

How Important is International Trade to Los Angeles?

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Los Angeles has the largest seaport in North America.¹ Its container cargo traffic – exports and imports combined – accounts for 1/3 of all cargo traffic in the U.S.² We can easily figure out that international trade is very important to the L.A. economy because it is the home of such a prominent seaport. In this report, we will (1) present further evidence of importance of trade to the L.A. economy, (2) examine how the trade is correlated with the U.S. economy, and (3) look at how trade impacts sector jobs in L.A.

However, it is worth noting that L.A. has never been the top seaport in terms of trade volume in the world. Figure 1 shows the top 30 seaports in terms of container cargo traffic measured by TEUs (Twenty-Foot Equivalent Units) in 2015. L.A. seaport (Ports of Los Angeles and Long Beach combined) ranked 10th in 2015 in terms of trade traffic. There is only one other U.S. port on the top 30 list, which is New York/New Jersey, shown in yellow. The top port in the world is Shanghai, followed by Singapore and Shenzhen. Indeed, there are five ports in China in the top ten busiest ports. That said, international trade should be even more important to China and other Asian countries than to L.A.

Figure 2 displays L.A. seaport traffic, in which the blue line represents the import cargo TEUs and the red line represents the export cargo TEUs. We can see that import

volume increased almost three times from 3 million TEUs to 8 million TEUs from 1996 to 2006. Then the Global Financial Crisis and the Great Recession disrupted international trade. Now, after 10 years of slump and recovery, the imports have finally surpassed their 2007 peak and are now nearing 9 million TEUs. Exports from L.A. increased from 2 million TEUs to 4 million TEUs from 1996 to 2008, but since 2008 have remained stagnant and are still below 4 million. The widened gap between imports and exports demonstrates the gigantic trade deficit between the U.S. and its Asian trading partners.

Los Angeles International Airport (LAX) is the second largest airport in the U.S. in terms of total passenger traffic and the fifth largest in terms of air cargo traffic. Figure 3 depicts air cargo freight through LAX, including both domestic and international traffic. The number of high-value air imports and exports and time-sensitive freights through LAX has seen a rapid recovery over the past years. Both have way surpassed their pre-recession peaks.

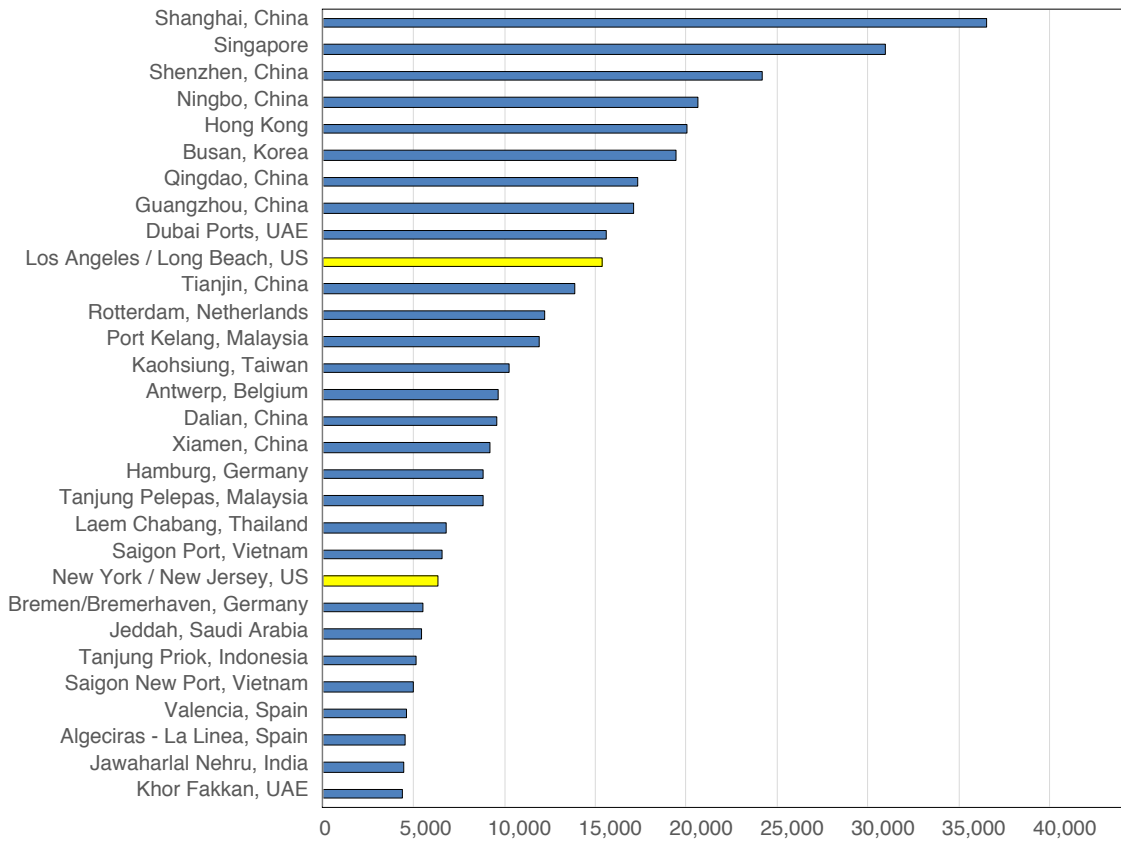
Figure 4 shows tremendous growth in domestic and international seasonally adjusted passenger traffic, including both arrivals and departures since early 2009 – from 51.7 million passengers in 2009Q1 to 87 million passengers in 2017Q4.

1. Here Los Angeles seaport includes both Ports of Los Angeles and Long Beach. It is based on container cargo volume from the American Association of Port Authorities 2015.

2. This figure is based on foreign container trade numbers by U.S. customs ports, put out by the Maritime Administration of the U.S. Department of Transportation 2015.

