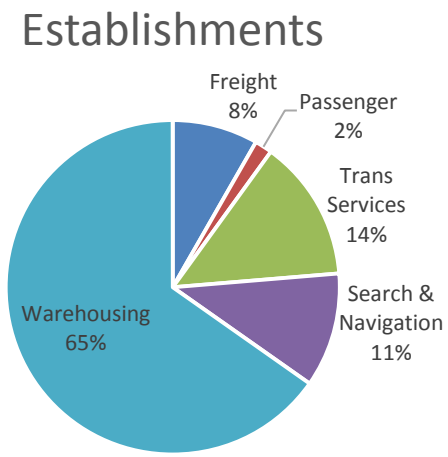
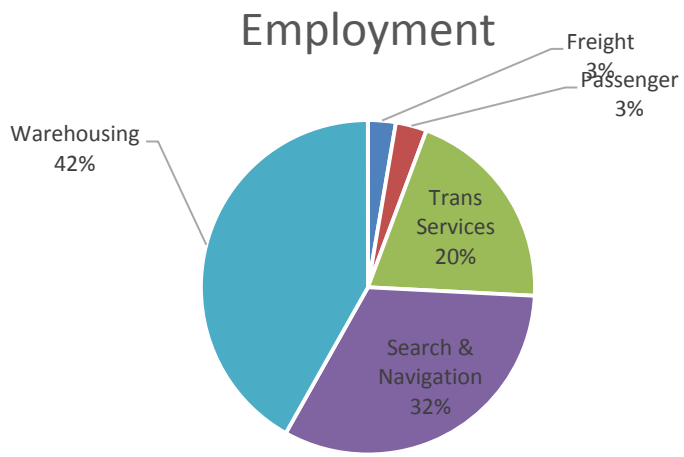
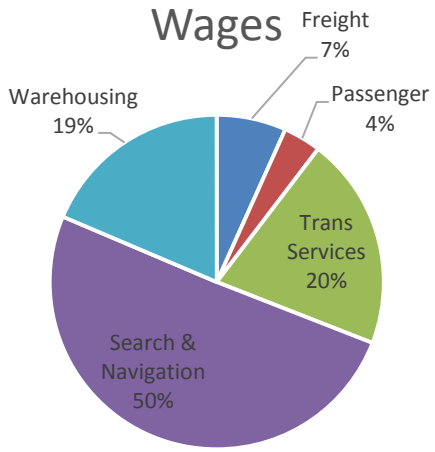
California's Ports: Current size, Past Performance, Future Challenges

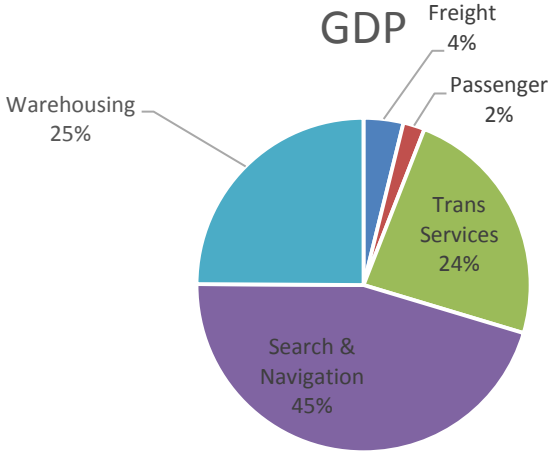
Charles S. Colgan PhD
Director of Research
Center for the Blue Economy
Middlebury Institute of International Studies at Monterey

The marine transportation sector is comprised of 5 sectors

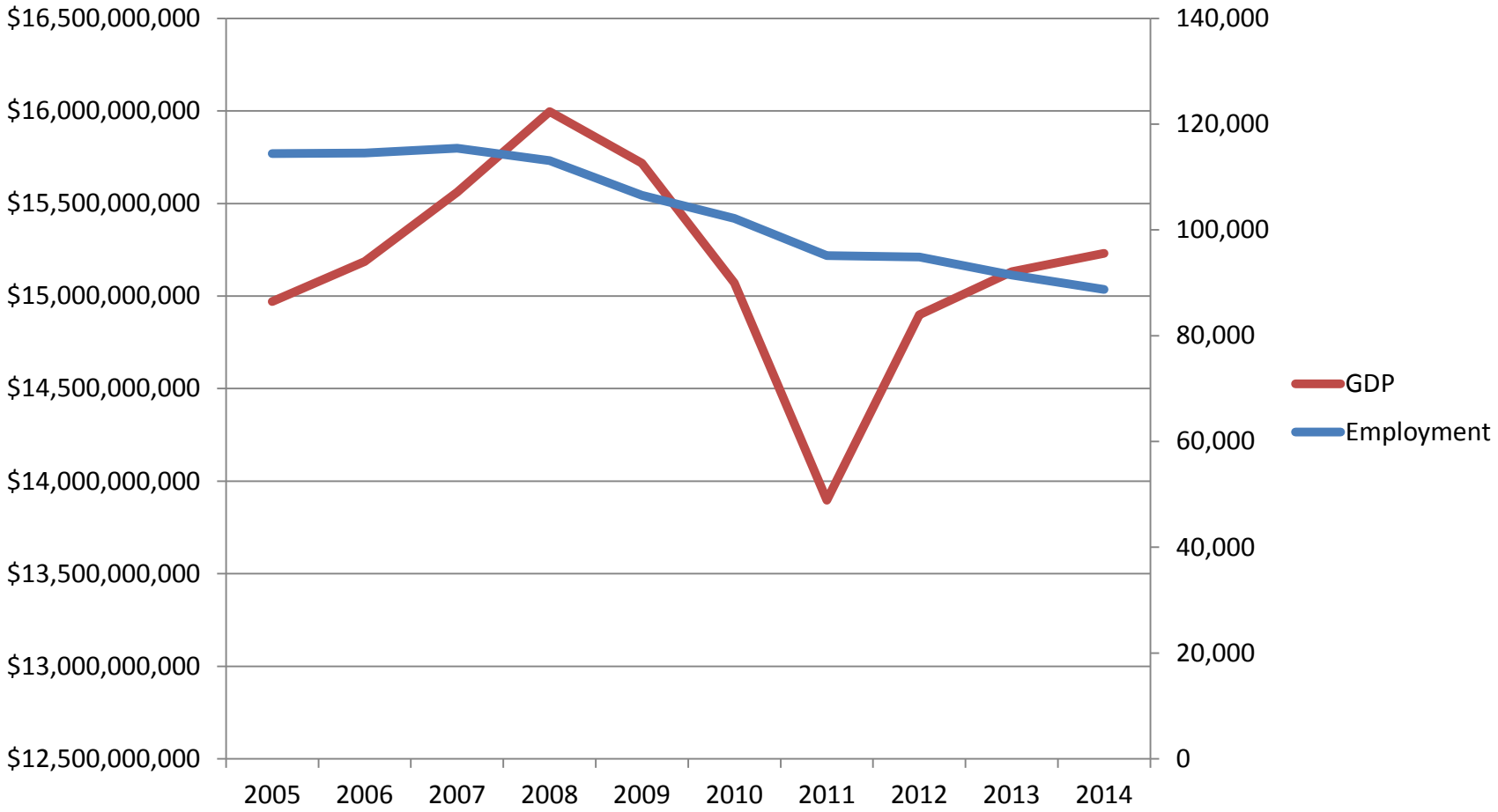




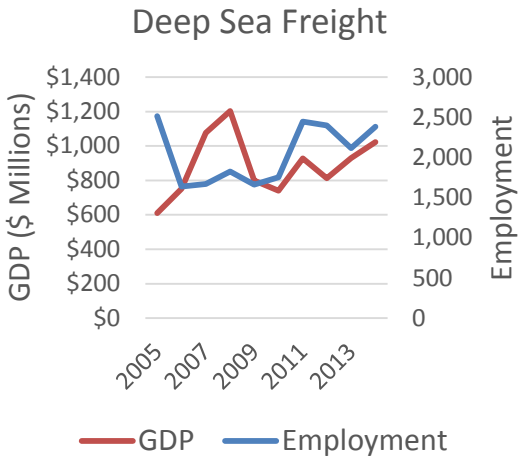


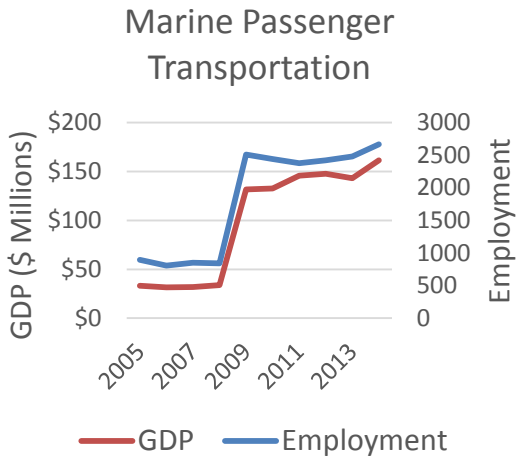


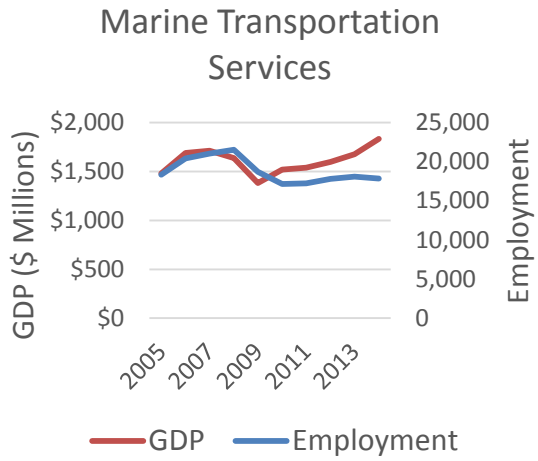
California Ocean Transportation Sector: 2005-2014

