	226,000		226,000
Related Jobs		2.873.000	2,873,000
Total	226,000	0	3,099,000

Figure 51: Ports Total Jobs Impacts

Baseline Impacts: Lost Market Share

As discussed previously, a combination of recent events, growing costs, and rising uncertainty over shipping and supply line reliability through the Ports in particular due to rising costs from past regulation and the uncertain costs and restrictions coming from future regulation has seen a sustained drop in overall market share. USATrade Online data shows the POLA/POLB total market share of containerized cargo (exports and imports) by weight in the US dropped from an average of 29.9% in the peak period 2006-7 to 22.9% in 2022 and further eroded to 22.5% in 2023. Market share for China (including Hong Kong and Macau) containerized cargo fell from an average of 50.7% in the relatively stable period of 2005-8 to 41.5% in 2022 and 41.0% in 2023.

Not all of this loss was avoidable. The loss of market share began in 2006, but recent years have seen an additional contributing factor from a shift in the underlying base as production risk has been diversified away from China, including some reshoring but more significantly in the shift to Southeast Asian countries and South Asia and their predominant trade routes to the East and Gulf Coast ports. The loss of discretionary cargo overall, however, has been due to weakening in the Ports comparative advantages and the rise of competing ports elsewhere in the US.

Estimating the economic effects of this second component provides a useful analog to the pending Ports ISR. Loss of this market share element came from a combination of events and factors that diminished the total level of trade through the Ports over time. The Ports ISR instead is likely to affect market share more immediately through other means depending on its final provisions. Both have significant economic ramifications to the region and its ability to support middle class workers.

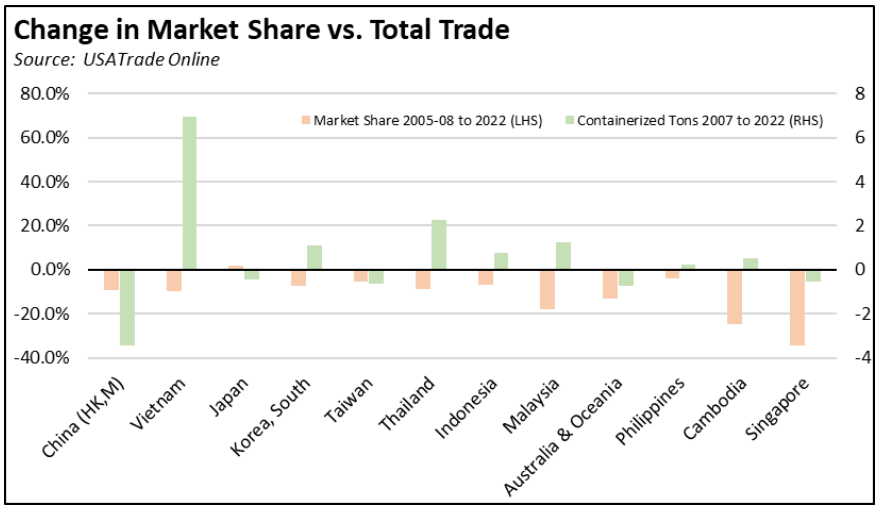


Figure 52: Ports Change in Market Share vs. Containerized Trade by Country

Looking at the East Asian and Pacific countries with total containerized trade (exports and imports) of over 1 million tons with the US in 2022, the Ports' experience has been mixed. For countries like Vietnam and Thailand, market share is down but total trade volume up as those countries generated much higher levels of trade overall. In the case of the dominant source with China, both market share and volume are down.

Inputs for the direct components that were assessed in the impact analysis focus on the countries shown in the chart. Singapore represents a general break-even point in the shipping advantages of the West Coast vs. East and Gulf Coasts. Other countries represent much lower total volumes of trade and would not affect the final results by a significant amount. For the US as a whole, the other East Asia countries together generated containerized trade that was only two-thirds the amount with the lowest country on the list, Singapore.

Using these countries except Japan—where market share increased by 2 percentage points—as the base, this lost market share translates into the overall containerized activity through POLA and POLB being 23% lower than what it would otherwise have been in 2022. Including empty containers, the opportunity costs associated with this lost market share equate to 4.4 million TEU. Overall market share of US containerized trade would have been 28.2% in 2022 with these additional flows.

Economic Loss from Reduced Market Share

Source: IMPLAN 2022 data for regions shown

	Employment	Labor Income ($ bil)	Value Added ($ bil)	Output ($ bil)
Southern California				
Direct	-21,000	-$2.16	-$2.50	-$4.56
Indirect	-11,100	-0.81	-1.35	-2.47
Induced	-13,400	-0.88	-1.62	-2.65
Total	-45,400	-$3.86	-$5.48	-$9.67
Rest of California				
Indirect	-300	-$0.03	-$0.06	-$0.11
Induced	-400	-0.03	-0.05	-0.08
Total	-700	-$0.06	-$0.11	-$0.19
Total				
Direct	-21,000	-$2.16	-$2.50	-$4.56
Indirect	-11,300	-0.84	-1.41	-2.58
Induced	-13,800	-0.91	-1.68	-2.73
Total	-46,100	-$3.92	-$5.59	-$9.87

Figure 53: Ports Economic Impacts from Reduced Market Share

Incorporating this amount, the resulting 23.4 million TEU total for 2022 would have been higher than the 20.1 million peak that occurred in 2021. Trade through the Ports that year experienced high degrees of congestion and delays. The principle cause of these problems was not capacity issues at the Ports but the result of complex issues throughout the supply chain including equipment supply, labor supply, shortages of warehousing and distribution center capacity, accelerated demand on distribution centers for online sales, and operational problems exacerbated by the pandemic-period shutdowns, pandemic rules that contributed to cargo backing up at the Ports, and periodic shutdowns at the ports in China. Other factors including monthly cargo flows, operational adjustments, labor availability, and related changes in the land-based portions of the supply chain would also come into play as to how the Ports as currently configured would have been able to handle this added level of cargo. Congestion was due to a surge at the Ports. If instead this flow had evolved over time, the supply chain would have already made accommodations to handle it.

The current master plans account for this volume. The plans incorporate facility improvements based on revised projections of 21.0 to 24.2 million TEU in 2022 and 23.5 to 34.5 million TEU in 2030 (POLA 2018; POLB 2022). Current work to accommodate these levels includes projects such as POLB's Middle Harbor Terminal Redevelopment Project. Some degree of capital investment or operational shifts likely would have been required in the upstream and downstream storage and transportation infrastructure to address the additional 4.4 million TEU at various points in the regional supply chain, but both the general plans and current capacity indicate the Ports themselves were prepared to adapt to these levels over time. The current configurations of the Ports and associated supply chain links likely would look somewhat different if these volumes had continued, but

accommodations for these changes are already baked into the associated general and capital improvement plans and would instead have been developed over a different timetable, providing no net economic changes in the region. The analysis, however, is agnostic as to how this would have been done and instead addresses the operating effects from this additional volume.

The model was run using the revised 23.4 million TEU level and compared to the baseline results to estimate the opportunity costs to the Southern California economy from this lost market share in 2022:

- Jobs are lower by 45,400 annually in Southern California and by 46,100 in the entire state compared to the outcomes had the Ports retained their market share.

- In 2022, labor income is $3.86 billion lower in Southern California and $3.92 billion in the entire state. Using the average value, cumulative income losses to the Southern California economy (in 2022 dollars) since 2006 are an estimated $30.9 billion.

- In 2022, value added is $5.48 billion lower in Southern California and $5.59 billion lower in the entire state. Cumulative losses to the regional economy since 2006 are an estimated $43.8 billion.

- In 2022, output is $9.67 billion lower in Southern California and $9.85 billion lower in the state. Cumulative losses to the regional economy since 2006 are an estimated $77.4 billion.

The associated state and local tax loss is $560.9 million to the state and local governments in Southern California. Cumulative losses to state and local governments since 2006 are an estimated $4.5 billion. The associated federal tax revenue loss is $935 million in 2022, or an estimated cumulative loss of $7.5 billion since 2006.

Putting these numbers into perspective:

- In 2022, the four counties of the region combined had an unemployment rate of 4.4%, which placed them in a tie with 8 other MSAs as being just barely above the bottom fifth of the 389 urban regions of the nation with the worst unemployment rate that year. Individually, the counties ranged from 3.2% in Orange County to 4.9% in Los Angeles. Staunching the job losses associated with the 4.4 million TEU market share drop would have instead improved the region's unemployment rate to 3.9% in 2022, pushing it near the top of the next quintile.

Economic Impacts of the Ports: State & Local Taxes

Source: IMPLAN 2022 data for regions shown; $ million

	Employers	Households	Total
State			
Corporation Income Tax	-$53.9	$0.0	-$53.9
Personal Income Tax	0.0	-162.8	-162.8
Property Tax	-5.4	-0.1	-5.5
Sales & Excise Taxes	-128.9	0.0	-128.9
Other	-71.6	33.8	-37.8
Total	-$203.7	-$185.2	-$388.9
Counties			
Property Tax	-$14.8	-$0.3	-$15.2
Sales & Excise Taxes	-2.8	0.0	-2.8
Other	-3.7	0.0	-3.7
Total	-$21.3	-$0.3	-$21.7
Cities			
Property Tax	-$30.4	-$0.6	-$31.1
Sales & Excise Taxes	-26.2	0.0	-26.2
Other	-12.1	0.0	-12.1
Total	-$68.7	-$0.6	-$69.3
Schools & Special Districts			
Property Tax	-58.5	-1.2	-59.8
Sales & Excise Taxes	-19.0	0.0	-19.0
Other	-2.2	-0.1	-2.2
Total	-$79.7	-$1.3	-$81.0
Total State & Local	-$373.4	-$187.4	-$560.9

Figure 54: Ports Economic Impacts from Reduced Market Share, Southern California State & Local Taxes

- In 2023 on a preliminary basis, the region's unemployment rose to 4.8%. Retaining the lost market share and its associated jobs would instead have put the rate at 4.2%, better than the state average of 4.8% but still worse when compared to the US average of 3.6%. By this metric, the Southern California economy is performing below the overall US average. Regaining lost market share and its associated jobs is capable of closing half the gap. Losing yet more market share under an additional indirect source rule instead would put the region further behind.