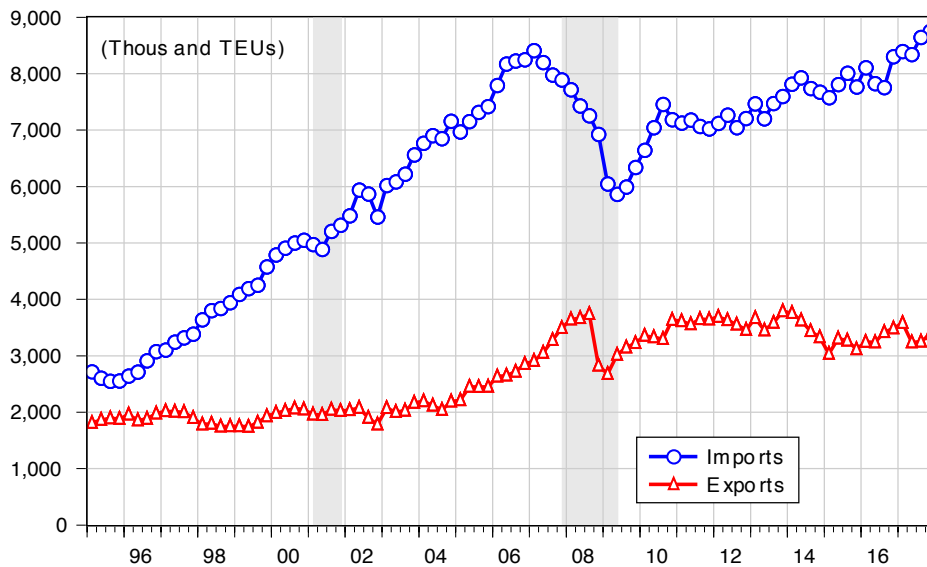
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Figure 1 The Top 30 World Ports by Container Traffic (Exports and Imports Combined; TEUs, Thousand), 2015



Source: American Association of Port Authorities

Figure 2 Los Angeles Seaport Traffic, Ports of Los Angeles and Long Beach Combined (Thousand TEUs, Annualized Seasonally Adjusted)

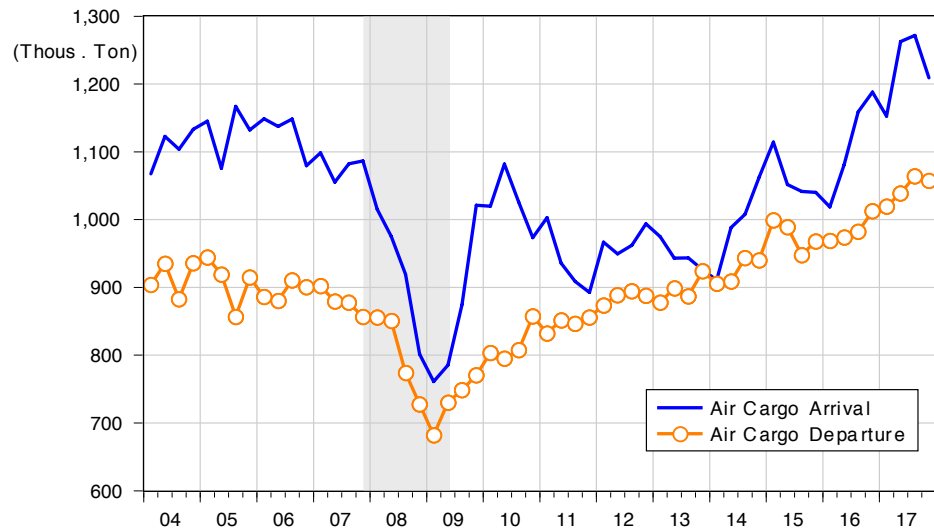


Sources: Ports of Los Angeles and Long Beach

Note: A "TEU" is a "twenty-foot equivalent," a standard shipping container

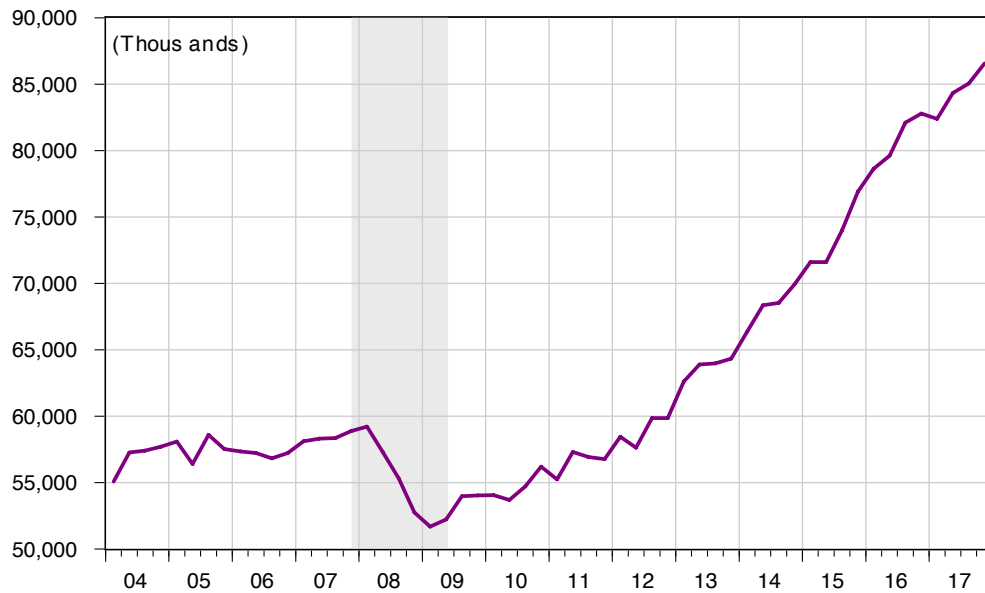
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Figure 3 Los Angeles Airport (LAX) Air Cargo Freights (Tons, Annualized Seasonally Adjusted)



Sources: LA World Airports

Figure 4 Los Angeles Airport (LAX) Passenger Traffic (Arrival and Departure Combined, Annualized Seasonally Adjusted)



Source: LA World Airports, for scheduled carriers only

The Correlation Between L.A. Trade and the U.S. Economy

With its prominent gateway location for seaport cargo, airport cargo, and airport passengers, it is likely that L.A.'s trade statistics are correlated to the U.S. economy for imports and exports through two channels: (1) When the U.S. economy is strong, Americans will buy and import more goods and services. (2) When the U.S. exports more goods and services, it directly contributes to more production, more GDP, and higher economic growth. In other words, we expect L.A. trade traffic to be positively correlated to U.S. economic growth. Here, we examine if this is the case.