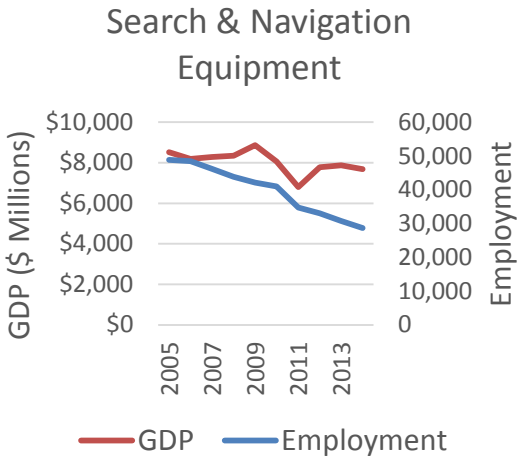


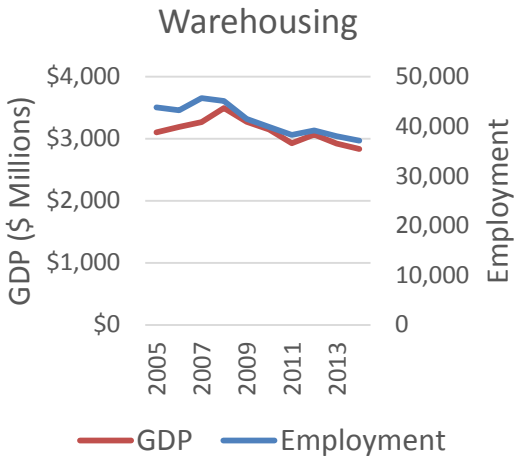
Declines primarily in Search & Navigation Equipment and Warehousing