- Between December 2022 and December 2023, the preliminary data (not seasonally adjusted) indicates the region saw employment (the number of people working) drop by 157,400. While some of this trend is due to regional population loss, it also indicates the region is not producing jobs fast enough to support its workforce. Retaining the Ports' market share and the associated jobs would have saved nearly a third of these jobs.

- After a boom period during the pandemic, the region is now seeing slower job growth and in some cases job dips in components of the Trade Cluster.[33] In December 2023 (not seasonally adjusted), Inland Empire Warehousing & Storage jobs dipped by 1,000 (-0.7%) compared to a year earlier, and by 300 in the region as a whole. While most of these effects have come from the overall slowing in global trade, a portion also is due to the continued drop in market share, with the Ports' share of total US containerized trade again slowing to 22.5% in 2023 from 22.9% in 2022. Regaining market share even under conditions of declining overall trade is an obvious strategy to combat this job slowing. Regulatory actions that would push market share even lower are just as obvious a path that would make this slowing and job loss even worse.

Trade Cluster Impacts

As discussed previously, the region's Trade Cluster achieved its prominence and consequent contributions to the region's economy largely due to the presence of the economic assets provided by the Ports. Adjusting quickly to shifts in the global trade patterns in the 1980s and 1990s, the Ports provided the core infrastructure making it possible for the region to emerge quickly as the nation's primary trade gateway. That dominance has since been challenged due to the various factors undermining the core cost competitiveness of the Ports, and the expansion of competing ports and their internal trade links especially in the Eastern and Gulf Coast states.

Although vulnerable to many of the same rising cost factors, that portion of the Trade Cluster serving local markets is relatively less susceptible to major variations. However, it is also less likely to generate any substantial future expansion as the local market stagnates and relative market size declines under current population projections that show no growth in the region at least through 2030.

The international trade component, however, has had a far greater effect on the current size and economic importance of the Trade Cluster. The breadth of businesses and consequent jobs are much larger at each level of this Cluster due to the volumes generated through trade. The number of levels is also much deeper due to the agglomeration economies that have produced a higher concentration of trade related businesses in the region along with related resources such as research and training assets in the region's universities and schools.

As discussed below in the section on Incremental vs. Discrete Impacts, this level of concentration is not permanent. Incremental changes over time risk undermining the economic rationales for businesses to remain in the region either wholly or through decisions to shift parts of their operations over time to other areas. Erosion over time of

[33] The Inland Empire's Once-Unstoppable Warehousing Industry Falls Into a Slump, Los Angeles Times, February 21, 2024.

this type of agglomeration effect is common to other industries that once helped shape the Southern California economy such as aerospace. The question is at what point does such a tipping point occur for Trade.

To begin to answer this question, we constructed a basic model that relates Trade Cluster employment to a population component and an international trade component, discussed in more detail in the Methodology section.

Using the 2022 results, every percentage point of containerized market share (by value) handled by the Ports underlies 6,800 wage and salary jobs in the region's Trade Cluster. The 9.6% percentage point loss since 2006 consequently equates to 65,500 fewer wage and salary jobs in this blue-collar middle-class wage employment center. Using the IMPLAN data, the equivalent total jobs affected are 8,000 and 77,100, respectively.

Note that there is overlap between these estimates and the previous impact numbers. These estimates, however, indicate the extent to which declining market share has affected the base numbers in one of the region's leading job growth centers.

Other Impacts

In addition to the quantitative impacts discussed above, there are a number of issues that are addressed in more qualitative terms.

Incremental vs. Discrete Impacts

IMPLAN and other input-output models provide useful information into the public policy process on individual events affecting regional economies. They are less useful in isolating the longer term effects of incremental factors accumulating over time. As an example from the analysis, IMPLAN is used to assess the current effects of the gradual loss in the Ports market share over the past 16 plus years. It does not, however, isolate the individual marginal contribution of each of the many factors that contributed to this loss, and their continuing effects into the future. This type of modeling is good at assessing the outcomes. It is less effective in measuring cause and effect.

As indicated, the Ports represent a significant asset providing the foundation for much broader economic activity in the region, including the wider Trade Cluster and what remains although in significant numbers of manufacturing jobs. Both would still exist in the Southern California region without the Ports, but they are much larger due to the presence of the Ports and the resulting ready access to export markets and to imported supplies and components. The Ports also provide comparable support to other regions of the state, including the economically critical agricultural industry in the Central Valley.

Other parts of the country have not stood still. The expansion of competing ports with efficient intermodal links has reduced both the costs and time of shipping through other

states relative to the Ports for an increasing share of the discretionary portion of the cargo flows as well as for the broader trade and manufacturing operations now choosing to locate there. The direct effects can be measured as in this report on what the resulting market share loss means to jobs and income in Southern California. Less measurable at least using input-output modeling is the underlying effect on the comparative economics for the Trade Cluster and manufacturing businesses now operating in the region and how this affects both investment and business migration decisions. In other words, at what point and by how much does this balancing lead to erosion in these broader job centers.

Southern California has seen announcements by major businesses in recent years to move to other states, including Cacique Foods, CBRE Group, CKE Holdings, Dole, First Foundation, Kubota Tractor, Nestle, Nissan, Occidental Petroleum, Toyota, and Wedgewood. Others such as Lionsgate, Panasonic, and Rivian have made major investments in other states rather than choosing to expand locally. This type of discrete migration, however, is often the exception, and what is far more common are incremental changes over time that see businesses shift individual units such as back-office operations and allocation of annual capital improvements to other facilities rather than remaining in the region. In the military base closure world, this process is known as "mission creep," under which small operating units or annual appropriations are allocated to other bases over time. Each such move and spending shift is inconsequential in itself, but accumulating over time determines which bases remain open and which ones get put on the closure list.

Southern California has seen this process before. The aerospace industry began and for some time was concentrated in the Los Angeles Basin. Painting operations, however, made more sense in the Inland Empire rather than the coastal climate of the Basin, and over time other finishing operations co-located there as well, dispersing the industry and its jobs more regionally. As regulations and the associated costs of those operations increased in the 1980s, the reverse happened with movements to other states rather than to other parts of the region. When industry consolidation eventually came in the 1990s, operations in other states remained open but were closed in Southern California. After booming in the region, the QCEW data shows Southern California lost 56% of its aerospace manufacturing jobs between 1990 and 2000. Those 87,500 lost jobs made up 41% of all manufacturing jobs lost in the region in that period.

Southern California has seen the same shifts in other once-leading industries in the region as well, including shipbuilding, furniture manufacturing, commercial fishing and canning, vehicle manufacturing, and erosion of its dominant role in movie and television production. What originally began with regulations having only "minor" or "absorbable" costs built over time to undermine the economic advantages of operating in the region to the point that whole industries and their associated middle-class jobs have been lost.

Regulations are often justified on a contention that they only result in incremental costs on the regulated industry and by extension on the costs that will be paid by their customers.

In reality, though, these are more accurately called "cost creep" that cumulatively adds to the total cost difference of operating in Southern California compared to competing locations. The threshold level will differ by industry and by individual businesses, but the broader impact is an increase in the trends undermining job levels and job potential in largely middle-class wage, blue collar industries. While public policy pronouncements continue to highlight concern for the ability of low income and middle-class income households to afford the costs of living in the region, actions such as the pending Ports ISR carry the potential of reducing the income options available to do so.

Impacts on Inflation & the Cost of Living

Imported goods have provided one of the few areas of relief to constantly rising costs of living in Southern California. Import prices in general previously ran in tandem with general inflation before leveling off and declining after 2011. Ready access to these consumer goods and production inputs through the Ports means consumers and businesses in the region do not pay premiums related to additional transportation costs while in most years benefiting from stable or falling import prices.

The spike coming during the supply congestion of 2021 and 2022 was an anomaly arising from conditions in that period, but it also illustrates the potential effect rising transportation costs such as increased costs of moving cargo through the Ports can still have. Transportation costs under modern transportation modes are generally considered to have a relatively smaller effect on final prices, and this situation has been a major driver of the large expansion in overall national and global trade levels. The spike shown in the graph is a clear sign they can still matter if these costs rise fast enough. Various papers investigating this price rise conclude that the steep increases in transportation rates during this period—vessel cargo as well as rail and truck rates—were responsible for as much as 68% to 111% of the increase in import price inflation and 15% to 25% of the increase in the producer price index (PPI) during this period.[34] Other estimates put global supply congestion as responsible for about 60% of the surge in US inflation in 2021.[35]

[34] Maggie Isaacson and Hannah Rubinton, Shipping Prices and Import Price Inflation, Federal Reserve Bank of St. Louis, Review, April 10, 2023.
[35] Global Supply Chain Pressures and U.S. Inflation, Federal Reserve Bank of San Francisco, FRBSF Economic Letter, June 20, 2023.