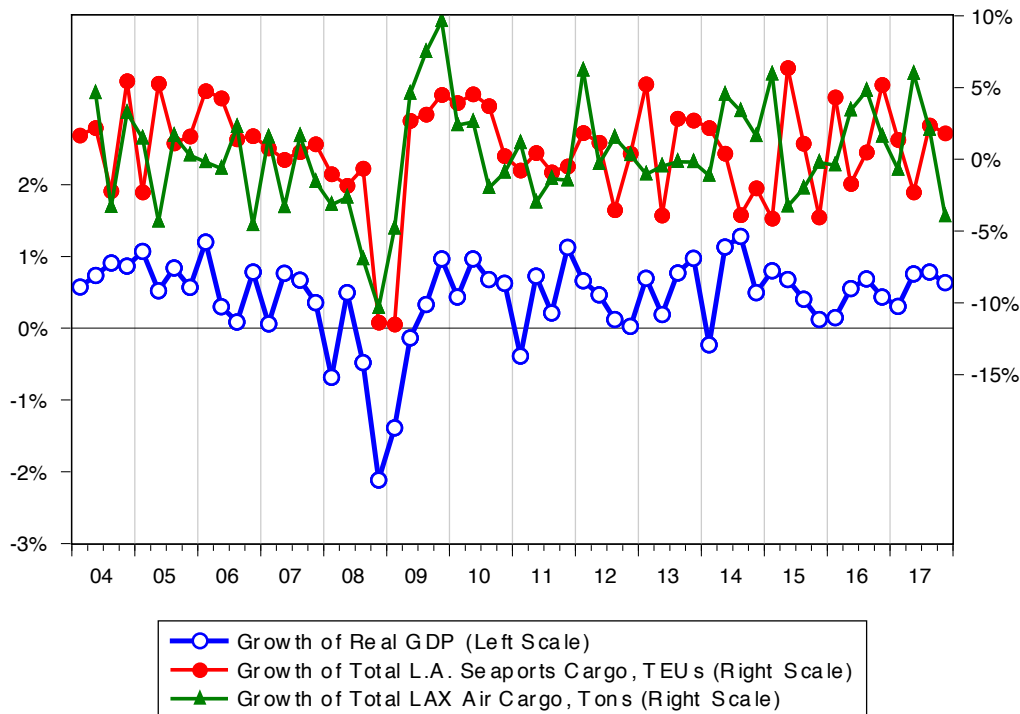
Figure 5 shows quarterly growth rates of U.S. real GDP (blue line, left scale), total L.A. seaport cargo traffic (red line, right scale), and total LAX air cargo traffic (green line, right scale) from 2004 to 2017. We can see some similar dynamics among these three series. For instance, from 2004 to 2007, growth rates slowed down and then slumped in 2008. The simple correlation between U.S. real GDP growth and total L.A. seaport container volume growth is 0.55 and

that between U.S. real GDP growth and total LAX air cargo volume growth is 0.48, meaning in both cases that there is a fair correlation.

Figure 6 shows the quarterly growth rates of U.S. real imports (blue line, left scale), L.A. seaport cargo traffic imports (red line, right scale), and LAX air cargo traffic imports (green line, right scale) from 2004 to 2017. The simple correlation between U.S. real imports growth and L.A. seaport container imports volume growth is 0.71, meaning these two activities are highly correlated and L.A. import growth is a great indicator of overall import growth in the nation. The correlation between U.S. real imports growth and LAX air cargo imports volume growth is 0.37, meaning these two activities are somewhat correlated, and therefore air cargo import growth is not as indicative of national import activity.

Figure 7 shows quarterly growth rates of U.S. real exports (blue line, left scale), L.A. seaport cargo traffic exports (red line, right scale), and LAX air cargo traffic exports (green line, right scale) from 2004 to 2017. Between U.S. real exports growth and L.A. seaport container exports

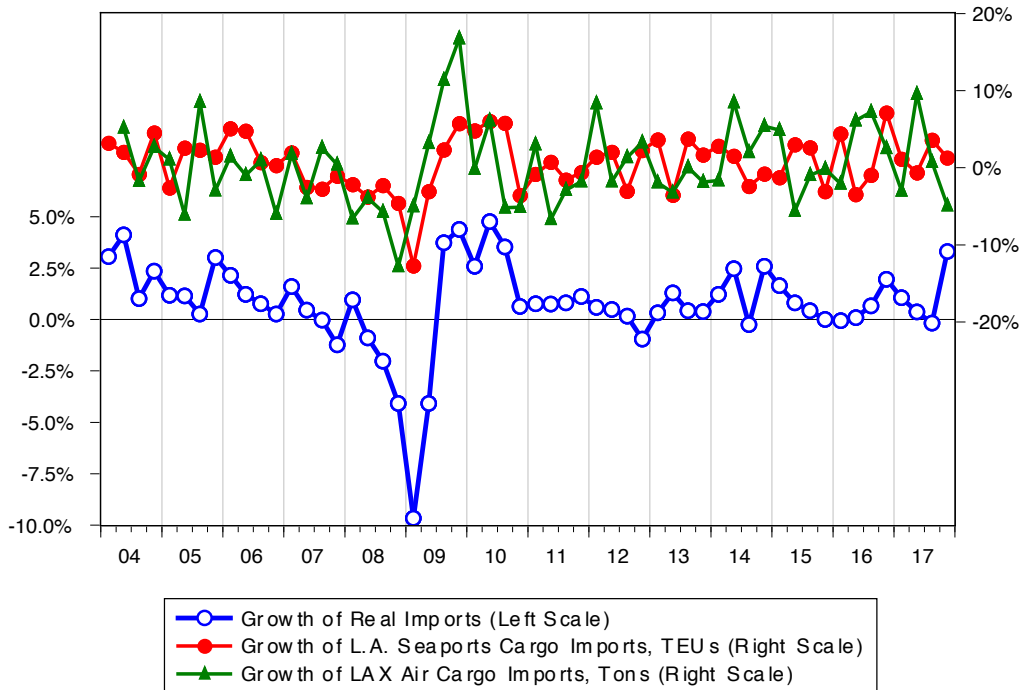
Figure 5 Quarterly Growth Rates of Real GDP, Total L.A. Seaports Cargo, and Total LAX Air Cargo



Source: Bureau of Economic Analysis, Ports of Los Angeles and Long Beach, and LA World Airports