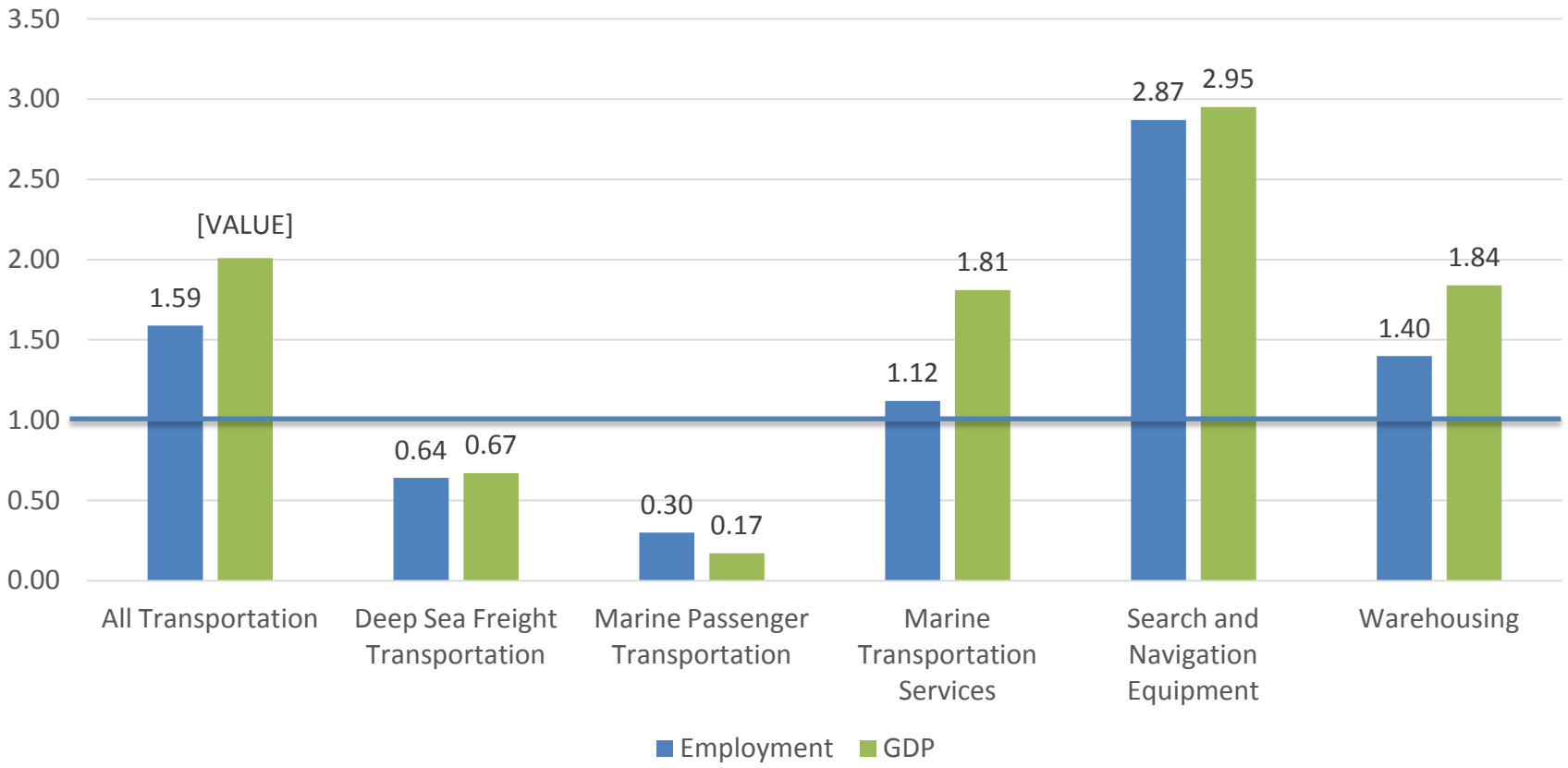




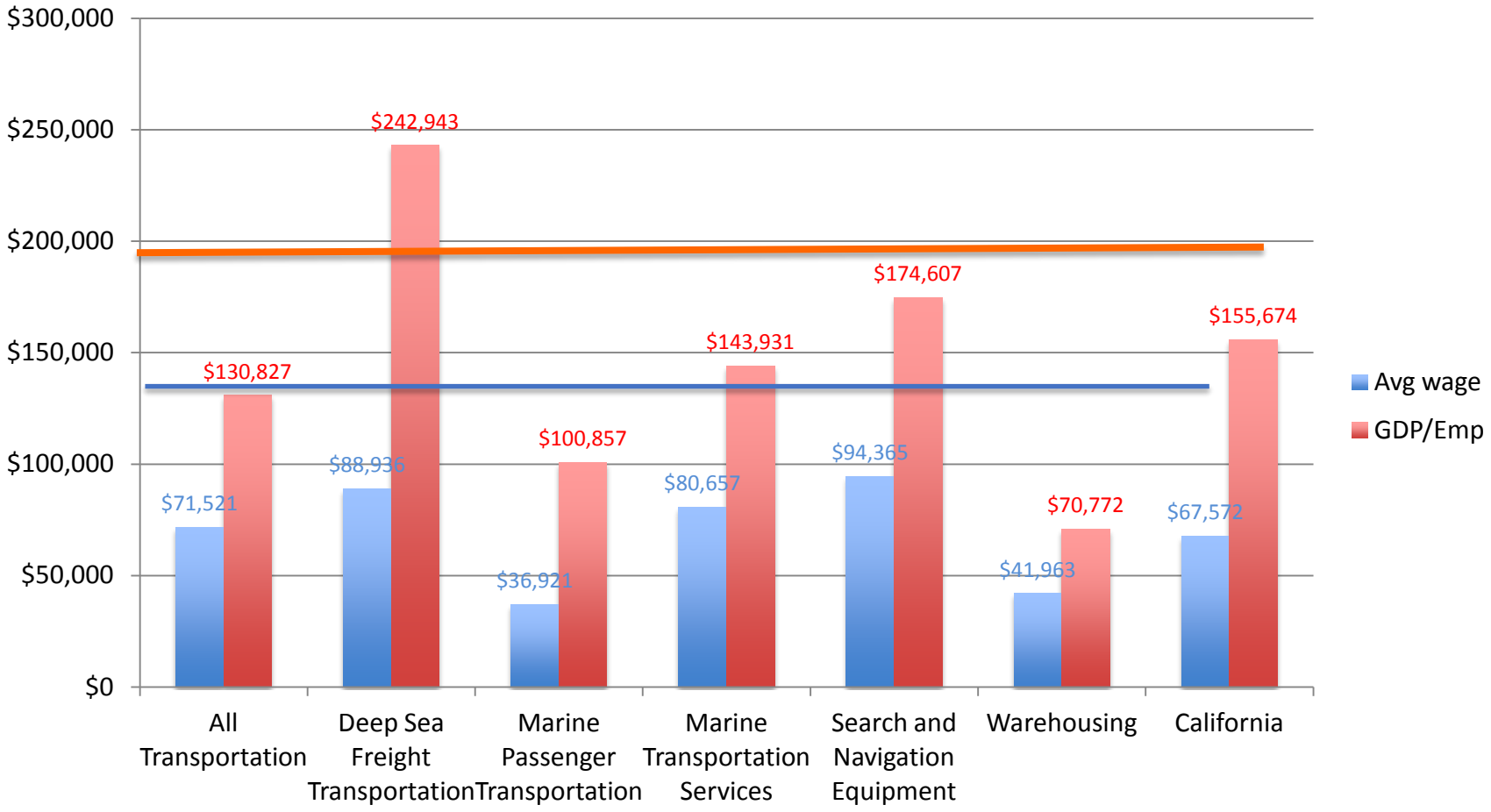




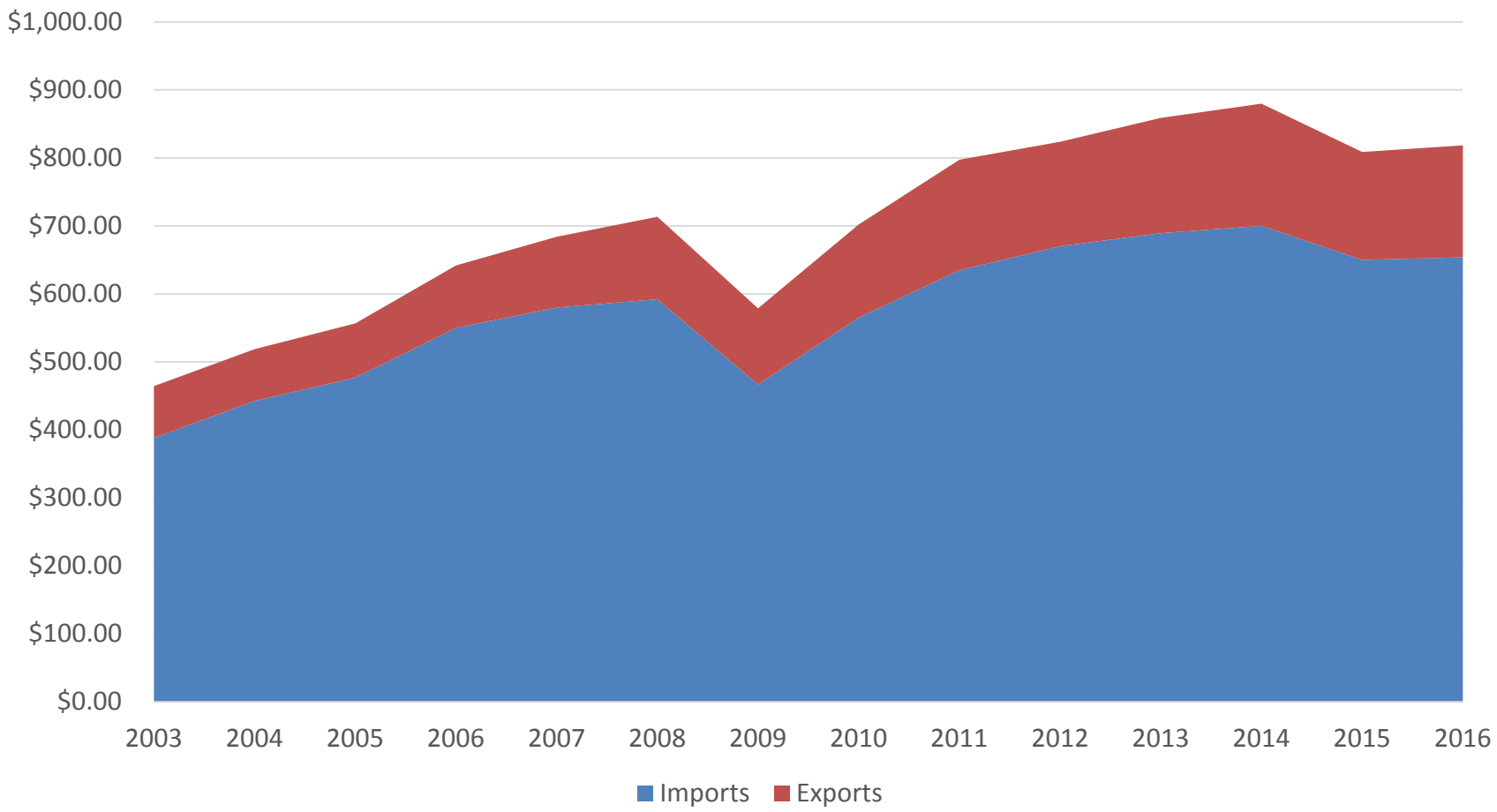
California's ocean transportation industries vary in share of the ocean economy relative to the US



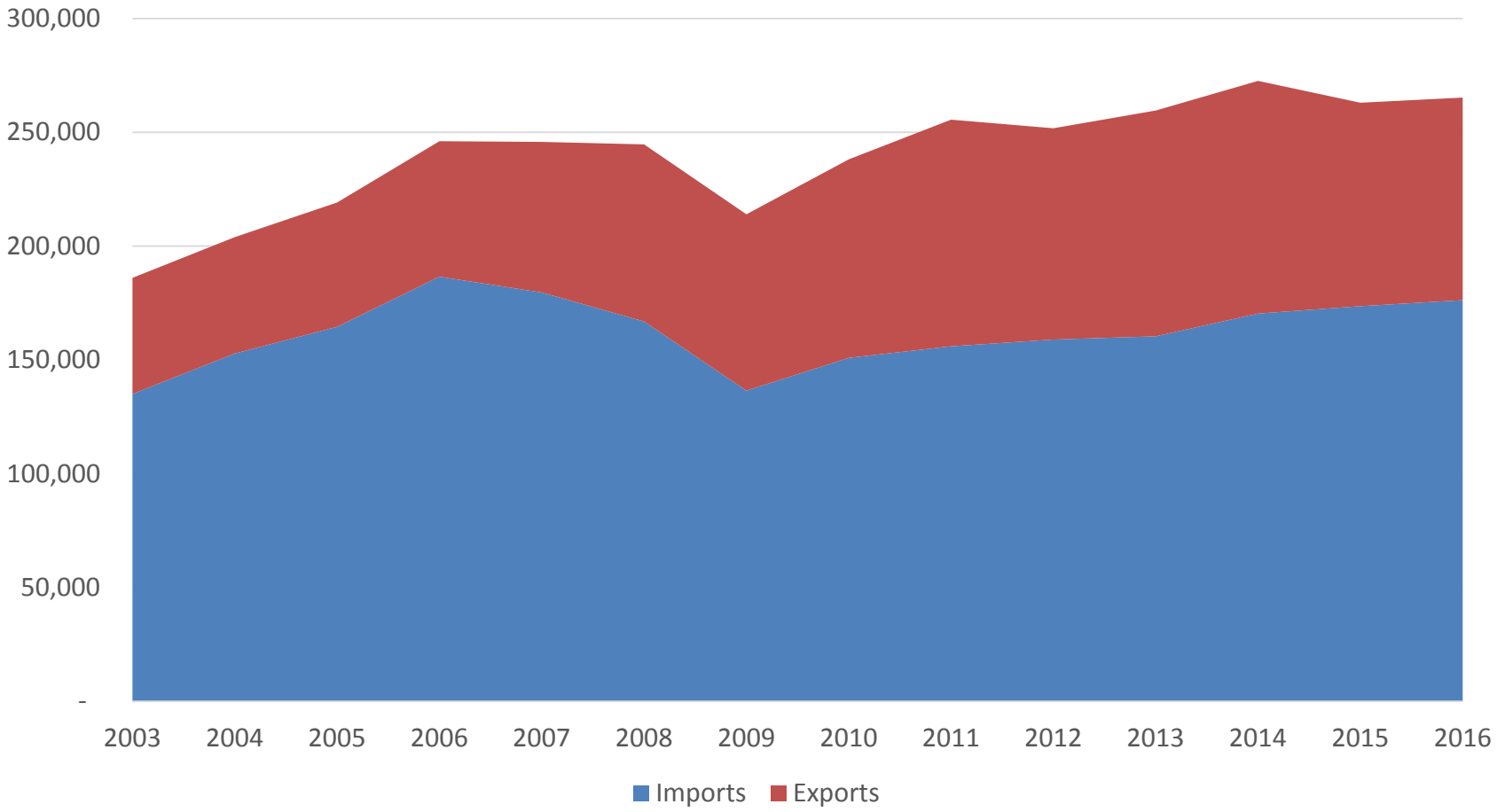
Average wages and GDP per employee in ocean transportation are higher than California averages overall and three of five industries