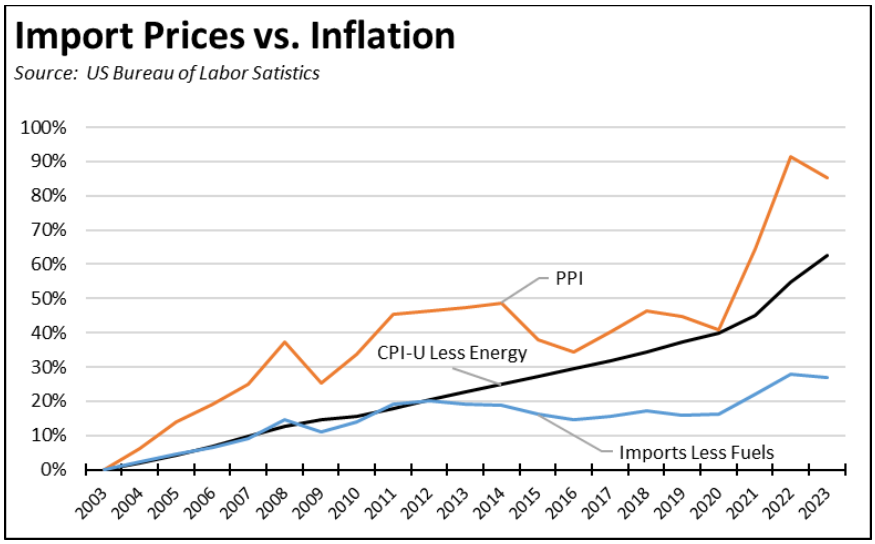


Figure 55: Import Prices vs. Inflation

	Coast/Rte	Diff in Ocean-Gateway-Inland Route Costs Vs SPB Route						
		Chicago	Kansas City	Dallas	Memphis	Atlanta	Columbus	Detroit
San Pedro Bay	PSW	-	-	-	-	-	-	-
Sea/Tac	PNW	(110)	240		70		(110)	(110)
Northeast US	ECNA-Pan	(335)	(60)		(160)		(905)	(635)
Southeast US	ECNA-Pan	(195)		5	(275)	(785)		
US Gulf	ECNA-Pan	(350)	(410)	(490)	(415)	(410)		

Source: Mercator (2020b), 8,000 TEU Vessel

Gateway	Coast/Rte	Diff in Ocean-Gateway-Inland Route Costs Vs SPB Route						
		Chicago	Kansas City	Dallas	Memphis	Atlanta	Columbus	Detroit
San Pedro Bay	California	-	-	-	-	-	-	-
Seattle/Tacoma	PNW	(110)	240		70		(110)	(110)
Northeast US	ECNA-Pan	(445)	(170)		(270)		(1,015)	(745)
Southeast US	ECNA-Pan	(305)		(105)	(385)	(895)		
US Gulf (8000 TEU)	ECNA-Pan	(220)	(280)	(360)	(285)	(280)		

Source: Mercator (2020b), 14,000 TEU Vessel

Figure 56: Costs of Using Ports vs. Competing Ports

POLA and POLB already are higher cost ports. In their analysis of the cost differences affecting discretionary cargo, Mercator (2020b) estimated per TEU costs for two different size vessels shipping from Asia and using the Panama Canal to access the East and Gulf Coast ports. While shipping costs to POLA/POLB are generally lower, the much higher POLA/POLB port charges (including ACTA) combined with rail and truck costs more than offset these savings and placed a cost disadvantage of up to $905 per container for the smaller vessels, and up to $1,015 per container for the larger vessels. While the time savings from using POLA and POLB can still justify these higher costs for many shipments, they do not for all. This cost differential has been a key element in the steady decline in the discretionary cargo market share and the associated damper on regional jobs and

incomes. These costs as they continue to grow also continue to add to the final prices paid on those goods destined for consumption in the region.

Ports Impact on State and Local Net Zero Goals

While green/clean energy jobs have been unable to provide a viable alternative to the Southern California Trade workers, as discussed previously, the Ports are an essential conduit for the equipment and materials required for those jobs that do exist and by extension the state and local climate change goals. In this regard, California has set ambitious goals, but the technology and equipment required to meet them largely comes from import trade:

- China contained 77% of global lithium-battery capacity in 2022, and is expected to still retain a near-monopoly level of 69% in 2027.[36]

- China also is the dominant processor of clean energy-critical materials, including more than 80% of global capacity for rare earths, over 60% for cobalt, nearly 60% for lithium, and about 40% for nickel and copper.[37]

- US Energy Information Administration data indicates 85% of the solar panels sold in the US in 2022 were imported, mostly from China.

- With their domestic industry now shifting to an export focus,[38] China is poised to become a major source for the electric vehicles—especially lower cost electric vehicles that will finally appeal to a broader segment of consumers—essential to California's 100% sales mandate by 2035.

In 2022, USATrade Online data shows the Ports handled 30% of the nations' imports of solar and wind equipment including 37% of all imported solar panels. In 2023, the total share went to 27% as these imports surged by 62%, but still included 30% of the $18.6 billion in solar panels imported that year. In 2022, the Ports handled 31% of all imports of lithium batteries and battery cells. In 2023, this share dipped to 29% as these imports rose by 37%.

Ports Impact on State and Local Recycling Goals

In 2021, the state recycled only 42% of its solid waste, once again failing to meet the 75% in 2020 goal.[39] In addition to missing the overall goal, this level also meant local recycling programs have become even more dependent on retaining what revenue streams remain

[36] Battery Manufacturing Capacity by Country, VisualCapitalist.com, January 16, 2023.
[37] International Energy Agency, The Role of Critical Minerals in Clean Energy Transitions, Revised Version, March 2022.
[38] China Offers Support to Accelerate EV Makers' Global Push, Wall Street Journal, February 8, 2024.
[39] CalRecycle, 2021 State of Disposal & Recycling Report, December 2022.

from that 42%. By providing a critical market channel for collected materials, the Ports have become an even more important component of the local recycling systems, enabling revenues that support local county and city programs while reducing emissions if these materials were otherwise landfilled or disposed in some other manner. In all, 40% of all collected recyclables in the state—12.2 million tons—were exported in 2021. The Ports handled 28.7% (5.4 million tons) of the nation's waste and scrap (not counting used articles) exported by water in 2022, and 27.6% (4.4 million tons) in 2023.

Impacts from Long-term Unemployment

Input-output modeling addresses unemployment potential by assessing the likely number of lost jobs and income. The overall economic effects of unemployment, however, are not limited to just the immediate event, but become more pronounced as the period of unemployment grows longer. Previous studies[40] have found significant extended economic effects including the following:

- The probability of finding a new job decreases the longer a worker remains unemployed.

- Even after they find new jobs, lifetime wages and income are lower. Long-term unemployed still have earnings losses of up to 40% after 10 years of separation from their jobs, and life-time income losses of 10%.

- Long periods of unemployment increase the risk that workers detach from the workforce. As the average period of unemployment grew, both labor force participation and the employment-to-population ratio never recovered after the Great Recession.

- During the pandemic recession, 55.9% of unemployed workers over 55 were long-term unemployed, compared to 39.6% of all workers age 16 and over. These older workers then dropped out of the workforce faster than any other group and moved into retirement at much higher rates than before the pandemic due to their inability to secure another job at comparable wages.

The Ports and the broader Trade Cluster helped to counteract these effects for many workers during the pandemic downturn by being the primary generator of jobs especially middle-class wage blue collar jobs during this period. Their ability to do so in the future depends on whether they are growing jobs or retrenching. The more complete impacts associated with lost market share consequently not only cover the 46,100 forgone jobs, but also the longer term income effects that could have been avoided for this number of workers.

[40] Katherine Townsend Kiernan and Sarah Miller, The Importance of Addressing Long-Term Unemployment for Economic Recovery, Federal Reserve Bank of Atlanta, August 5, 2021.

Health Impacts from Unemployment

South Coast AQMD as a single-purpose agency necessarily views public health issues through a single, emissions-based lens. Risk assessments are limited to chronic and mortality calculations related to a proposed rule, and not a net result after taking into account the likely effects coming from other factors, specifically those associated with unemployment.

A substantial body of research, however, exists on what these increased health risks are. These include the following:

- CDC's annual National Health Interview Survey indicates health outcomes are worse for adults who are not working compared to those who are employed. Of the indicators in the table, the results show unemployed adults having outcomes that are anywhere from 20% to 230% worse than those who are employed. Significant differences arise even for those adults who are only able to find part-time work. Some of these differences are likely due to a degree of cause-and-effect relationship, but reduced incomes and higher levels of anxiety due to unemployment also result in lifestyle impacts that are a major contributor to these higher levels. The survey results also indicate that both the unemployed and employed show only minor differences in overall health care coverage, but unemployed adults are far more dependent on public coverage. In California, this dependence raises the additional issue of health care access. Although the situation has improved somewhat in recent years, the state under its Medi-Cal program reimburses health care providers at a lower rate, resulting in shortages of providers willing to take on this caseload in particular new Medi-Cal patients. As a result, the unemployed are still more likely to resort to emergency room visits for health care rather than in circumstances that provide for a continuum of care.

Percentage of Health Status for Adults Aged 18 and Over, 2022

Source: Centers for Disease Control & Prevention, National Center for Health Statistics

	Employed	Not employed	Full-time	Part-time	Not Employed but Has Worked Previously
Fair or Poor Health	7.7%	25.7%	7.1%	10.2%	26.1%
High Cholesterol	15.3%	34.3%	14.7%	17.7%	35.8%
Diagnosed Hypertension	18.2%	42.9%	17.8%	19.5%	44.5%
Coronary Heart Disease	1.9%	10.3%	1.6%	3.1%	10.8%
Current Asthma	8.0%	9.9%	7.8%	8.7%	9.9%
Any Type of Cancer	5.4%	17.2%	4.8%	7.6%	18.1%
Diagnosed Diabetes	6.1%	15.7%	6.0%	6.2%	16.0%
Regularly Had Feelings of Worry, Nervousness, or Anxiety	11.3%	14.9%	10.7%	13.9%	14.7%
Taking Prescription Medication for Feelings of Depression	9.1%	16.1%	8.3%	12.4%	16.4%
Uninsured for At Least Part of the Past Year (18-64)	15.8%	17.6%	15.0%	19.5%	17.7%
Public Health Plan Cerverage (18-64)	14.6%	47.1%	11.5%	29.6%	46.8%
Hospital Emergency Department Visit	17.3%	24.2%	16.4%	20.7%	24.7%

Figure 57: Health Effects from Being Unemployed

- Health care access was also an issue identified in the Center's extensive research of the working poor in California.[41] Respondents in both surveys and an extensive series of focus groups highlighted the difficulty and related stress of accessing and more critically maintaining eligibility for the public social benefit programs. Most of the participants indicated that if given a choice between a job with health care coverage and one without but with higher pay, they would choose the health coverage due to the limits and uncertainty they faced in the public options. As indicated in Trade Worker section, Trade Cluster jobs provide workers with wages somewhat higher than the average for all regional jobs, while providing employer/union provided health coverage at essentially the same level.

- A large body of research has identified mostly long-term health impacts associated with long-term unemployment lasting longer than 6 months and underemployment. As reported from a literature survey, [42] these effects include increased mortality; increased depression, somatization, anxiety, and substance abuse; increased mental distress; higher rates of suicide and mental hospitalization; and decreased use of healthcare services including one study that found that a 1% increase in the unemployment rate led to a 1.58% decrease in use of women's health care services including mammograms, pap tests, and annual check-ups.