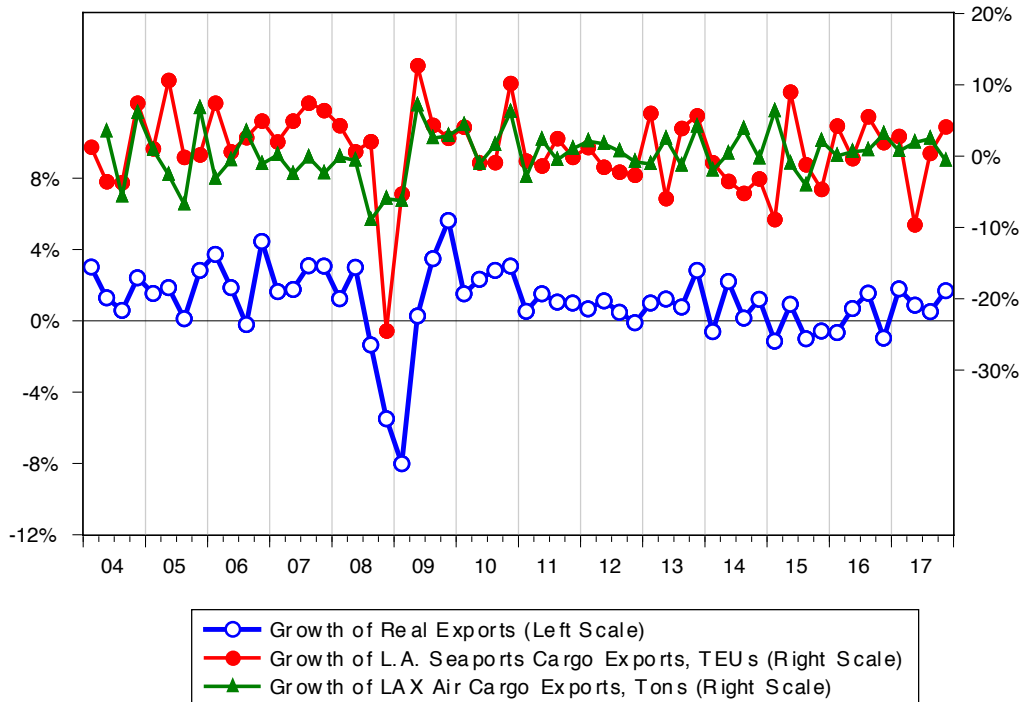
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Figure 6 Quarterly Growth Rates of Real Imports, L.A. Seaports Cargo Imports, and LAX Air Cargo Imports



Source: Bureau of Economic Analysis, Ports of Los Angeles and Long Beach, and LA World Airports

Figure 7 Quarterly Growth Rates of Real Exports, L.A. Seaports Cargo Exports, and LAX Air Cargo Exports



Source: Bureau of Economic Analysis, Ports of Los Angeles and Long Beach, and LA World Airports

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volume growth, the simple correlation is 0.56, meaning these two activities are fairly correlated. As with the imports, the correlation between U.S. real exports growth and LAX air cargo exports volume growth is 0.38, meaning these two activities are less correlated, although there is still a correlation. As a rule, L.A. seaport activity is more closely correlated to national trade activity than air cargo activity.

How Does International Trade Impact the L.A. Economy?

Now let's take a look at how international trade impacts the L.A. economy by its sector employment growth. We use a simple regression to examine the correlation between the two with the following equation for the annual growth rate from 2004 to 2017:

$$\text{L.A. Sector Payroll Jobs Growth Rate} = \alpha + \beta \times \text{L.A. Seaport Cargo Traffic Growth Rate}$$

Table 1 lists the summary correlation. The first two rows show that L.A. seaport cargo annual traffic growth is fairly correlated with U.S. (0.59) and L.A. (0.53) annual payroll employment growth.

For the L.A. sector employment correlations, we list them by the magnitude of correlation. We find that the retail trade (0.72), professional and business services (0.68), and wholesale trade (0.68) sectors are highly related to international trade activities, while the financial (0.55), manufacturing (0.51), construction (0.50), and transportation and warehousing (0.47) sectors are fairly related.

Note that as we mentioned in the previous section, L.A. seaport trade volume growth is highly related to the whole U.S. economic growth. Therefore, we cannot fully distinguish in Table 1 whether the responsiveness of sector job growth is driven by seaport trade or the U.S. economy as a whole. When we replace L.A. seaport cargo with LAX air cargo, the correlation decline significantly. This indicates that in terms of influence on L.A. local jobs, L.A. seaport trade is more important than LAX air cargo trade.

In contrast, L.A.'s information, leisure and hospitality, government, and education and health sectors are less related to international trade and the U.S. economy. As the world capital of the entertainment industry, L.A.'s information sector is naturally unique. The leisure and hospitality sector is much more related to passenger traffic than cargo. It is not surprising to see that the government sector is less related to international trade and the U.S. economy because

Table 1 Correlation Between L.A. Seaport Cargo Growth and L.A. Sector Job Growth

Total US or LA Payroll Employment	Simple Correlation	
Total US Nonfarm	0.59	
Total L.A. Nonfarm	0.53	
LA Sector Employment	Simple Correlation	% of Total L.A. Employment
Retail Trade	0.72	9.7%
Professional & Business Services	0.68	13.7%
Wholesale Trade	0.68	5.1%
Financial	0.55	5.1%
Manufacturing	0.51	7.9%
Construction	0.50	3.1%
Transportation & Warehousing	0.47	3.9%
Information	0.44	5.3%
Leisure & Hospitality	0.34	11.5%
Government	-0.17	12.9%
Education & Health	-0.38	17.9%

government engages in nonmarket activities and usually lag to business cycle. The education and health sector is related to aging demographics and the government’s health care policies, making it less responsive to the business cycle.