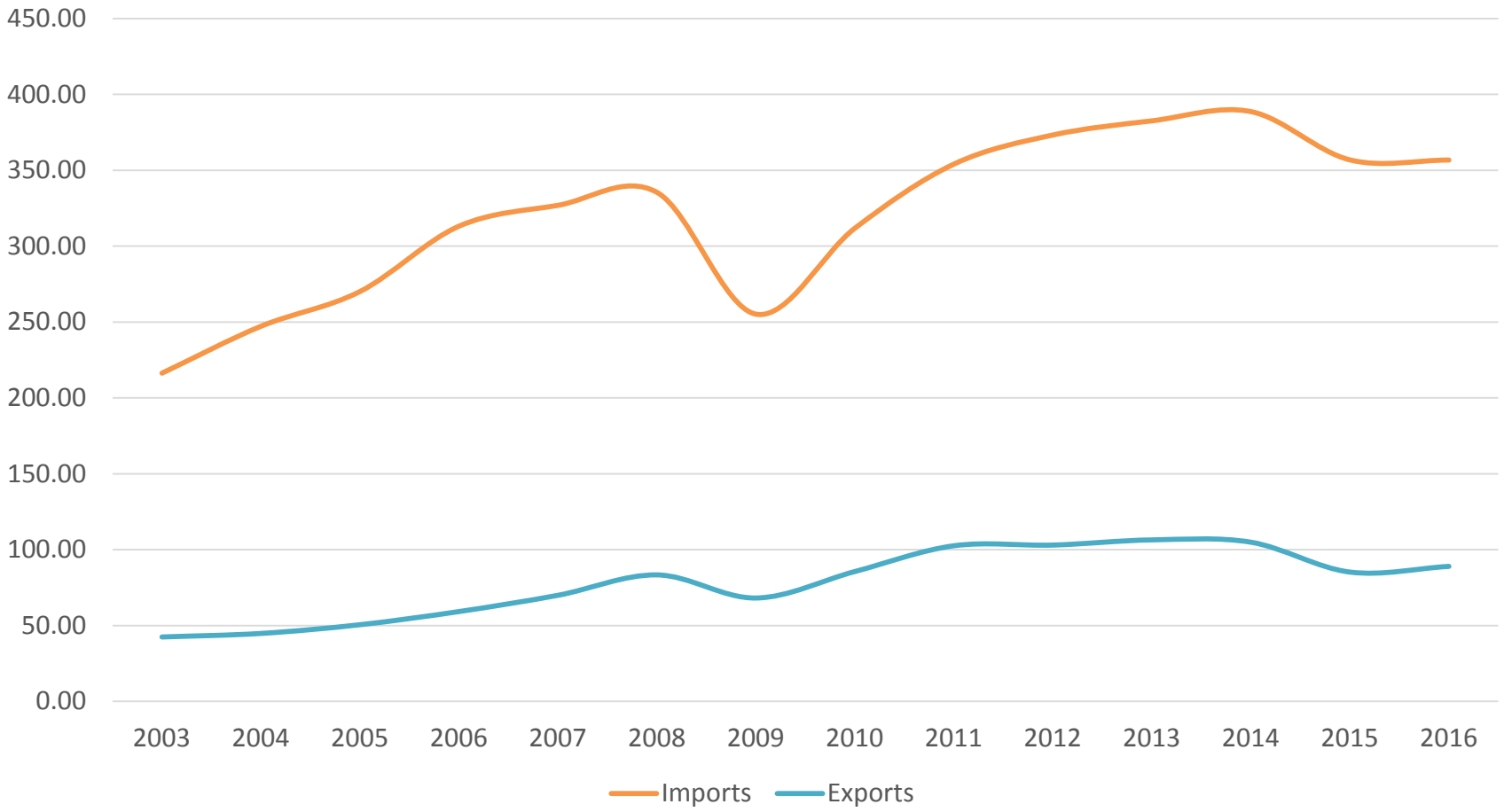
Value of imports dominates value of exports



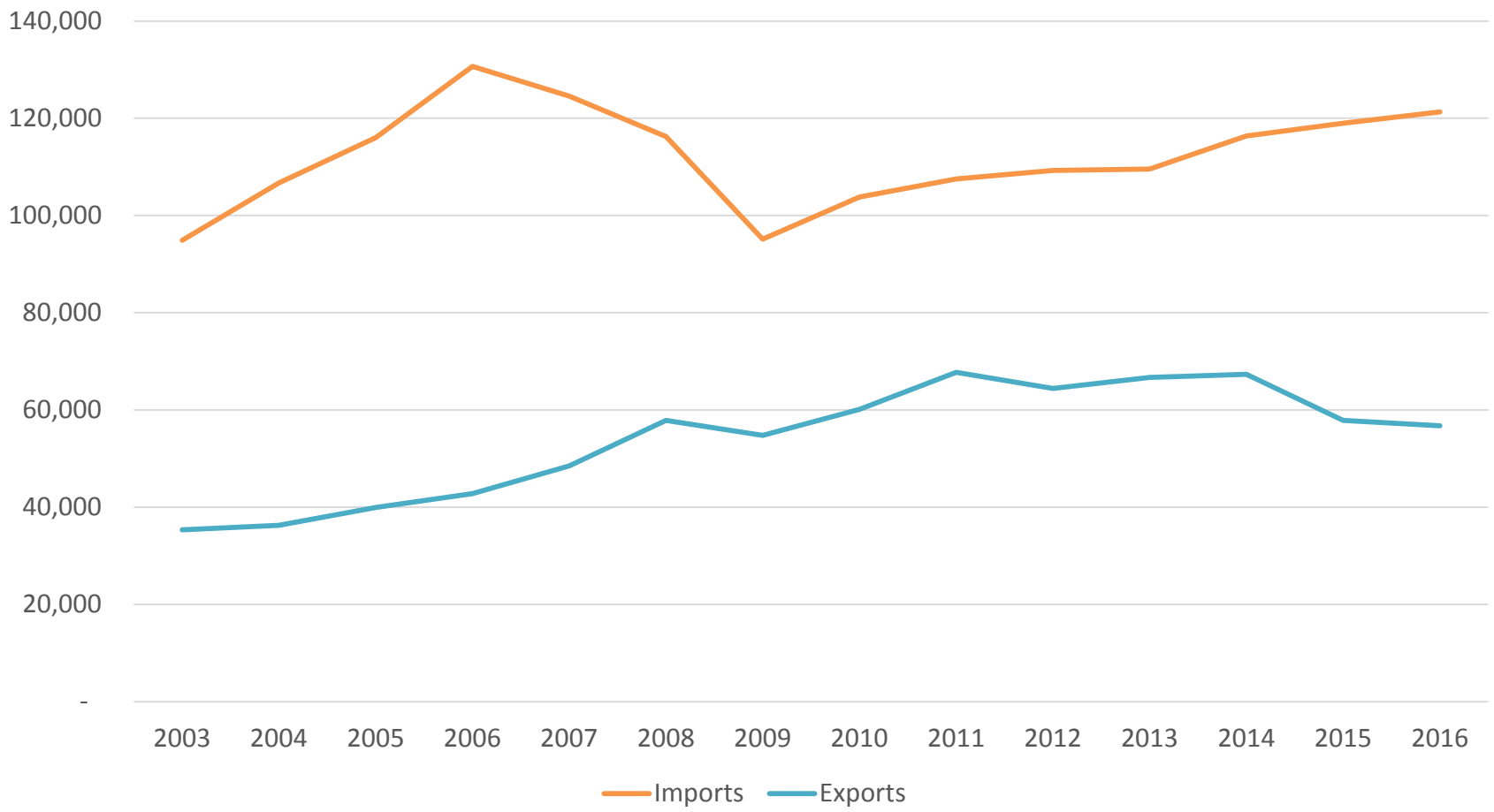
Imports and Exports are more balanced by weight but imports still dominate



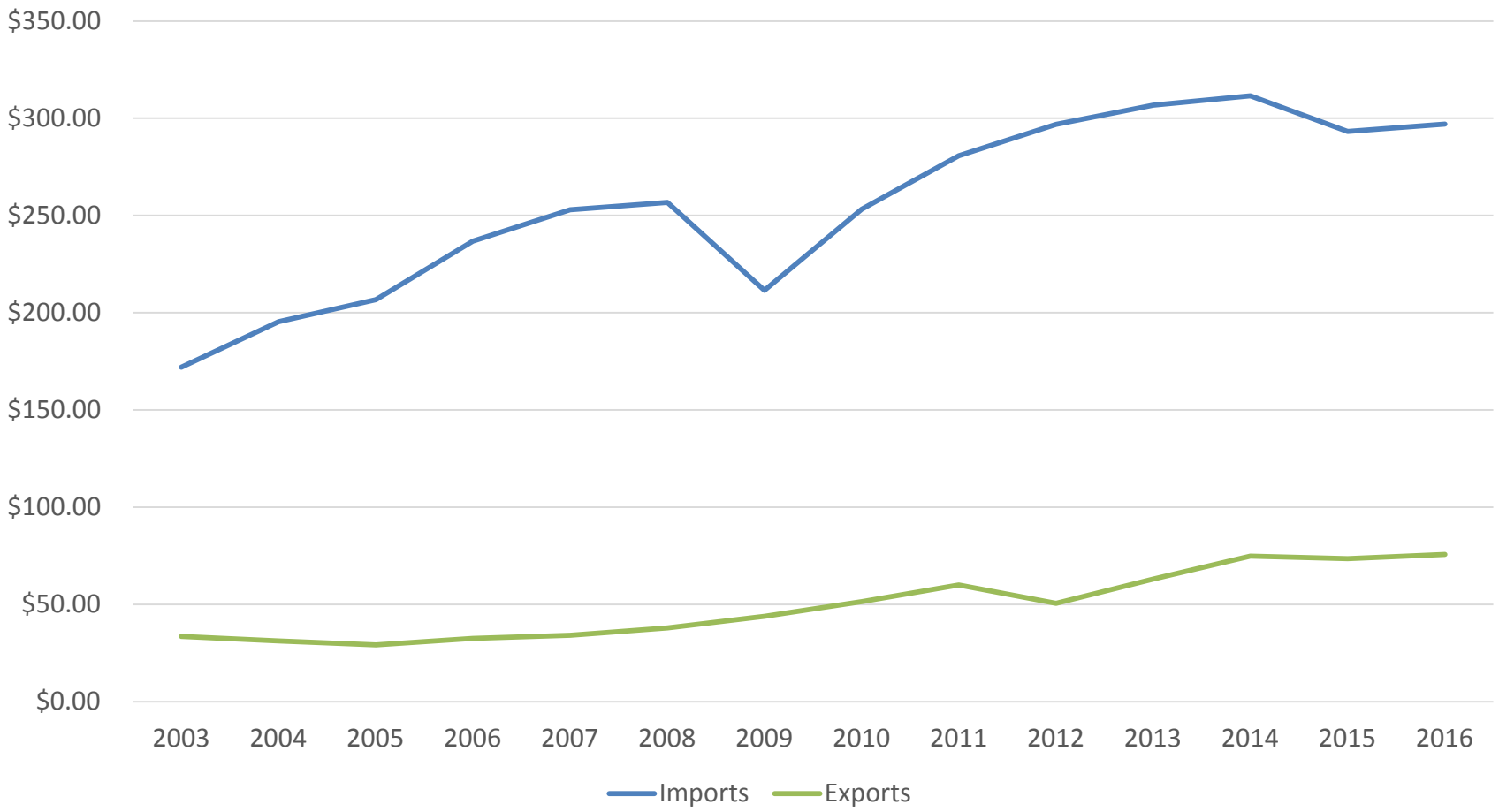
The value of exports and imports of non-container traffic declined in the past 2 years for the first time since the recession