- A more recent paper[43] calculated mortality rates for persons who are homeless and concluded that those who are non-elderly face mortality rates 3.5 times higher than those who are housed. The mortality rate for persons who are homeless compared to those who are not is highest for those in the 30s and 40s. As discussed previously, recent research shows that loss of income (job) is the leading cause of homelessness. Another paper[44] estimated an unemployment rate elasticity under which a 1% percentage point increase in the unemployment results in a 0.65 increase in the number of homeless per 10,000.

The Ports and the broader Trade Cluster have reduced the associated public health risks by increasing the availability of jobs and in particular availability for lower-skilled workers. Regulations that instead limit the continued growth of this employment or send it into reverse will have the opposite effect. A proper evaluation of the potential health benefits of a proposed regulation needs to take these offsetting factors into account as well.

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[41] California Center for Jobs and the Economy, Jobs, Poverty & Upward Mobility, 2018.
[42] Preethi Pratap et al., Public Health Impacts of Underemployment and Unemployment in the United States: Exploring Perceptions, Gaps and Opportunities, International Journal of Environmental Research and Public Health, September 2021.
[43] Bruce D. Meyer, Angela Wyse, and Ilina Logani, Life and Death at the Margins of Society: The Mortality of the U.S. Homeless Population, National Bureau of Economic Research, Working Paper 31842, November 2023.
[44] Kevin Corinth, The Impact of Permanent Supportive Housing on Homeless Populations, Journal of Housing Economics, March 2017.

Comparing the Related Studies & Their Impact Results

This report relies on and compares the impact results from a number of previous studies assessing the economic effects of the Ports as well as the impacts arising from various events affecting them over the past few decades. Understanding these studies in the context of this current report must analyze and reconcile the bases of inconsistent methodologies or inputs. This report acknowledges and accounts for these differences which arise from the fact that each study is assessing a different aspect or set of aspects related to the Ports activities. Fortunately, the results for the core component activities—impacts arising from activities at the Ports themselves—are relatively consistent after considering the different data, dates, and modeling used in each study.

Reconciling Differences in Impact Components

A generalized overview of the core components leading to differences in study results is shown in the following diagram.

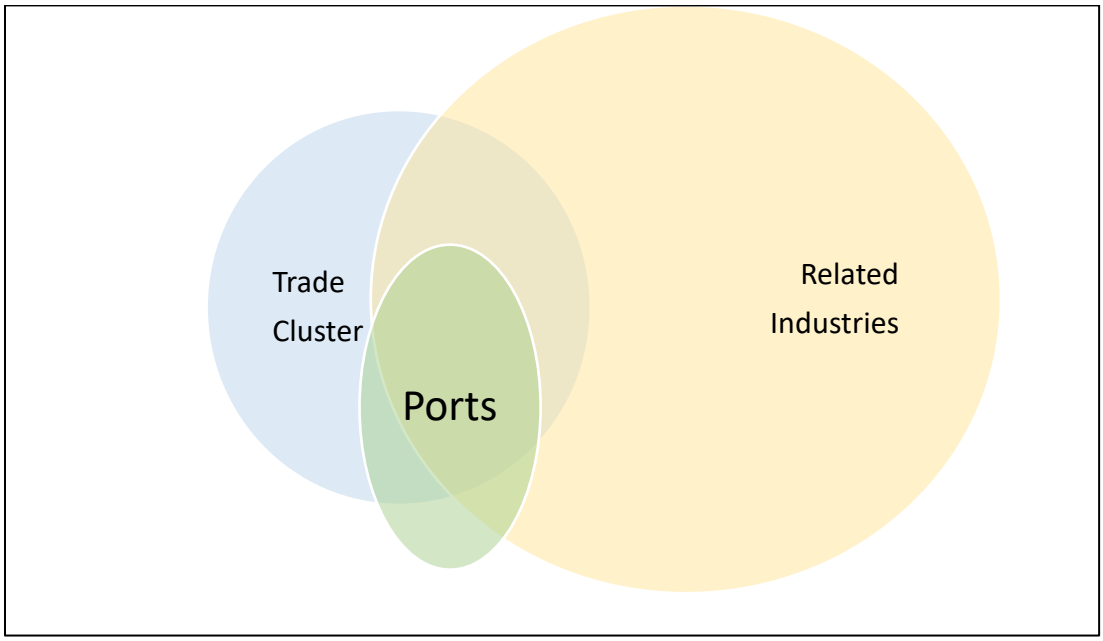


Figure 58: Impact Study Universe

Regarding the "Ports" effects, all of the studies analyze the Ports' impacts. Although, the definition of Port-related activities may differ slightly, these studies incorporate some combination of the Ports and activities at their terminals, public trust activities on Ports property, ACTA, and some other degree of consolidators, distribution centers, and transload operations. While the specific results further differ due to the base year being analyzed, cargo volumes, data used for direct inputs, and impact model used, the overall impact estimates are generally consistent after accounting for these differences. There is some overlap between the Ports impacts and the other two components, as well as some portion that is unique, primarily related to the induced impacts portion.

Regarding "Related Industries," these effects come from production and use of the export and import goods themselves. As discussed in the next section, these effects cover the jobs supported by the goods flow through the Ports rather than jobs generated by Ports activities, and are generally incorporated to illustrate the broader regional and national reach of the Ports and their importance to the overall economy. The treatment of this component differs by study, with some assessing only the direct jobs supported by the goods flow while others include multiplier effects as the EDR (2019) study does.

The third component is the "Southern California Trade Cluster" which is addressed in this report and that exists at its current size and depth due to the Ports and their prominence in international trade. A portion of this component overlaps with the Related Industries such as for goods movement and Wholesale Trade, but also includes businesses engaged as well in domestic trade activities.

Differences in the studies consequently arise from the fact that different elements of the economy are being measured.

Reconciling the Estimates Used by the Ports

This document gives impact estimates for POLA and POLB combined, which requires a closer look at the impact numbers and methodologies used by each port. The Port of Long Beach on its website[45] cites numbers for POLB alone:

- 50,000 jobs in Long Beach
- 575,000 jobs in Southern California (4 counties used in this study plus Ventura and San Diego)
- 2.6 million jobs supported nationally.

The Port of Los Angeles describes its economic impact[46] as:

- 128,000 jobs in Los Angeles

[45] About the Port, https://polb.com/port-info/, accessed April 8, 2024.
[46] Port of Los Angeles, 2023 Facts & Figures Card.

- 462,000 jobs in the five-county region (4 counties used in this study plus Ventura)
- 1.4 million jobs throughout the US.

The POLA document also gives impact estimates for POLA and POLB combined. Subtracting the POLA numbers from this total produces somewhat different estimates for POLB alone:

- 43,000 local jobs
- 469,000 jobs in the five-county region
- 1.3 million jobs throughout the US.

At first glance, the POLA results appear to be showing different regional multipliers for the two ports, while estimating a national impact that is only half the POLB estimate. The two studies used for these numbers, however, differ in several respects. The POLA numbers appear to be based on one of the earlier studies (Martin (2007)) that also provided a model used by POLA to update its numbers over the years as well as used in the subsequent Martin studies. This study/model considers all economic activities at the port, including the terminals as well as other public trust activities. In addition to the traditional direct, indirect, and induced impacts estimated in most studies of this type, this report also includes a "related effects" component that estimates the jobs and other economic effects supported by the goods transiting through the Ports. The related effects are estimated only for containerized cargo and are calculated using per container factors for the end user/producer industries both regionally and nationally without any multiplier effects. They consequently vary according to the nature and origin/destination of the exports and imports handled in each of the two ports. The regional numbers in particular, which are dominated by these "related effects" estimate, differ by scale due to this aspect.

The POLB numbers come from a more recent study (EDR (2019)). The port activities assessed cover both terminals and public trust activities, but are limited to those that take place within the port boundaries instead of the broader direct jobs base used in the Martin studies and this report that extends to the points at which goods enter or leave the international trade system (e.g., freight consolidation, distribution centers, transload operations). The related effects are handled differently, and are assessed in their model based on the value of the goods themselves. The results consequently incorporate direct, indirect, and induced effects associated with the production (exports) and use (imports) of the goods themselves. Using typical generalized multipliers, the POLB 2.6 million job number incorporating these related effects (as do the regional numbers), is generally consistent with the POLA 1.3 million direct job number but is larger due to the inclusion of these indirect and induced components.

Reconciling the Impacts Calculated in this Report

The common element in all the reports covers the impacts coming from activities at the Ports themselves. The following table compares the results from this report to the two most recent related studies that report this information separately. The numbers for Martin (2023) are taken as reported. The numbers for Martin (2022b) are estimated from the reported results for all California ports based on the Ports' share of total California trade. The results shown in the table cover direct, indirect, and induced impacts within California.

	Report	Martin (2023)	Martin (2022b, est.)
Jobs	226,000	233,600	214,300
Personal Income (billions)	$19.9	$28.7	$25.7
Output (billions)	$48.5	$58.6	$47.8

Figure 59: Comparison of Direct, Indirect & Induced Impacts on California

As shown, the job impact results show the closest consistency, varying primarily because of trade volumes in each of the years analyzed along with some differences arising from the degree to which jobs had recovered in various industries from the pandemic period closures.

The greatest differences are in the Personal Income results. In addition to the effect of trade volumes in each year, some differences also arise from the different models used in the studies. A more important factor, however, comes from shifts in average wages and incomes used to calibrate those models. The years analyzed in the two Martin studies were affected by the pandemic period job closures that saw the primary impacts on lower wage jobs, which had the effect of raising average wages and incomes across many industries, sharply so in some cases. An additional factor is the higher levels of overtime in those years for workers still having a job, especially in many production and service sectors. The 2022 data used to calibrate the IMPLAN model used in this report largely saw those temporary spikes smoothing out.

The previous studies differ widely in their estimates for related employment numbers supported by the trade volumes, in some cases by up to an order of magnitude. These variances come from the much different approaches used in each study to assess the jobs supported by the export and import goods themselves, and also to the extent the estimates cover only direct jobs or also incorporate indirect and induced effects as well as in the POLB numbers discussed above.