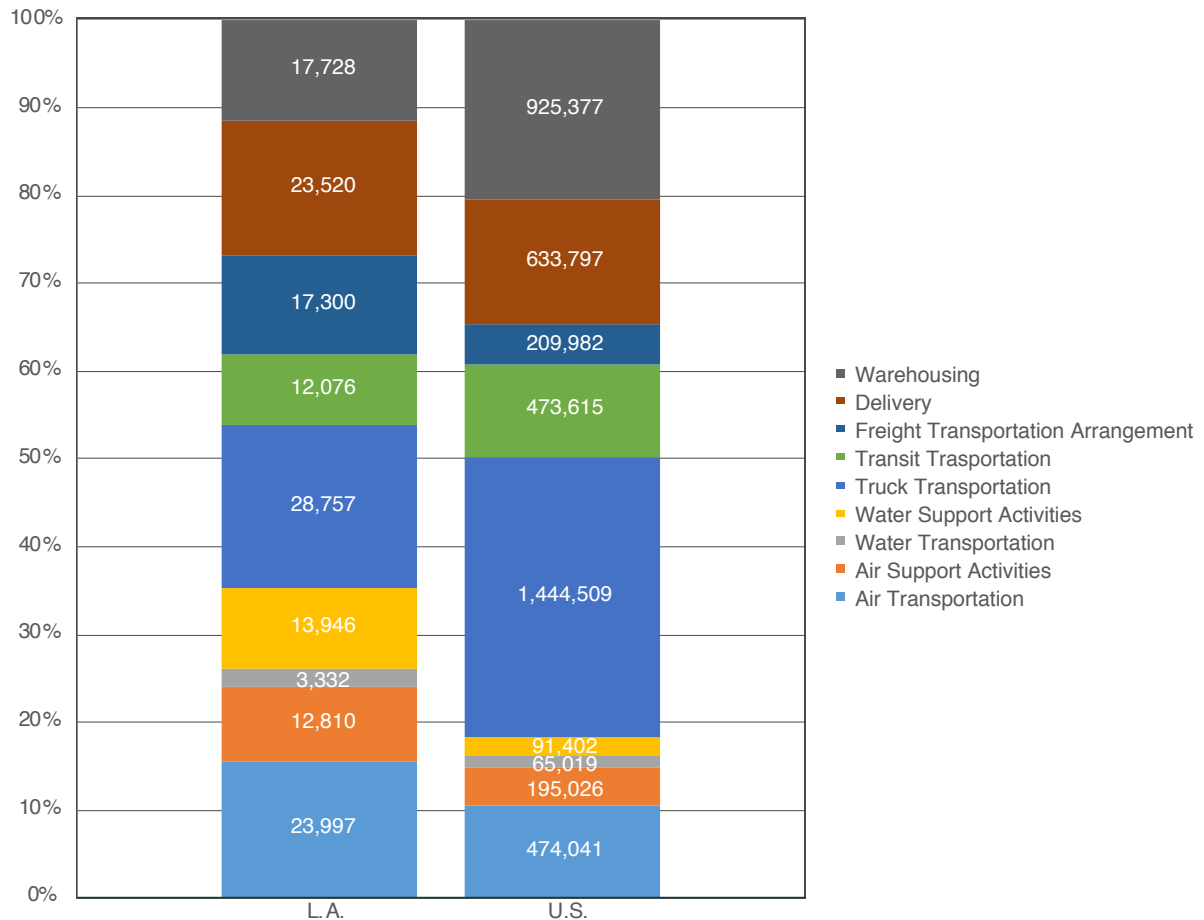
A Detailed Look at L.A. Transportation and Warehousing Sector Jobs and Wages

Before analyzing Table 1, we would assume that international trade should be mostly related to jobs in the transportation and warehousing sector and the wholesale trade sector in L.A. For the wholesale sector, indeed it shows a relatively high correlation. But it is a bit surprising to see that the transportation and warehousing sector is not that highly correlated. What is going on? Here we take a closer look at the components of the transportation sector.

Wholesale trade jobs (229,000) account for 5.9% of the total private jobs in Los Angeles County while wholesale jobs account for only 4.9% of the total private jobs in the U.S. as a whole. Transportation and warehousing jobs (177,000) account for 4.1% of total private jobs in L.A., while those same jobs account for 3.7% of jobs across the U.S. The numbers demonstrate that trade-related sectors have more weight in L.A. than in the nation due to the higher percentage of the workforce accounted for in each case.

Figure 8 shows the subsectors of jobs in the transportation and warehousing sector for L.A. County and the U.S. We can guess that air transportation and its support activities, water transportation and its support activities, and freight transportation arrangement are directly related to international trade through international airports and seaports. We see that these sectors hire a higher percentage of workers in

Figure 8 Sub-Sector Jobs of Transportation and Warehousing Sector, 2016



Source: Quarterly Census of Employment and Wages
 Note: The numbers in the graph are jobs.