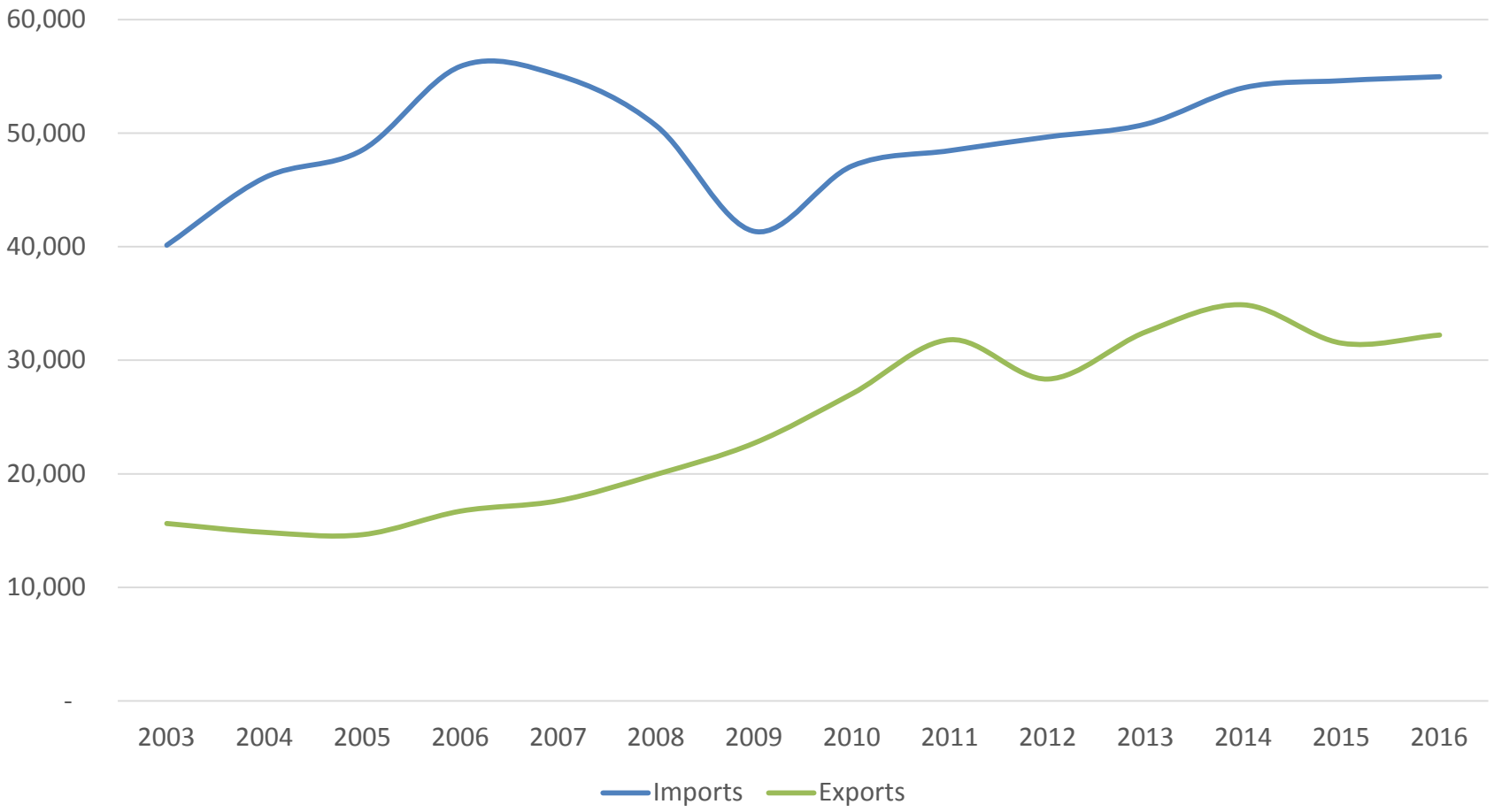
Weight of imports via non-container traffic has risen, but exports have fallen



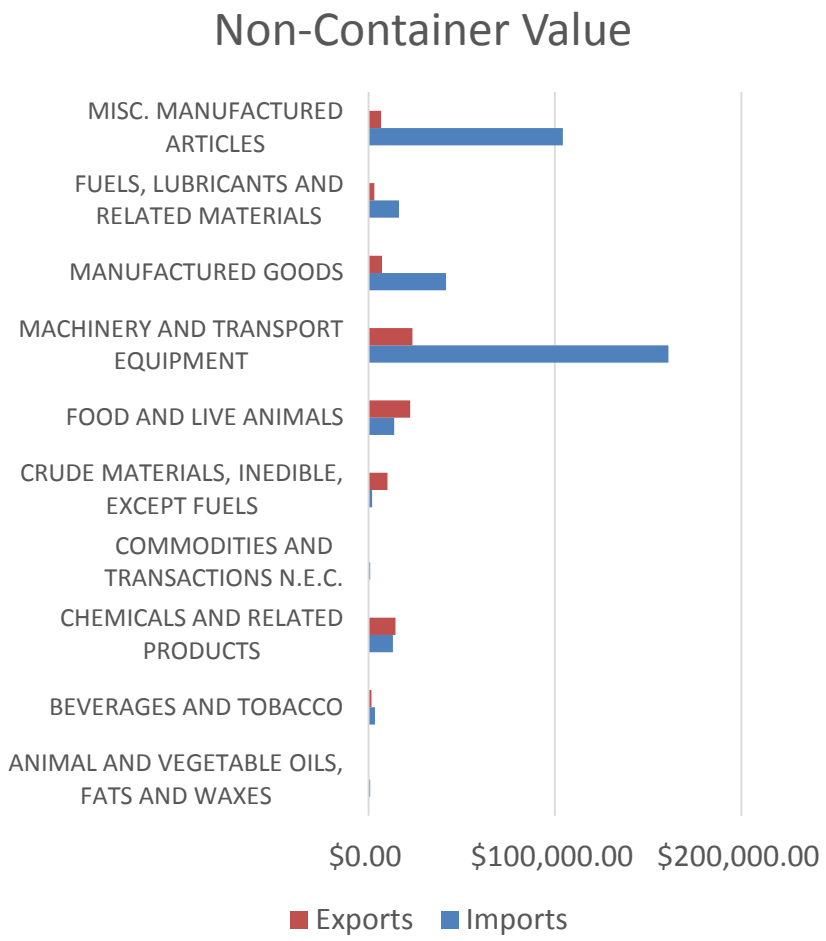
Container export values have held up, while import values dropped in 2015