The estimates in this report attempt to be consistent as possible with the approach used in the numbers being reported by the Ports, in particular the POLA numbers in order to show the effects of changing Ports volumes and economic conditions rather than a change in methodology. The resulting estimate of 2.9 million related jobs and 3.1 million total jobs

(incorporating the Baseline Impacts numbers) in this report are somewhat higher than the 2.7 million total jobs reported by POLA for both of the ports. The primary differences arise from a number of factors, including: (1) the numbers in this report cover all goods (except crude oil, fuels, and natural gas), (2) the data source is different but generally consistent, (3) margins and output per employee vary by year, and (4) national employment levels overall were much higher in 2022, having recovered from the pandemic period job closures.

Related Studies

There have been a number of previous studies analyzing the economic importance of the ports, both within the region and nationally.

Impact Assessments

All of the previous studies along with this report are based on some form of input-output model which tracks the economic effects of an activity such as the ports through a defined geographic region. These effects are captured under the following types of impacts:

- Direct Effects cover the jobs, wages, and other expenditures generated by the activity being analyzed, in this case operations and costs to maintain and move goods through the two Ports. These elements as measured by those portions that occur in the region are used as inputs into the models.

- Indirect Effects are the additional jobs, income, and output generated in the region as the direct expenditures are spent at other regional businesses. This element incorporates a cascading effect as each of these businesses in turn buy goods and services from other regional businesses in accordance with their production or cost model and again as each of those next tiers do the same. Each of these rounds becomes smaller as a portion generally leaves the region to buy those goods and services from elsewhere.

- Induced Effects bring in the effects of spending by households, both as the result of additional wage income being earned from the direct and indirect effects but also in some studies from any significant price effects that shift household expenditure patterns. The models capture the totality of these rounds for both the indirect and induced effects, but do not determine a specific time frame in which they occur. Under normal conditions, these effects would generally occur within a year, but will vary depending on a variety of factors including the current velocity of money in the region being studied.

In addition to these traditional categories, some of the studies also estimate related effects that cover employment and income generated by businesses relying on the import and export of goods as part of their sourcing and final sales. These businesses both in the region and nationally benefit from the Ports as a supply channel conduit. They are not dependent on the Ports and would likely continue operations at least for a period of time at their current level and locations even if required to shift to use of another port or shipping mode such as air, as evidenced by these shifts during the high congestion period in 2021

and beginning of 2022. Generally, these effects are measured by the related employment and income in the businesses producing or using these goods domestically. The studies, however, differ in how these are treated. The estimated size of these effects consequently varies widely.

Model outputs generally cover the following areas, although differences exist on how individual items such as employment and output are measured:

- Employment is the number of jobs, regardless of whether the jobs are part-time or full-time. The ratio of full-time equivalent (FTE) employment to total employment differs by industry, typically ranging from about 80% to 90% of the employment impact numbers. Total employment in the IMPLAN models used in this report covers both wage and salary workers and proprietors (sole proprietors and partnerships).

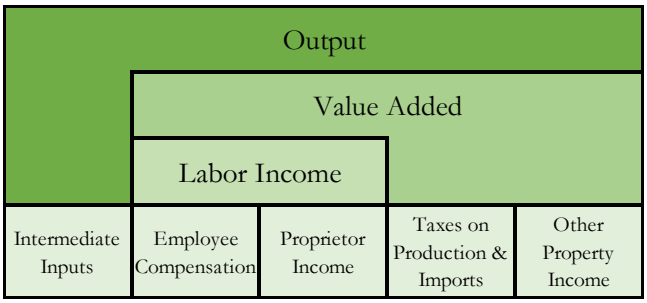
- Income is the total amount of income from wages, salaries, proprietor income, bonuses, and other compensation. In the IMPLAN model used in this report, income incorporates both money income and benefits.

- Value Added covers the portion of output production or operations occurring within each industry in the region, measured by total Output less the value of intermediate inputs such as imports. It is a measure of how much of the economic activity used to produce, move, and sell goods and services within the region actually occurs within the region, and in an impact analysis consequently can be used to measure the share of the regional economy that will be affected.

- Output is generally equivalent to sales within each industry, but more specifically measures production of goods and/or services in each industry. The key differences are in manufacturing where output is equal to sales adjusted for changes in inventory, and in retail and wholesale trade output which is set by gross margin (sales minus cost of goods sold) rather than gross sales.

- Taxes are generally based on overall state averages for the state and local components from the annual Census Bureau reports.

For the IMPLAN model used in this report, the relationship between the various measures is shown in the following chart.



Source: IMPLAN

The Martin Associates (Martin) studies provide a useful classification of the different economic activities covered under the direct effect estimates used in the various studies:

- Surface Transportation Sector covers the railroad and trucking operations including support operations moving cargo between the marine terminals and their origins/destinations.

Summary of Previous Economic Impact Reports

	Base Year	Impact Source	Impact Region	Port of Los Angeles				Port of Long Beach				Combined Ports			
				Direct	*Direct, Indirect, Induced*	*Related*	*Total*	*Direct*	*Direct, Indirect, Induced*	*Related*	*Total*	*Direct*	*Direct, Indirect, Induced*	*Related*	*Total*
JOBS															
Martin (2007)	2006	POLA, terminals	US	43,398	122,220	943,688	1,065,908								
Martin (2007)	2006	POLA, all activities	US	47,325	131,484	943,688	1,075,172								
EDR (2019)	2017	POLB, all activities	California								705,430				
BST (2021)	2020	POLA, POLB, trade value	US												2,565,000
Martin (2022b)	FY 2021	POLA, POLB, terminals es	California									85,771	214,296	3,029,358	3,243,653
Martin (2023)	2021	POLA, POLB, terminals	California									95,957	233,602	3,436,677	3,670,278
INCOME ($ million)															
Martin (2007)	2006	POLA, terminals	US	$2,223	$10,012	$35,018	$45,030								
Martin (2007)	2006	POLA, all activities	US	$2,358	$10,404	$35,018	$45,422								
EDR (2019)	2017	POLB, all activities	California								$38,700				
BST (2021)	2020	POLA, POLB, trade value	US												$115,200
Martin (2022b)	FY 2021	POLA, POLB, terminals es	California									$6,711	$25,742	$106,244	$131,987
Martin (2023)	2021	POLA, POLB, terminals	California									$7,620	$28,737	$120,328	$149,065
OUTPUT ($ million)															
Martin (2007)	2006	POLA, terminals	US				$159,816								
Martin (2007)	2006	POLA, all activities	US				$160,320								
EDR (2019)	2017	POLB, all activities	California								$110,700				
BST (2021)	2020	POLA, POLB, trade value	US												$256,900
Martin (2022b)	FY 2021	POLA, POLB, terminals es	California									$30,663	$47,779	$647,393	$695,673
Martin (2023)	2021	POLA, POLB, terminals	California									$39,197	$58,632	$732,716	$791,716
TAXES ($ million)															
Martin (2007)	2006	POLA, terminals	US		$1,131	$3,957	$5,088								
Martin (2007)	2006	POLA, all activities	US		$1,176	$3,957	$5,133								
EDR (2019)	2017	POLB, all activities	California								$7,272				
BST (2021)	2020	POLA, POLB, trade value	US												$32,500
Martin (2022b)	FY 2021	POLA, POLB, terminals es	California										$2,949	$12,172	$15,121
Martin (2023)	2021	POLA, POLB, terminals	California										$3,416	$21,065	$24,478
NOTES															
Martin (2007)	2006	POLA, terminals	US	Cargo activities only											
Martin (2007)	2006	POLA, all activities	US	Cargo and non-cargo activities											
EDR (2019)	2017	POLB, all activities	California	Related effects incorporated directly into impact estimates											
BST (2021)	2020	POLA, POLB, trade value	US	Study assesses effects associated with containerized cargo flows rather than the Ports and associated industries											
Martin (2022b)	FY 2021	POLA, POLB, terminals es	California	POLA/POLB estimated based on share of West Coast trade											
Martin (2023)	2021	POLA, POLB, terminals	California	Every 1% loss in discretionary cargo reduces jobs by 5,763, state personal income by $823 million, and state and local taxes by $101 million											

Figure 60: Comparison of Previous Economic Studies

- Maritime Service Sector covers cargo marine transportation services arranging for the inland and water movement of cargo; vessel operations including support operations; cargo handling including terminal operations, warehouse and distribution centers, container services, and automobile service firms; government agencies including the two Ports and other agencies providing services related to cargo handling and vessel operations such as US Customs and Border Protection, Coast Guard, Army Corps of Engineers, and inspections by California Departments of Agriculture and Fish & Wildlife; banking and admiralty/maritime law firms; and maritime engineering/construction service and associated specialties.

- Port Related Cargo Users vary in their treatment. The Martin studies include under direct impacts factors related to the portion of goods flow between terminal and initial destination as well as transload operations and fulfillment centers located near and dependent on marine cargo from the Ports. The remaining components under this category are considered under the related effects, as above. Other studies incorporate these activities directly into the impact calculations.

- Non-cargo Operations covering activities related to the Public Trust uses of the Ports are not included in the Martin studies but are in some of the other reports. These include restaurants, marinas, shops, other recreational, and industrial activities on the Ports property.

Comparing the results from the different studies is imperfect due to several factors. The impact assessment methods differ and use different data input sources. The base of activities being analyzed also differs, with some of the studies assessing a more traditional input-output analysis of the applicable industry activity and others instead looking at the effects associated with goods flow through the ports. The studies further differ by geography, looking at individual ports, both ports combined, and all West Coast ports along with their effects within California and/or the nation as a whole. Keeping these differences in mind, the summary table attempts to put the conclusions within a consistent framework.

Keeping in mind these differences and adjusting the results to 2022 dollars, the last two studies in the table on average conclude that the Ports support a total 3.5 million jobs, $153 billion in income, and $812 billion in output. Not including the related job effects, the direct, indirect, and induced effects within California average 224,000 jobs, $29.7 billion income, and $58.1 billion output.