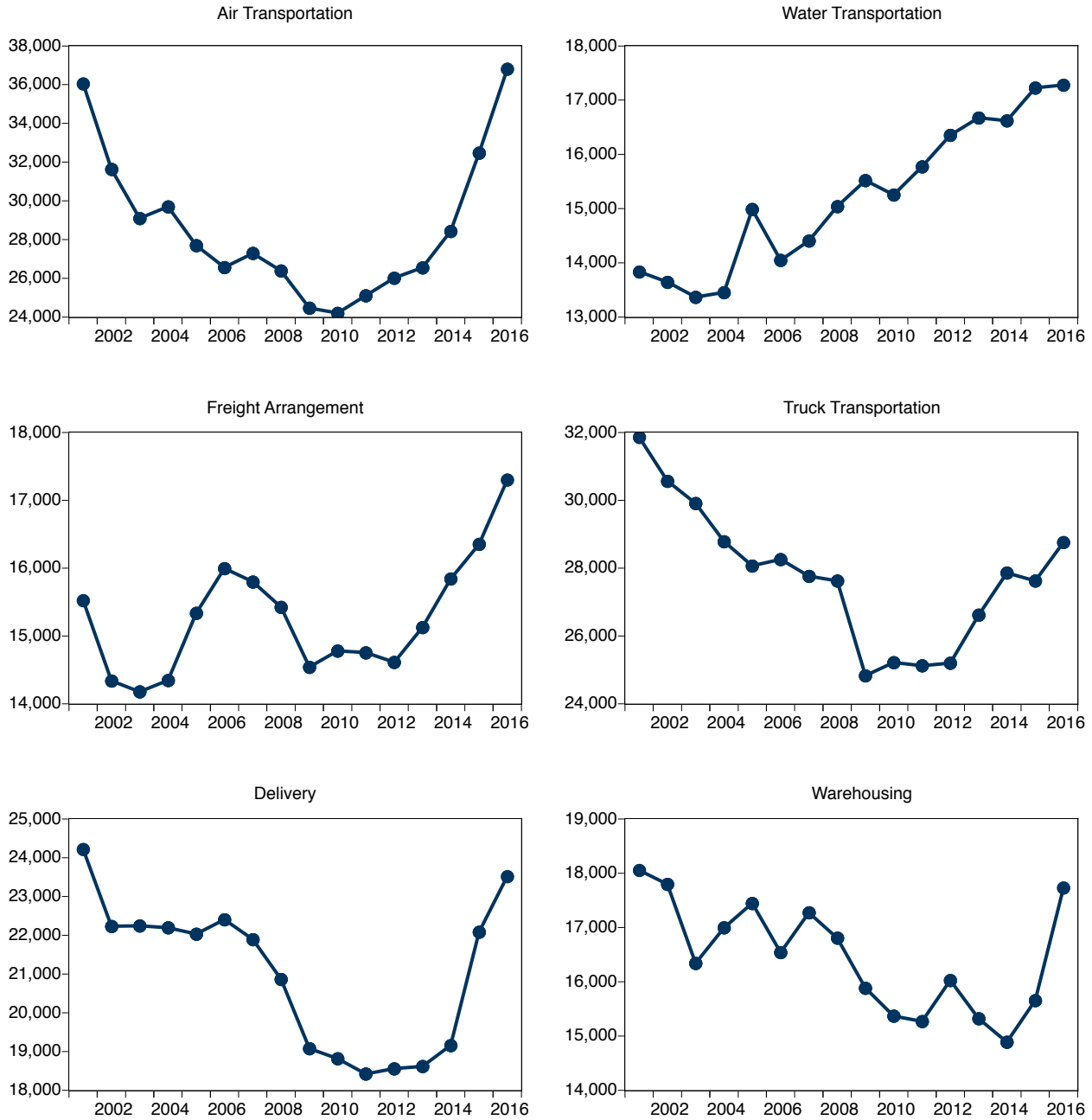
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L.A. than in the nation. Again, it echoes the idea that international trade is more important to L.A. than to the nation.

Figure 9 exhibits transportation and warehousing jobs by subsector in L.A County from 2001 to 2016, and Figure

10 presents those in the U.S. By looking at the dynamics of subsectors in Figure 9, we might be able to explain why the transportation and warehousing sector growth is not highly correlated to L.A. seaport cargo growth. Simply put, although the freight transportation arrangement, delivery,

Figure 9 Transportation and Warehousing Jobs in Los Angeles County, 2001 to 2016



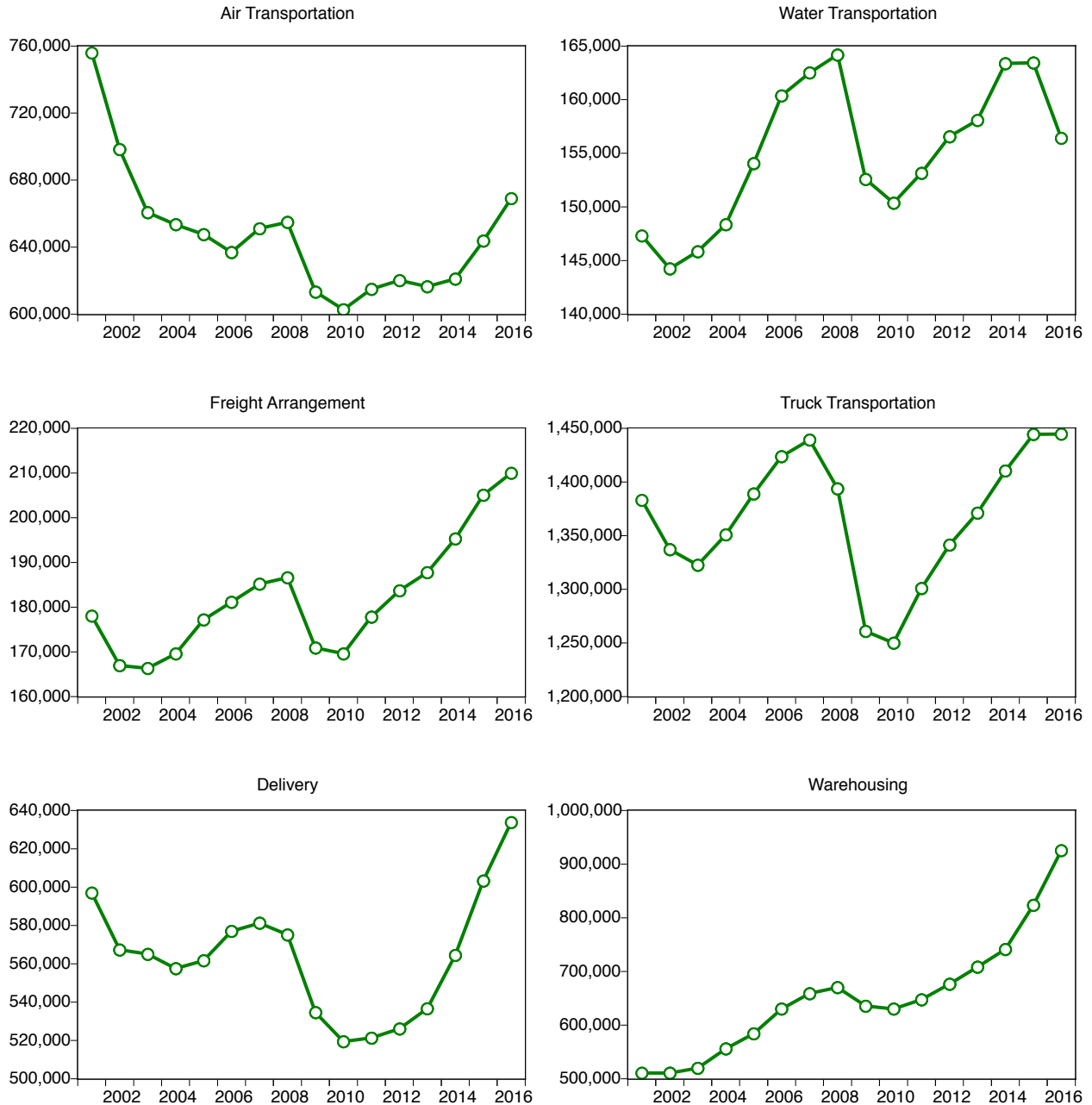
Source: Quarterly Census of Employment and Wages

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and warehousing subsectors do show a similar pattern with L.A. seaport cargo dynamics, the air transportation, water transportation, and truck transportation subsectors behave very differently. Since the sector includes these varying subsectors, the overall correlation will not be strong.