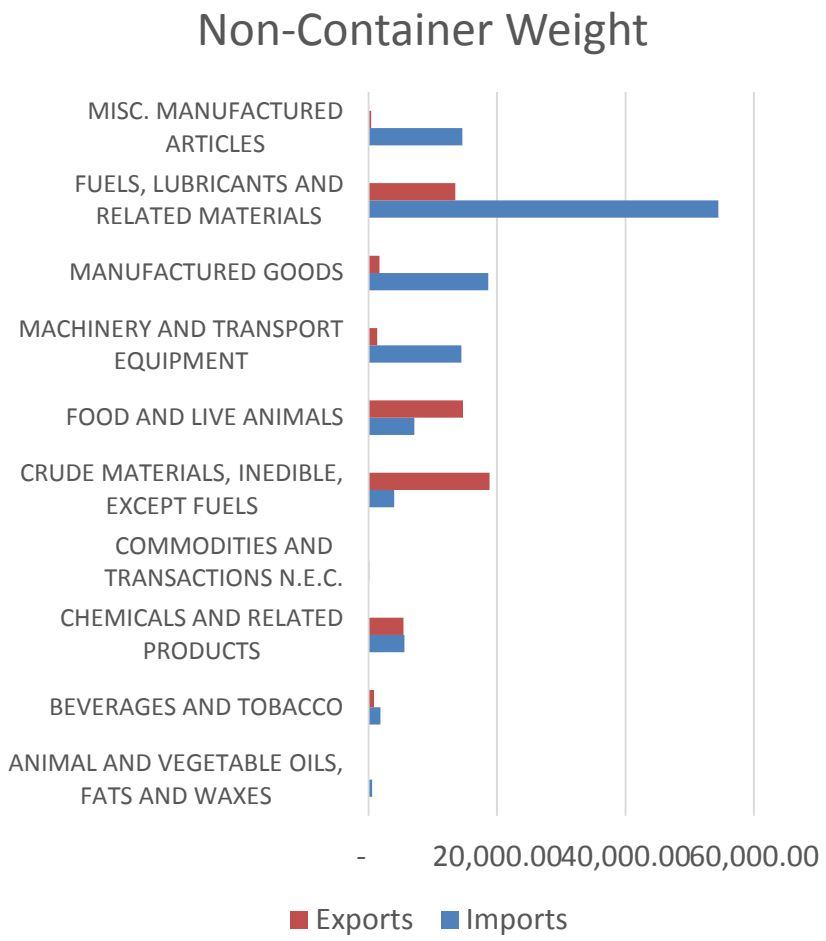


Container imports have mirrored the U.S. economy almost exactly, while exports have grown erraticly

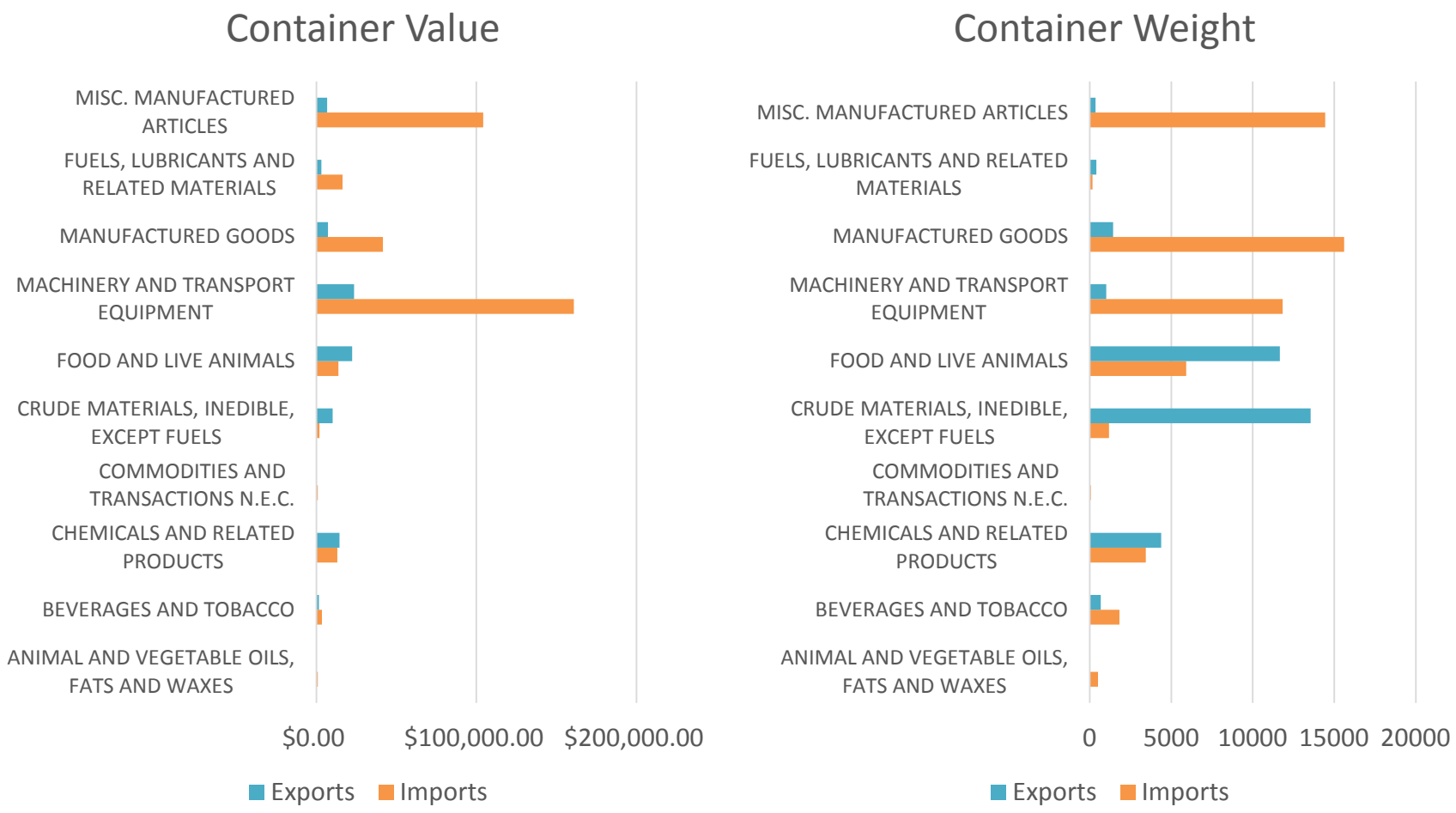


Manufactured goods dominate imports by value, but oil dominates imports by weight
Food, raw materials, and machinery are key exports