Martin (2007)

This study assesses the economic effects of POLA on the California economy. Unlike their other studies, the activities are not limited to the cargo functions of the port, but cover as well the other Public Trust related uses including cruise, marina, fish processing, and other

real estate business activities. The study is based on extensive employer survey data, Martin's economic impact models, and multipliers from their model calculations and US Bureau of Economic Analysis RIMS II input-output model for California. The study also provides additional details on economic effects by commodity and business line at the port. Related effects were estimated using per container values for jobs, value added, and output.

The results for analysis of the marine terminal/cargo activities at the port in 2006:

- Direct effects account for 43,400 jobs and $2.2 billion income.
- Direct, indirect, and induced effects were 122,200 jobs, $10.0 billion income, and $1.1 billion in state and local taxes.
- Incorporating the related industry effects, POLA supported 1.1 million jobs, $45.0 billion income, $159.8 billion output, and $5.1 billion in state and local taxes.

The results for all activities at POLA:

- Direct effects account for 47,300 jobs and $2.4 billion income.
- Direct, indirect, and induced effects were 131,500 jobs, $10.4 billion income, and $1.2 billion in state and local taxes.
- Incorporating the related industry effects, POLA supported 1.1 million jobs, $45.4 billion income, $160.3 billion output, and $5.1 billion in state and local taxes.

Martin (2018)

Providing numbers that can be used to place the economic effects of the two Ports into an overall US perspective, this study analyzed the economic effects of all deepwater ports in the US using the same data and modeling approach from Martin's other studies. In summary:

- Direct effects account for 653,100 jobs and $184 billion in output in 2018.
- Direct, indirect, and induced effects were 2.2 million jobs and $323 billion in output.
- Incorporating the related industry effects, the nation's ports supported 28.6 million jobs and $5.0 trillion in total output.

This study updates an earlier report (Martin 2015) using the same approach:

- Direct effects of 541,900 jobs and $124 billion output in 2014.
- Direct, indirect, and induced effects of 1.7 million jobs and $224 billion output.
- Incorporating the related industry effects, total effects of 21.4 million jobs and $4.6 trillion output. These levels are up from 13.3 million jobs and $3.2 trillion output in 2007 estimated by Martin in another earlier study.

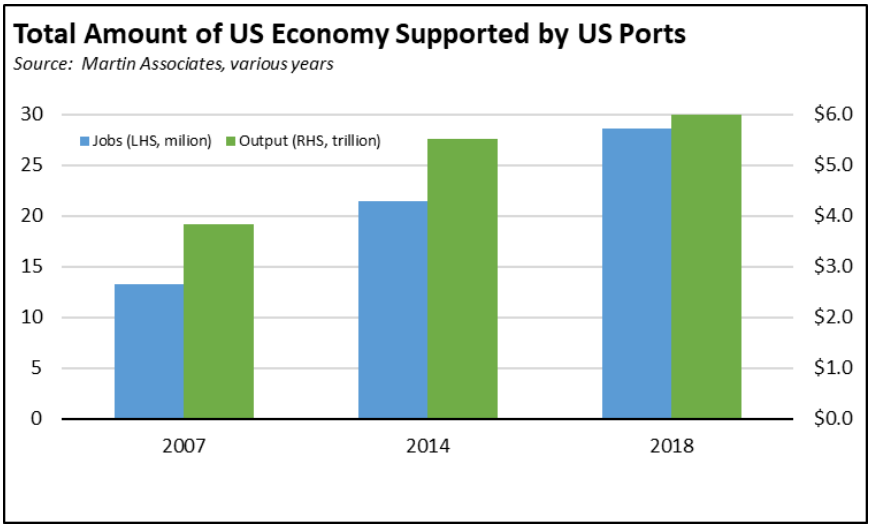


Figure 61: Portion of US Economy Supported by US Ports

Combining the results of these three Martin estimates, as shown in the chart above, the total number of US jobs relying on the nation's ports grew at an average annual rate of 7.2% between 2007 and 2018. Total output grew at an annual average rate of 4.1%. In comparison, total nonfarm jobs grew at an annual average rate of only 0.7%. GDP (nominal) grew at 3.3%. As US trade has expanded, so has the share of US jobs dependent on the efficient functioning of the ports. Regions maintaining investments in their ports to keep them competitive consequently will also remain competitive for this expanding base for blue collar, middle-class jobs.

EDR (2019)

The study assesses the effects of POLB, with estimates presented for Long Beach, Los Angeles County, Southern California region but also including Ventura and San Diego Counties, California, and the US. The activities covered include the cargo operations addressed in the other studies, but also includes cruise services, retail and tourism, and related construction. Impacts are calculated using PIERS data as the primary inputs and IMPLAN as the impact model. Rather than breaking them out separately, the related effects are incorporated into the report's impact numbers through valuation of the cargo shipped. The results consequently are not directly comparable to the other impact

assessments, and the results of this study cover only the effects associated with cargo shipped through POLB rather than the port and its associated industry activities.

Using the results for the state:

- Total direct, indirect, and induced effects incorporating the related components in 2017 within California supported 705,400 jobs, $38.7 billion income, $110.7 billion output, $7.3 million in state and local taxes, and $7.3 million in federal taxes.

BST (2021)

The BST studies are three related reports assessing the economic effects of the California ports. The documents cover a summary of previous studies, economic effects of all the ports as well as information on individual ports, and disaggregation of the results by legislative district and other political subdivisions.

These studies focus on the economic value of the trade flows through the ports rather than the ports and related businesses themselves. Import estimates are determined from retail and wholesale margins applied as appropriate to the import values allocated by state of destination. Export estimates are made from using the export values, allocated by state of origin, as output values. Multipliers (direct, indirect, and induced) in both cases are taken from RIMS II.

The effects of all waterborne trade are calculated only in the case of the California ports combined. Separate analysis provides the results of containerized trade through POLA and POLB in 2020:

- For California, containerized trade flows through the Ports were associated with 795,500 jobs, $39.5 billion income, $137.7 billion output, and $10.2 billion state and local taxes.

- For the national economy, containerized trade flows were associated with 2.6 million jobs, $115.2 billion income, and $32.5 billion in state and local taxes. The job effects are 27% higher than the 2.0 million estimated for 2000, but are down 24% from the high of 3.4 million estimated in 2008. Since 2016, the total job estimates have been relatively level as the result of discretionary trade moving to other ports.

Economic Roundtable (2022)

This report focuses on the Ports workforce along with ways the ports as a regional asset can be used to support export-oriented manufacturing in the region. Key points include:

- 36% of the Ports dockworkers live in the City of Los Angeles and 13% live in Long Beach. In all, 84% live in Los Angeles County, which consequently is the location of most of the economic impacts coming from the Ports wages.

- Average hourly wage for dockworkers in 2021 was $62.44, and the median was $59.95. The study's data indicates the average wage was more than 3 times larger than both the City of Los Angeles and County minimum wage that year.

- Median annual earnings for ILWU port workers in 2019 were $89,560, compared to $33,345 for all other workers living in the same communities.

- By educational attainment, dockworkers had substantially higher median wages. In a comparison using the sub-county Public Use Microdata Areas (PUMAs) with high numbers of dockworkers, median wages in 2019 were 137% compared to non-port workers with less than a high diploma, 120% for those with a high school diploma, 264% higher for those with some college, and 151% higher for those with a BA or higher. Similar gaps between port and non-port workers also are shown based on sex, age, ethnicity, and race.

- Using the same basis for analysis, only 19% of ILWU dockworker households are rent burdened (spending more than 30% of income on housing) compared to 56% of non-dockworker households.

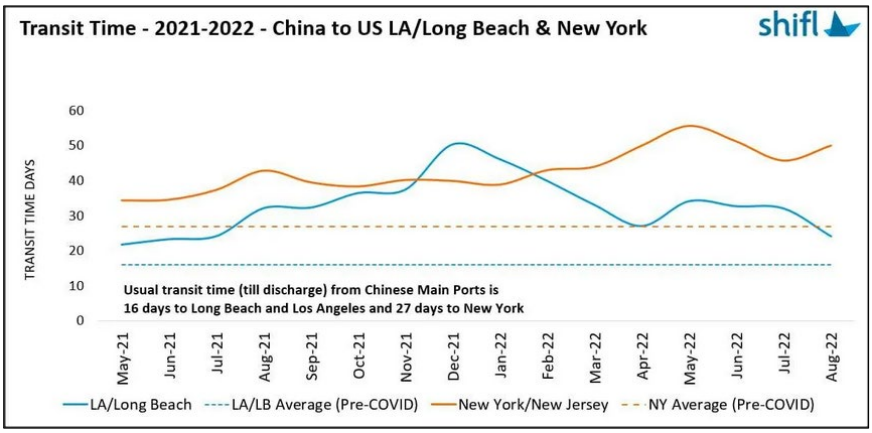
- Economic effects analyzed through the IMPLAN input-output model indicate ILWU dockworker wages supported 7,065 jobs in the California economy, $453 million in income, $860 million in value added, and $1.4 billion in output.

Martin (2022a)

This study assesses the effects of congestion on the Ports during the pandemic period and the implications to their future competitiveness. This congestion tested the capacity of both the Ports and the inland supply chain components. The number of container vessels anchored or slow-steaming off the Southern California coast reached 109 in February 2022. Warehouse vacancy rates fell below 1% in the region, and below 0.5% in the Inland Empire East portion of the region. The average dwell time for containers reached 8.4 days in November 2021, compared to an historical average of 3.3 days, reflecting constrained capacity in the region's warehousing. Rail dwell times ranged from 8 to 12 days in mid-2021. Shortages of chassis and truck drivers in addition to the overall labor shortages in the region contributed to blockages at every point in the supply chain.

Using an updated chart from one contained in the report, comparative transit times from the China ports to both the Ports and the East Coast narrowed and flipped for nearly 5 months beginning in Fall 2021. Transit times were down on the West Coast by April due

more to lockdowns at the China ports reducing traffic rather than from congestion relief measures, but were still above pre-pandemic levels. In contrast, transit times were rising on the East Coast as the diverted cargo flows began backing up.



Source: Shifl Press Release, October 6, 2022

Figure 62: Ports vs. New York Transit Teim from Chinea

Congestion and consequently higher costs of using the Ports saw diversion of Asian cargo to other US ports. After remaining relatively steady within a narrow band beginning in 2019, the Ports share of containerized Asian imports dropped about 9 percentage points in the third quarter of 2021. The North Atlantic ports picked up most of this share along with a marginal decline in the share diverted from other West Coast ports.