Let's look more closely at some of these divergent subsectors. Air transportation employment in L.A. has seen a soaring recovery over the past four years, surpassing its 2001 peak. The reason might be related to booming tourism and passenger traffic in L.A. (shown in Figure 4). No such

Figure 10 Transportation and Warehousing Jobs in the U.S., 2001 to 2016



Source: Quarterly Census of Employment and Wages

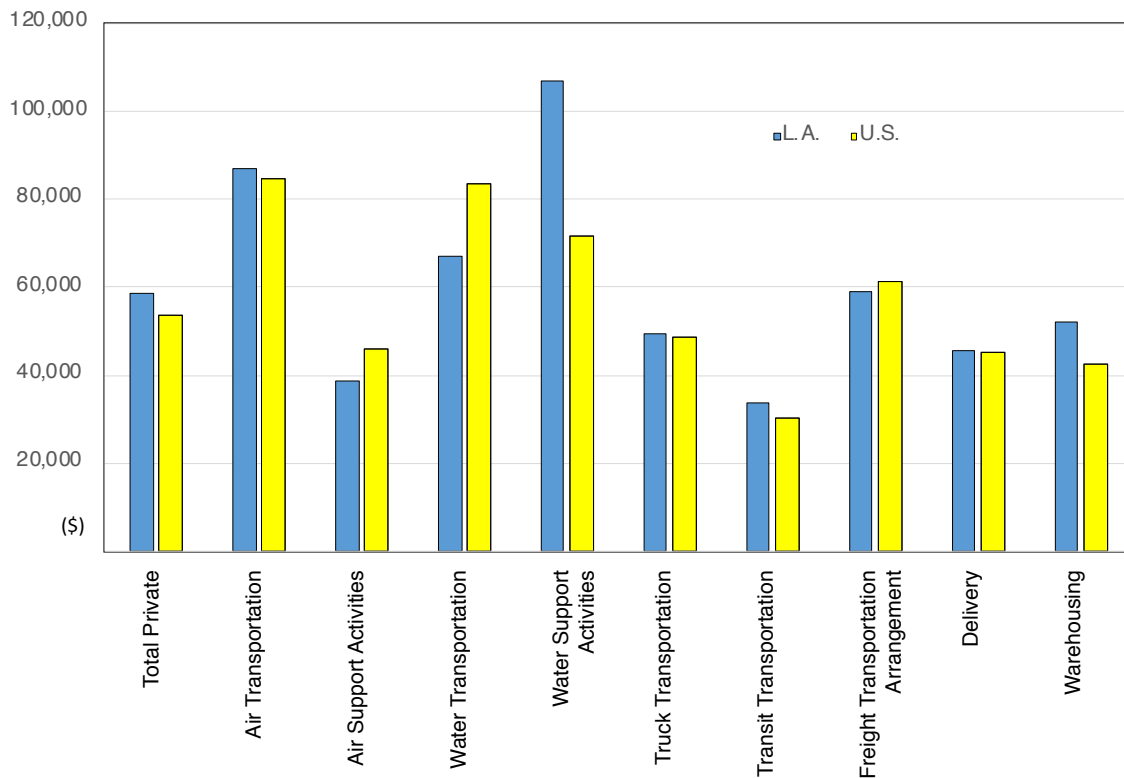
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reason presents itself for the water transportation subsector, however. Why have these jobs continued an increasing trend despite the global financial crisis and trade slump in 2008? It is unclear. The pattern is unique for L.A., though, because the pattern of water transportation jobs in the nation looks much more similar to the L.A. seaport cargo volume activity.

Despite its unusual patterns of L.A. water transportation jobs, it is clear that the growth and health of international trade is very important to L.A. because of its large and growing share of the total local jobs. Furthermore, it is worth noting that air transportation jobs and water transportation

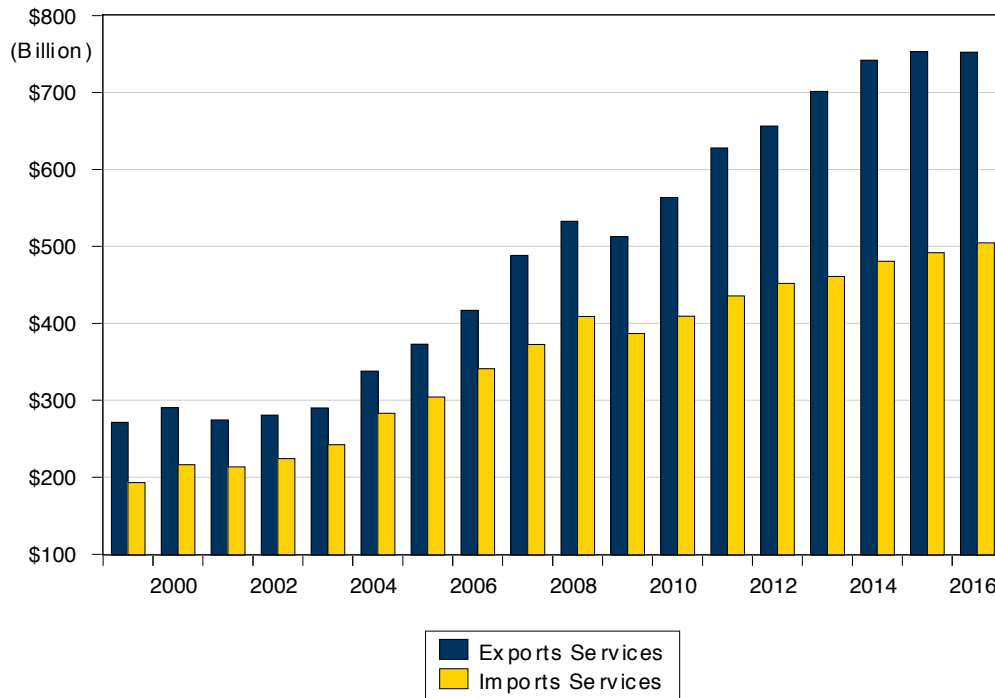
jobs in L.A. are very well paid positions, as shown in Figure 11. In L.A. in 2016, there were 24,000 air transportation jobs with an average annual wage of \$87,000 (total wage: \$2.1 billion) and 14,000 water transportation supporting activities jobs, e.g. dock workers, with an annual average wage of \$107,000 (total wage: \$1.5 billion). We believe that workers with high wages and salaries will create a bigger economic multiplier effect through their higher purchasing power. In other words, international trade will play a bigger role in the L.A. economy than in other parts of the country. L.A. benefits more from prosperous trade while it would suffer more from a trade war than would the nation as a whole.