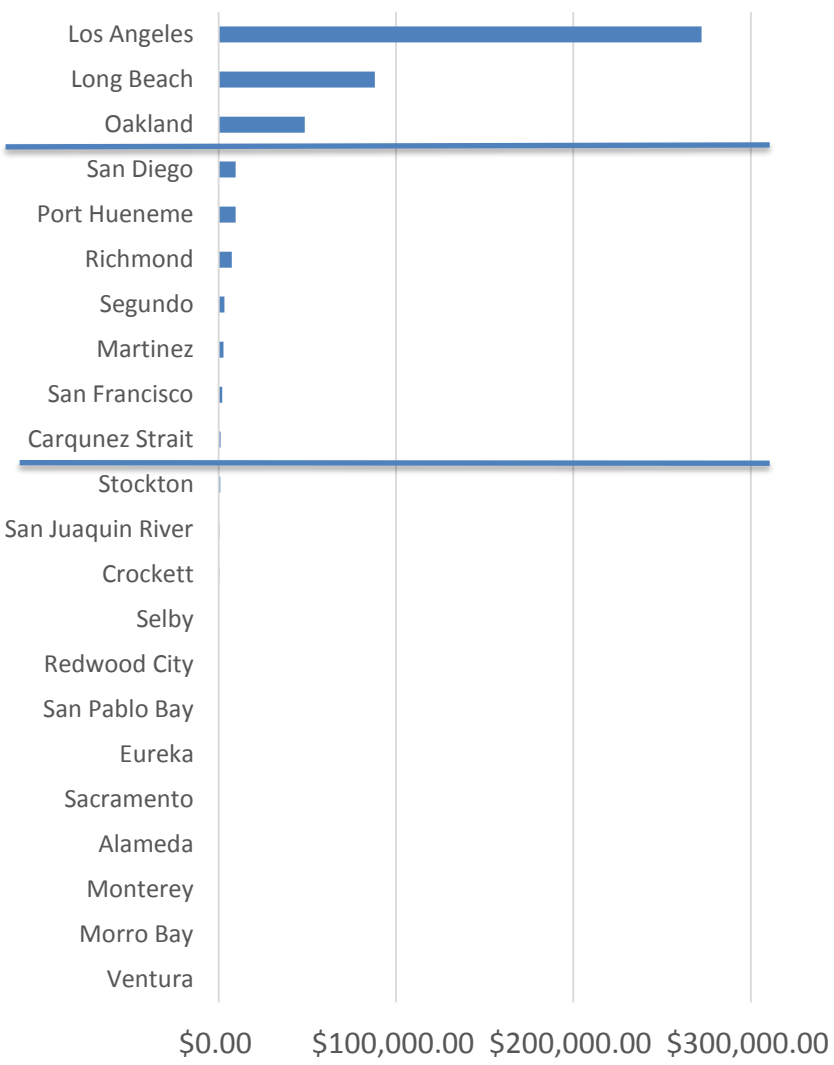


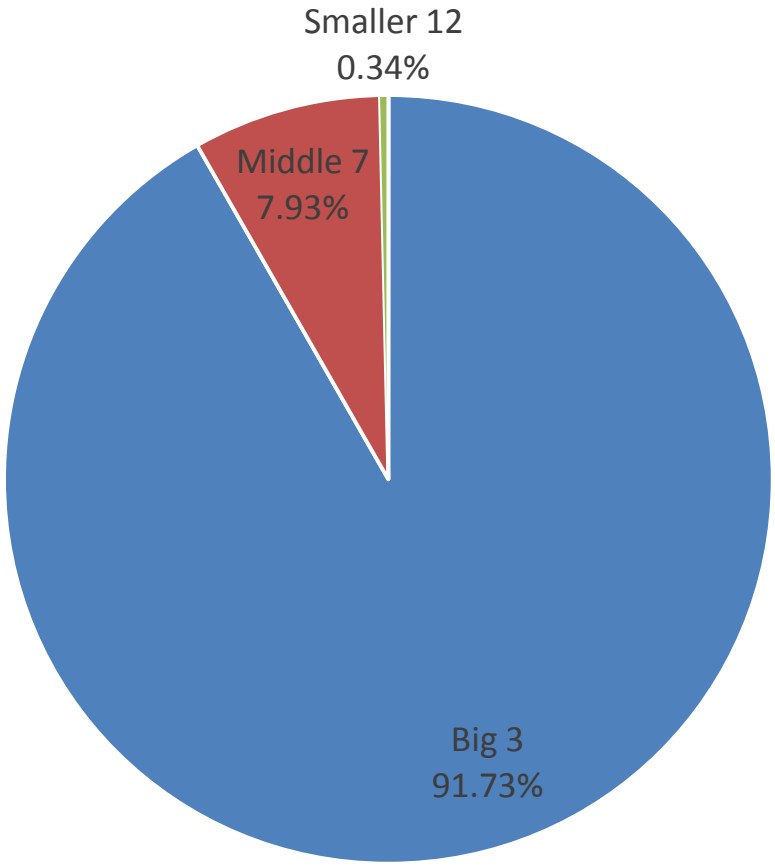


Manufactured goods dominated container traffic

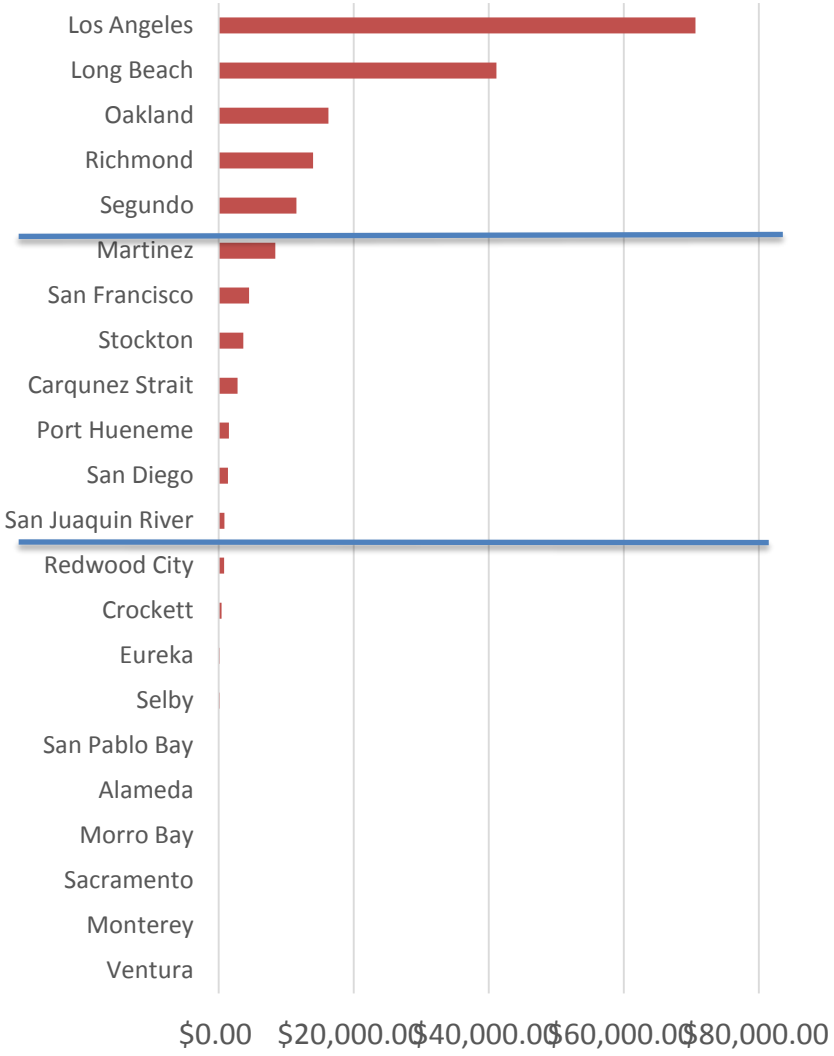


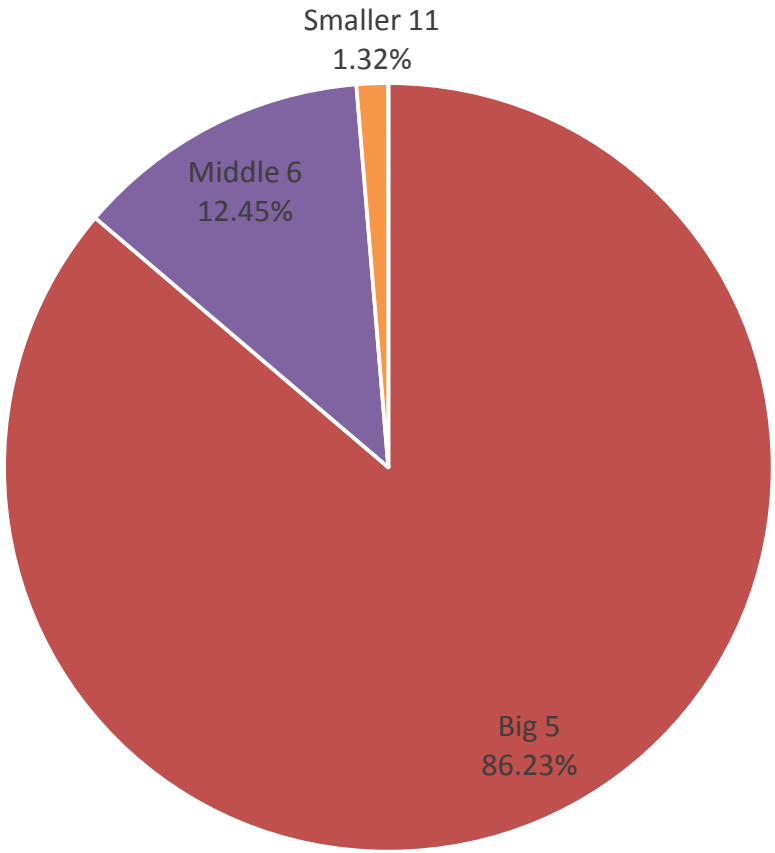
Ports of California: Non-Container Value





Ports of California:
Non Container Weight





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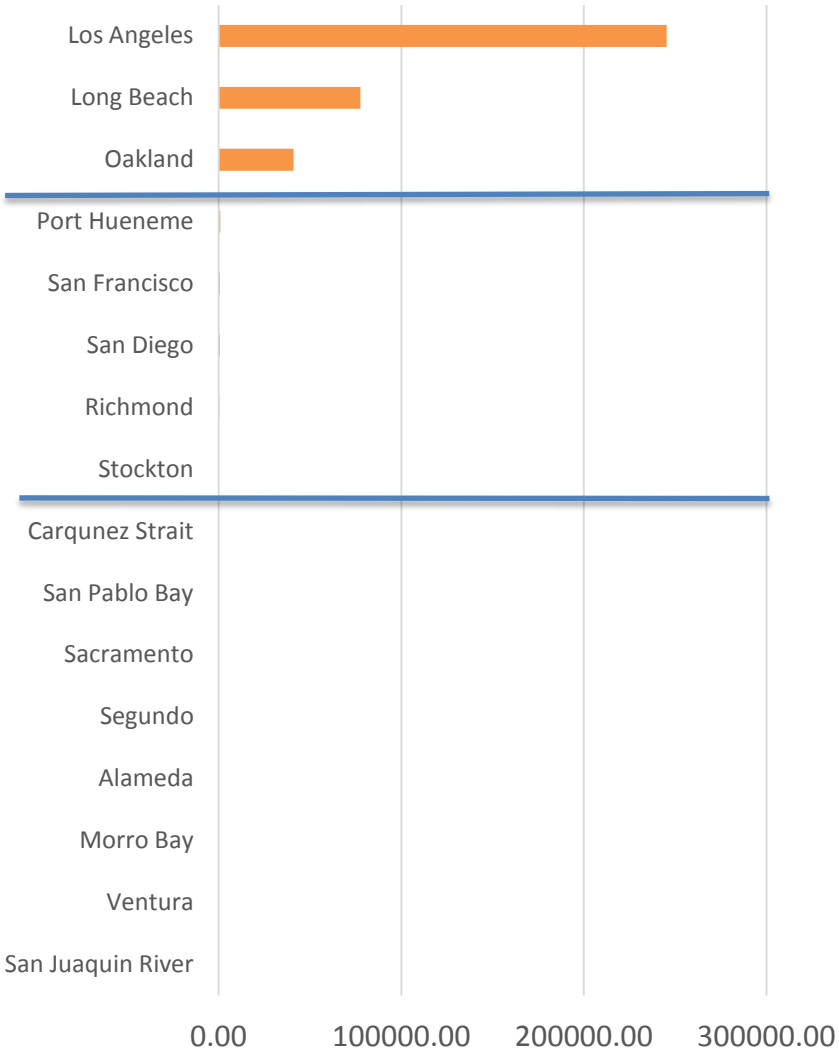