The pandemic congestion, however, illustrates the effects of capacity limits on POLA and POLB. Transit patterns especially for the discretionary portion of the trade flows are not fixed. As capacity limits are reached and as costs increase, cargo and the associated jobs and other economic effects can and will be diverted to other ports in the US.

Martin (2022b)

The study assesses the economic effects in fiscal year 2021 of the US West Coast ports in California, Oregon, and Washington. The effects are shown for all ports along with separate calculations grouping the different ports by state. Economic effects as well are shown at different regional levels: national, three-state region, and the individual states. Individual ports, however, are not shown separately. Method and data sources are similar to those used in the other Martin impact studies.

Using the results for the California ports on the California economy:

- Direct effects account for 120,800 jobs, $9.5 billion income, and $43.2 billion in output in fiscal year 2021.

- Direct, indirect, and induced effects were 301,800 jobs, $36.3 billion income, $67.3 billion in output, and $4.2 billion in state and local taxes.

- Incorporating the related industry effects, the California ports supported 4.6 million jobs, $185.9 billion income, $979.1 billion output, and $21.2 billion in state and local taxes.

As a rough approximation, USATrade Online data shows POLA and POLB accounted for 71% of all exports and imports by value through the state's marine ports in 2021. This share is used to estimate the numbers for this study in the summary table.

Martin (2023)

This analysis provides an update to the previous study, and assesses the combined activity at POLA and POLB in 2021. Method and data sources are similar to those used in the other Martin impact studies. Separate impact estimates on California are provided covering all marine terminals at the two Ports, all container terminals, and for those terminals operated by ILWU workers.

- Total activities (direct, indirect, and induced) at all marine terminals generated 233,600 jobs, $28.7 billion in personal income, and $58.6 billion in output within California in 2021.

- Of these amounts, 56,000 jobs, $7.0 billion personal income, $19.3 billion output, and $943 million in state and local taxes were generated by the discretionary cargo flows that are the most vulnerable to disruption from competing ports and regulatory restrictions. Every 1% loss of this discretionary cargo is equivalent to about 200,000 TEU, resulting in a loss of 5,763 jobs, $823 million personal income, $1.4 billion in output, and $101 million in state and local taxes.

Incorporating the related effects, total economic output supported by the two Ports and their associated export and import volumes was estimated at $791.4 billion. Based on loaded TEU volume through the Ports in 2021, the Martin numbers translate into one job in the state supported for each 3.5 TEUs handled by the Ports that year.

Methodology

This section contains discussion of the methodologies and data sources used in the report, presented in order of the calculations contained in the main text.

General Methodology

All analysis is done for the Southern California region as defined by Los Angeles, Orange, Riverside, and San Bernardino Counties.

Unless otherwise noted, all calculations are presented using the base year 2022.

For general cost categories, current amounts are adjusted to constant 2022 amounts using the CPI-U published by US Bureau of Labor Statistics unless otherwise noted. Import and export values are adjusted using the Bureau's end user import and export price indices for all commodities.

As with all data of the type presented in the report, rows and columns in the various tables may not sum to the totals due to independent rounding.

Containerized Market Share

The graphs show US market share based on containerized vessel shipping weight by port from USATrade Online.

Discretionary Market Share

Data is from National Transportation Research Center, Freight Analysis Framework Version 5. All data excludes crude petroleum, gasoline, fuel oils, and natural gas and other fossil fuel products to focus on the primary goods traded with other states. Data is analyzed for waterborne imports and exports for Los Angeles CMSA, which includes the 4 counties in the study's regional definition plus Ventura County. The data's inclusion of the Hueneme and Ventura ports in Ventura County has little overall effect on the results, as they only constitute 3% of the total when combined with POLA and POLB. This effect is diminished further by adjusting the results for the two primary products—edible fruits and nuts and vehicles—that make up 80-90% of volume through those two ports.

Share of waterborne trade is a measure of the degree to which each state relies on POLA/POLB for exports produced and imports consumed within their state economies. The ratios are calculated from the value of exports and imports moving through

POLA/POLB and foreign markets, divided by all waterborne exports and imports in the state. These include goods that may be traded through in-state ports, and goods that move by vessel at ports in other states but that have their origination/destination in the subject state. As above, the calculations do not include crude petroleum, gasoline, fuel oils, and natural gas and other fossil products.

Average Energy Costs

Average diesel price was estimated from GasBuddy.com monthly data.

Average electricity rates were estimated through the following steps: (1) electric service providers within each county were identified as the primary provider by census tract from the Public Utilities Commission data used in their Annual Affordability Reports, (2) average annual rates by provider were calculated from the US Energy Information Administration annual sales and revenue files, and (3) provider rates were weighted by population using the census block equivalency files for the counties. Data for the other states is calculated from US Energy Information Administration data.

Nonfarm Jobs: Manufacturing

Data in the chart is taken from US Bureau of Economic Analysis, Total Full-time and Part-time Employment. Data from 1969 to 2000 is by SIC industry and in the subsequent years by NAIC industry. The two series are presented together in the chart, but a portion of the change between 2000 and 2001 is due to the shift in the underlying series used. Data for New York-Newark-Jersey City MSA in the NAICS series contains several years where the data is estimated or subject to non-disclosure. The chart shows these points by a continuous line between years with disclosed data.

Wage & Salary Jobs

All data is from the Quarterly Census of Employment & Wages (QCEW), US Bureau of Labor Statistics QCEW Data Files, which reports on number of jobs covered by unemployment insurance tax returns. The data is an actual count of wage and salary employees, wages, and establishments and covers more than 95% of total jobs. Not included are proprietors, the unincorporated self-employed, unpaid family members, certain farm and domestic workers, and railroad workers covered by the railroad unemployment insurance system. Also not included are workers who earned no wages during the entire applicable pay period because of work stoppages, temporary layoffs, illness, or unpaid vacations. The data is more detailed and differs from the monthly jobs data reported from the Current Employment Statistics series, which is composed of estimates from surveys and modeling and which is subject to annual revisions based on the QCEW counts.

The annual wage data is based on reported total compensation paid during the period, and consequently combines the effects of both hourly wage and number of hours worked and includes all non-benefit compensation components including wages, salaries, and bonuses.

All numbers for Trade are based on the Trade industry cluster used in the LAEDC reports (LAEDC 2017). The cluster consists of the following NAIC industry components:

- NAICS 423 Merchant wholesalers, durable goods
- NAICS 424 Merchant wholesalers, nondurable goods
- NAICS 425 Wholesale trade agents and brokers
- NAICS 481 Air transportation
- NAICS 482 Rail transportation
- NAICS 483 Water transportation
- NAICS 484 Truck transportation
- NAICS 4881 Support activities for air transportation
- NAICS 4882 Support activities for rail transportation
- NAICS 4883 Support activities for water transportation
- NAICS 4884 Support activities for road transportation
- NAICS 4885 Freight transportation arrangement
- NAICS 488991 Packing and crating
- NAICS 493 Warehousing and storage

The core data is for private ownership. Rail is estimated separately using Occupational Wages & Employment Statistics from US Bureau of Labor Statistics. Local government support for air and water transportation (the ports) is subject to nondisclosure in most of the applicable years. Numbers instead are estimated from the State Controller's General Government Compensation in California and local budget documents.

Industries are classified as middle-class wage or below based on annual average wages in 2022 and the comparable middle class income standard (see below) that year. In 2022, the standard translates into household income of between $49,800 to $149,500. While this income level can be achieved by households with more than one wage earner, industries are classified based on their ability to provide this income through a single wage job.

Share of Households in the Middle Class

There are a number of different definitions of what constitutes middle class in the US, including self-designations based more on perceptions and general lifestyle rather than income level. The approach used in the calculations relies on a generally used income-based standard, as discussed by Pew Research Center in their reports on the topic (Pew 2022). Under this standard, middle class households are those with median incomes

between two-thirds and double the federal median household income. For the purposes of their studies, Pew further adjusts incomes based on household size. This report, however, relies on the general income bands.

Data is from the public use microdata sample for the Decennial Census 1980-2000 and American Community Survey 1-Year results (ACS), as accessed through IPUMS.org[47] and analyzed through UC Berkeley's Survey Documentation and Analysis (SDA) application available on the IPUMS website. The share of households within each income band is determined from occupied households (no group quarters) and the relevant federal median household income from each applicable year. In the ACS data, no results were reported for 2020 due to the survey responses falling below acceptable statistical significance that year.

Typical Entry-level Educational Requirement

Data is from US Bureau of Labor Statistics, Occupational Employment and Wage Statistics showing the typical educational requirement for entry-level positions by industry for 2022. The data is adjusted to the industry groupings under Wage & Salary Jobs. Red shading in the table indicates industries with jobs growth and/or annual average wage levels below the Trade cluster, as calculated under Wage & Salary Jobs.

Trade Workers

Characteristics of Trade workers in the region were developed from two key data sources:

- Basic demographic information by age, sex, race and ethnicity, and education come from the Census Bureau's Quarterly Workforce Indicators (QWI) accessed through the LED Extraction Tool. The advantages of this source are that it is based on the same core data as the QCEW results presented under Wage & Salary Jobs plus additional administrative record sources, and consequently does not rely on survey estimates. The disadvantages stem primarily from the limited cross tabulations that are available, restricted only to those calculated in the database. This source also reflects job flows within the covered period. For example, the share of Latino workers is based on the total workers employed in 2022, regardless of whether they were employed in a single or more than one quarter.

  Data covers the same NAICS industries under the Trade industry cluster, but only for private employment. The data does not include the additional adjustments for Rail and local government employment. The effect on the results is minimal as these adjustments only account for 1.3% of the total Trade cluster estimate in 2022.

[47] Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rogers, and Megan Schouweiler. IPUMS USA: Version 14.0 [dataset]. Minneapolis, MN: IPUMS, 2023. https://doi.org/10.18128/D010.V14.0.

The Age categories: Youth (14 to 18), Young Adult (19 to 24), Prime Working Age (25 to 54), and 55 and Above.