Figure 11 Annual Wage in Transportation and Warehousing Sector by Its Subsectors in L.A. and the U.S., 2016



Source: Quarterly Census of Employment and Wages

Figure 12 Nominal Exports and Imports Services in the U.S., 1999 to 2016



Source: Bureau of Economic Analysis

Exports Services

Despite the chronic trade deficit as a whole and in tangible goods as illustrated in Figures 2 and 3, the U.S. in fact has had a trade surplus in services with the world for the past two decades as shown in Figure 12. Export growth will directly contribute to GDP growth. Figure 13 (next page) exhibits selected subsectors in export services in the U.S.: seaports, airports, travel and education, and intellectual property charges, including movie and TV program sales overseas. We can see mostly increasing trends over the past 16 years. Because of its prominent seaports and airports, balmy weather, and being the center of the world entertainment industry, we suggest that L.A. shares a bigger piece of the pie of these services exports, which shows once again how important international trade is to its economy.

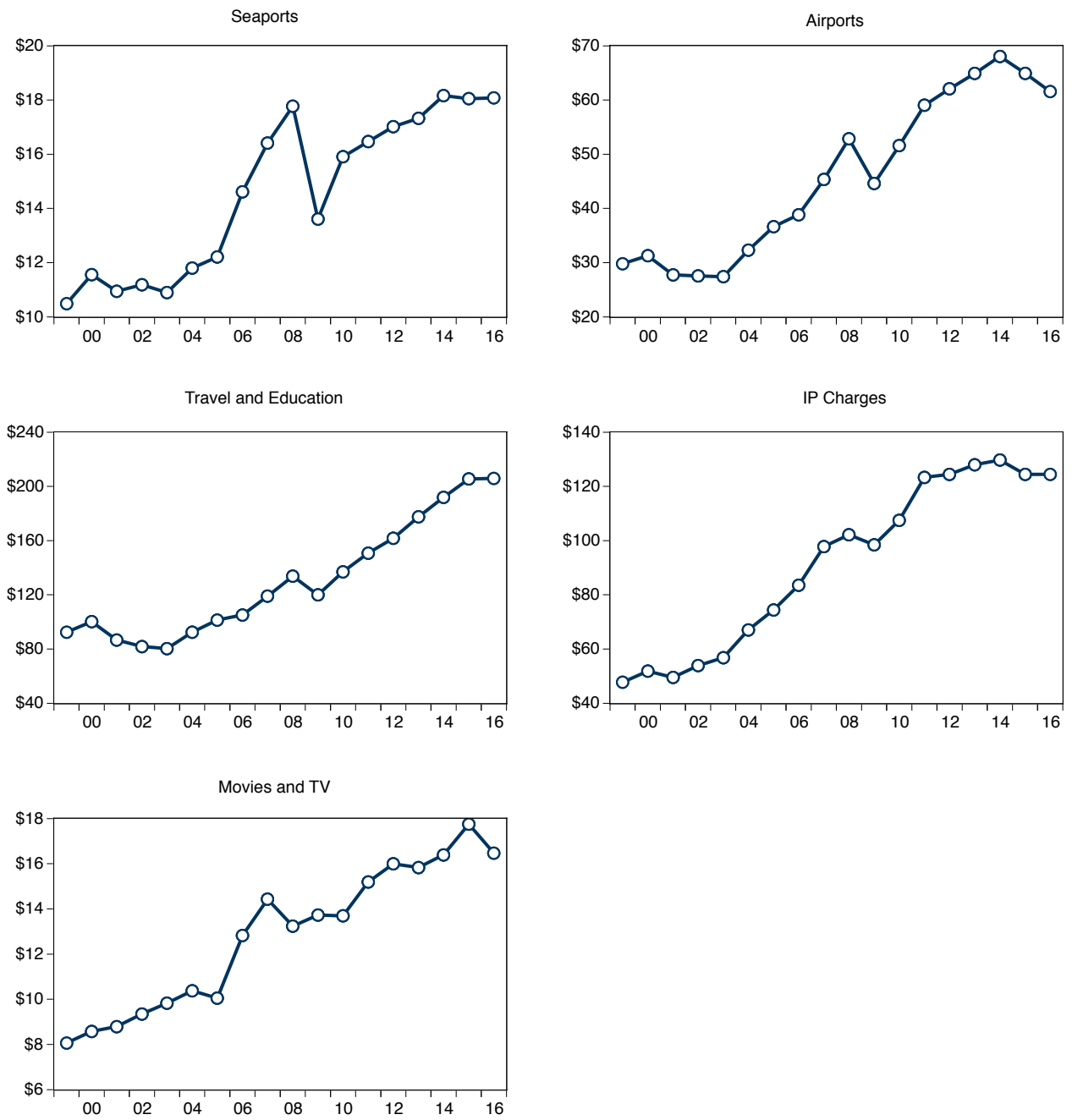
Conclusions

The takeaways of the report are as follows:

- Los Angeles is a prominent gateway city for seaports cargo, air cargo, and airline passengers. International trade is more important to the L.A. economy than to the nation’s. L.A. will benefit more from prosperous trade while it will suffer more from a trade war.
- We find that both L.A. seaport and air cargo growths are useful indicators of the U.S. GDP growth. L.A. cargo import and export volumes are highly correlated to the nation’s real imports and exports.
- International trade and the U.S. economy have differentiated correlations with L.A. sector job growth. The retail trade, professional and business services, and wholesale trade are more correlated to the international trade and business cycle than the education and health, and government sectors.

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Figure 13 Nominal Exports Services for Selected Subsectors in the U.S., 1999 to 2016, Billion Dollar.



Source: Bureau of Economic Analysis