Education is determined only for persons age 25 and older. The N/A category shown in the table covers workers age 24 and younger.

Because all categories are calculated independently, totals may show some variation in the tables.

- Supplementary demographic cross tabulations and economic characteristics are estimated from the public use microdata sample for the ACS 1-Year results as accessed through IPUMS.org[48] and analyzed through UC Berkeley's Survey Documentation and Analysis (SDA) application available on the IPUMS website. Trade workers are identified based on industry of primary job. Workers, however, may work in more than one industry for the 12 months covered in the survey or may be unemployed, and the economic elements reflect this situation. The data is for all classes of workers. Where applicable (such as housing tenure), the results exclude workers in group living situations, a factor that does not change the results significantly but is included for completeness.

  The analysis includes two elements constructed from the base selections in IPUMS. Housing affordability ratios are constructed from gross rent and household income for renters, and from owner costs and household income for homeowners.

Economic Effects of the Ports

The assessments consider Southern California trade and the ports from four perspectives. All analysis of direct, indirect, and induced effects in the first three is done using the IMPLAN application for California using 2022 data and reporting the results in 2022 dollars. As with any input-output model, IMPLAN tracks the interactions between industries within a region and with the final demand sectors. In this instance, industry is a more general term describing businesses that have been grouped together based on their having similar operating characteristics, including private businesses, nonprofits, and government operations. Including all the different aggregation levels, industry classifications generally start with the 1,436 NAICS categories, not all of which exist in every region or in some cases exist at levels that are subject to non-disclosure provisions in the various public data bases.

[48] Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rogers, and Megan Schouweiler. IPUMS USA: Version 14.0 [dataset]. Minneapolis, MN: IPUMS, 2023. https://doi.org/10.18128/D010.V14.0.

IMPLAN collapses the NAICS structure into 546 different industries, and includes standardized estimation procedures in cases where data has been subjected to non-disclosure. Other models used in the previous related studies use a similar approach. For example, RIMS II provides results organized by either 372 detailed or 64 aggregated industries.

As with any model of this type, IMPLAN[49] is based on several assumptions, including fixed production functions with no substitution and constant returns to scale, no supply constraints, no changes in technology, and no changes in prices. The core model data is tied to the most recent national input-output model maintained by US Bureau of Economic Analysis and updated every 5 years. The IMPLAN model is then calibrated to each region and year drawing on a wide range of other more current data sources.

All estimates are done for two regions: Southern California and the Rest of California. Unlike most other models that calculate these components by running the application twice at the different levels, IMPLAN uses a Multi-Regional Input-Output (MRIO) technique that models the specific links between the two regions for goods and services and commuting rather than treating these flows as leakages within the region under study.

Economic Contributions of the Trade Cluster were assessed through IMPLAN's Industry Contribution Analysis. Under this approach, the results describe the overall economic structure of the cluster, both jobs and income coming from the individual industries making up the cluster plus those coming from their network of regional supply and support industries. Unlike an impact analysis, this approach does not include indirect and induced feedbacks into the cluster component industries themselves and assesses the supply and support industries through a MRIO rather than an impact technique. Data inputs use the QCEW jobs numbers for the industry components within the Trade cluster as discussed above, including the estimates of the portion coming from the ports, rail, and airports.

Baseline Impacts of the Ports use the following inputs:

- This study takes advantage of the previous estimates of direct jobs associated with the Ports, in particular the very recent survey data completed in the Martin studies. Where possible, the various study estimates are adjusted to consistent Ports-wide numbers and regressed against container numbers as the primary proxy for overall Ports activity. The result provides an estimate of both a fixed component of direct jobs along with a variable component that will change as container activity changes. As a test of the results, the number of ILWU jobs in 2022 estimated by this approach differs by only 1% from the actual number reported in Pacific Maritime Association's Annual Report.

[49] For more information on the IMPLAN modeling process, go to IMPLAN.com.

- The Ports and related operations in 2022 still incorporated some elevated levels as importers and exporters worked to overcome the pandemic-period supply chain disruptions, and this activity came during a period of significant labor shortages. As a result, average hours worked were elevated from overtime particularly in industries such as Trade which continued operating during the state's job disclosures. Again using the Pacific Maritime Association Annual Reports, ILWU-staffed operations at the Ports average hours worked in 2021 were 7% higher than in pre-pandemic 2019. In 2022, this difference had eased to 3%. This adjustment factor is applied to the components more subject to overtime variation, such as Trucking, Warehouses, and Terminals.

- The individual components incorporated into the Ports and related operations assessed in the model are discussed above in the Related Studies section.

- Where possible, the IMPLAN numbers are adjusted using data specific to the region. The Ports component (POLA, POLB, ACTA) uses numbers from the applicable annual financial reports. ILWU salaries and benefits are taken from the Pacific Maritime Association Annual Report. Warehouse numbers are adjusted using proprietary information from industry sources. Adjustments are also made to the Ports spending pattern where elements are entered as direct inputs rather than calculated through the model.

- Estimates for the Public Trust activities come from various sources, including regional industry averages and various public sources reporting job levels including Employment Development Department's Find Local Employers estimates.

- The construction element is based on capital spending from the annual financial statements. These numbers are adjusted for an estimated portion that is spent within the region based on various sources including the Clean Air Action Plan and capital spending plans, construction budgets in selected grant applications, and general factors from the IMPLAN investment patterns by industry data.

Related Jobs impacts were assessed based on the direct jobs supported nationally (Southern California, rest of California, and the other states) through production of exports shipped through the Ports and use of the imports as intermediate production inputs and for final demand. The estimates were done using an approach similar to that used in the earlier Martin studies:

- Export and import values for shipments through the Ports were taken from the National Transportation Research Center, Freight Analysis Framework data by commodity. The numbers are adjusted as above for the Ventura County factor, and do not include crude petroleum, gasoline, fuel oils, and natural gas and other fossil fuel products to focus on the primary goods traded with other states.

- The commodity import values were then distributed using US Bureau of Economic Analysis Input-Output Accounts Data, Import Matrix to estimate the allocations to intermediate inputs by goods producing industry and to the final demand sectors. A similar distribution by commodity was then estimated for total US imports.

- For goods producing industries, the related jobs supported by imports through the Ports were estimated from the resulting share of total import use by industry supplied through the Ports. Imports to the service industries were assumed to enter through the wholesale trade sector to simplify the analysis and produce a conservative estimate, and the personal consumption amounts were analyzed through the retail trade sector. No related jobs are associated with imports allocated to capital investments and net changes in inventories. Job estimates are based on US Bureau of Economic Analysis, Full-Time and Part-Time Employees by Industry, with the wholesale and retail components based on the applicable margins and total output (producer prices) per employee. Use of the Bureau's employment numbers covers all classes of employees and results in estimates comparable to the IMPLAN output.

- The export components are estimated based on total output (producer prices) per employee by commodity-producing industry.

- Adjustments were then made to eliminate any double counting for employment already incorporated into the Baseline Impacts results. Other adjustments were made to eliminate any duplication in the export and import based estimates. For example, in an extreme example, if imports through the Ports supported 10% of an industry's output and 100% of that output was produced for exports through the Ports, the 10% would not be counted twice. While conceivably these production streams could have some degree of separation in the real world, the level of aggregation used in the data and analysis is more amenable to comparing output estimates.

The resulting estimates cover only the direct employment associated with trade volumes through the Ports, and do not include any multiplier effects related to indirect or induced factors.

Lost Market Share impacts were evaluated by running IMPLAN using the higher volume from an additional 4.4 million TEU, as described in the text, and comparing the results with the baseline impacts. The associated employment and output direct factors were adjusted through the following steps:

- Total revenues (output) for the Ports and ACTA were revised based on the portion coming from containerized traffic. Other types of cargo are not included in the analysis. Domestic cargo is assumed to be unchanged.

- Wages across all inputs are assumed to be unchanged even with the higher labor demand. Because the model assumptions include constant technology and fixed production functions, the analysis assumes no changes in current operation patterns.

- Based on the regression results developed for the baseline impacts, other inputs are adjusted using the revised TEU volume.

- The analysis also assumes no change in the construction and Public Trust components.

Trade Cluster Impacts were assessed using the following regression analysis. As above, Trade Cluster employment was estimated for each year 2003-2022 and then analyzed using various factors to assess the local population serving component and the portion related to international trade through the region. The final specification as shown in the adjusted R^2 of 0.8804 covers a high share of variance in annual Trade Cluster employment. All variables are statistically significant at the 95% confidence interval or higher.

Regression Results	
Intercept	2,097,556***
	(505,991)
Real (2022) Value, Regional Imports & Exports (in $ million)	0.5153**
	(0.1348)
Regional Population Share	-32,700,163***
	(8,178,967)
Adj. R^2	0.8804
No. Observations	22

*Standard errors in parentheses. *** 99% significance; ** 95% significance*

In the results, Real (2022) Value of Regional Imports & Exports covers all international trade flows through the region, including both marine and air cargo, in millions of dollars. Regional population is Southern California's share of total US population.

The population component is negative. What this outcome suggests at least in the period analyzed is at least one of three outcomes: (1) as population share rises in the region,

economies of scale in the local sharing trade activities reduce the incremental employment effects; (2) the coefficient captures the strong shift to online sales during this period of declining population share; or (3) in periods when population share is rising, it is because of emerging industries (e.g., aerospace) that are hiring away available labor. Southern California instead is now facing a declining share that has emphasized the importance of local geographic advantages such as is the case for Trade.

Abbreviations

ACS	American Community Survey
ACTA	Alameda Corridor Transportation Authority
BEA	US Bureau of Economic Analysis
BLS	US Bureau of Labor Statistics
BNSF	BNSF Railway Company
CDC	Centers for Disease Control & Prevention
DOT	US Department of Transportation
ISR	indirect source rule
MSA	metropolitan statistical area
NAICS	North American Industry Classification System
PNW	Pacific Northwest
POLA	Port of Los Angeles
POLB	Port of Long Beach
PPI	producer price index
QWI	Quarterly Workforce Indicators
SCAQMD	South Coast Air Quality Management District
TEU	twenty-foot equivalent unit
UP	Union Pacific Railroad
WTO	World Trade Organization

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