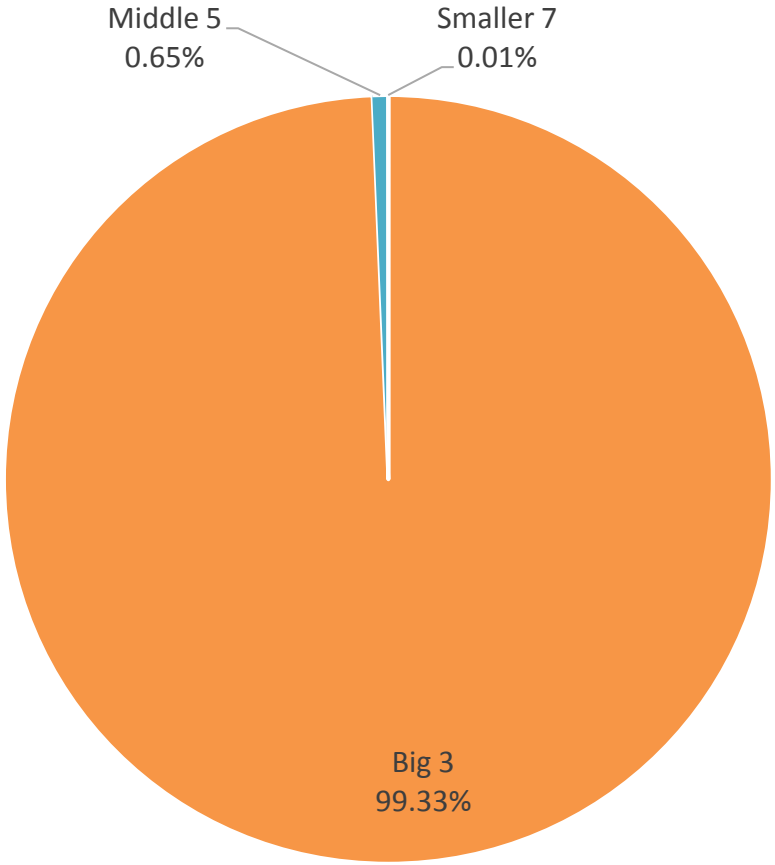

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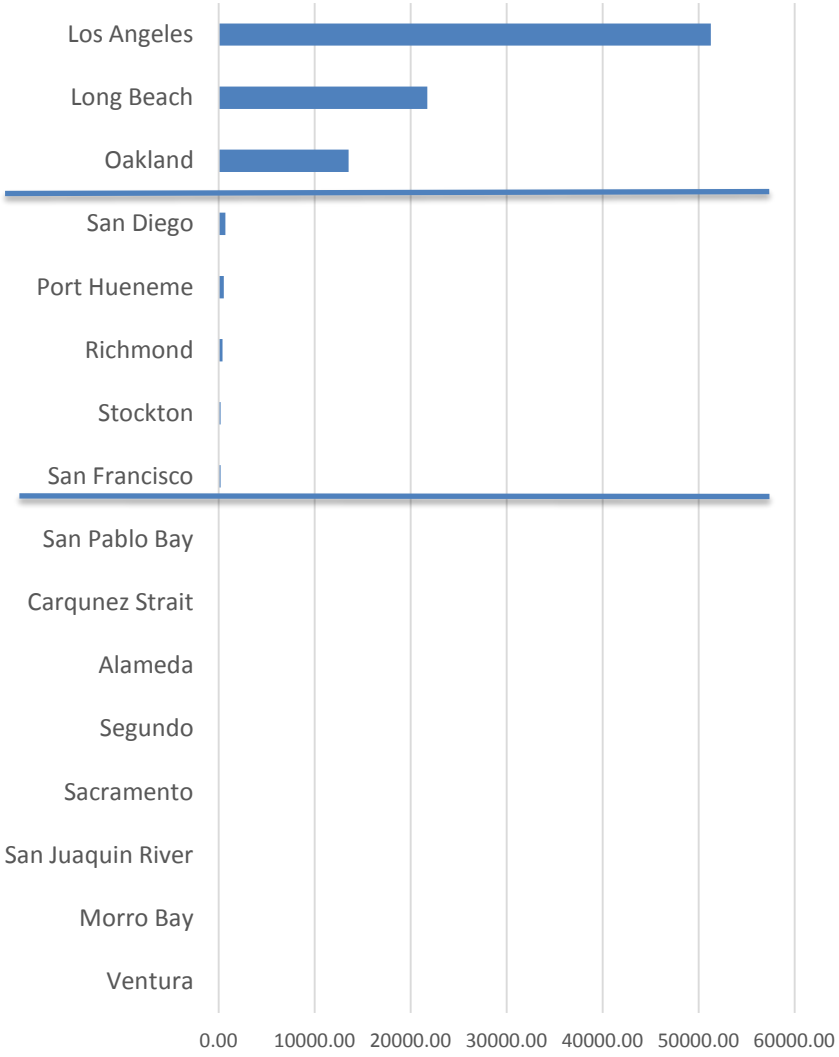
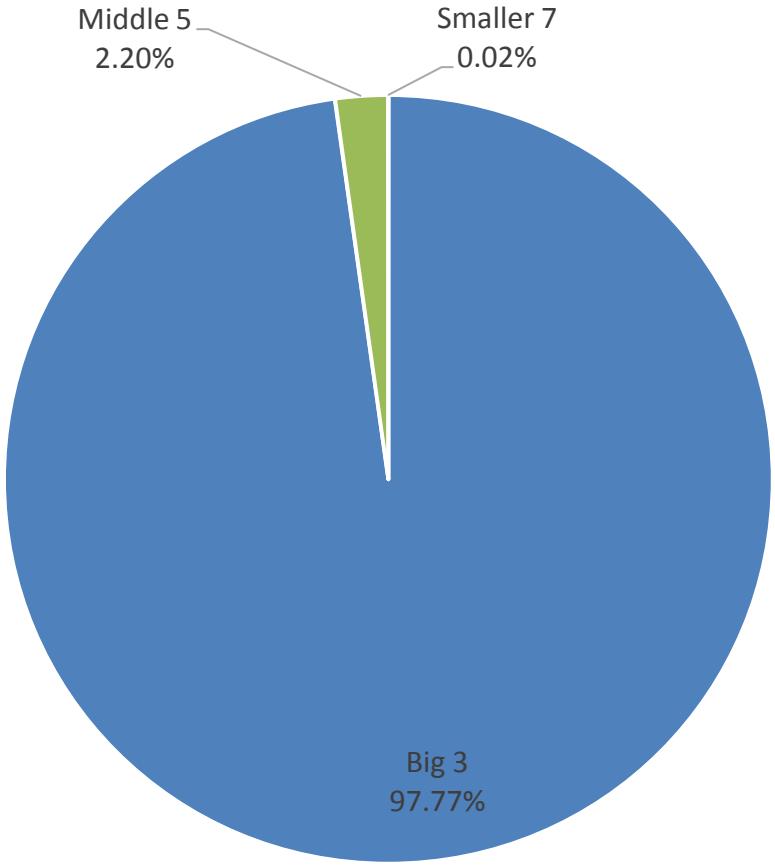


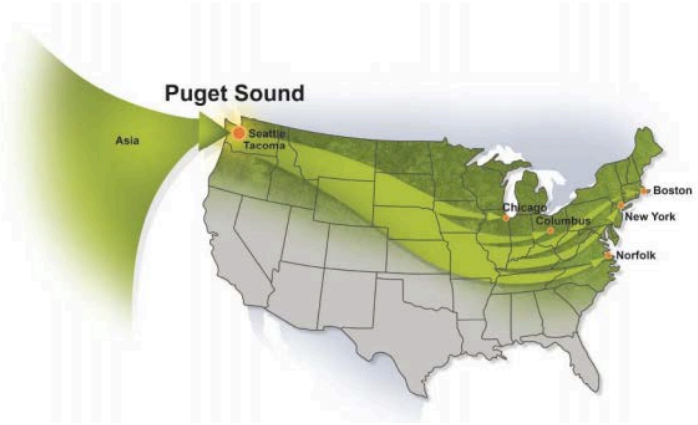


Ports of the Future

Climate Change Challenges: Mitigation

THE GREEN GATEWAY

The Ports of Seattle and Tacoma are the low carbon corridor for cargo moving between Asia and the American Heartland and all the way to the East Coast.



Origin: Shanghai*		CO_2 emissions (metric ton/TEU)		
Discharge Port	**Ship Size**	**Chicago**	**Columbus**	**Memphis**
Seattle	6,500 TEU	1.579	1.664	1.715
Oakland	6,500 TEU	1.686	1.772	1.694
LA/LB	6,500 TEU	1.663	1.748	1.663
Prince Rupert	6,500 TEU	1.598	1.680	1.725
New York via Panama Canal	4,500 TEU	2.520	2.468	2.574
Norfolk via Panama Canal	4,500 TEU	2.493	2.401	2.482
Savannah via Panama Canal	4,500 TEU	2.469	2.556	2.369
Houston via Panama Canal	4,500 TEU	2.470	2.510	2.323

Climate Change Challenges: Adaptation to Sea Level Rise

- A problem of “deep uncertainty”
  - How much will the climate change?
  - How much will global sea level rise?
  - How much will local sea level rise?
  - How will the frequency and intensity of weather events change?
- When should we act?
- How much risk are we willing to bear for what cost?

- How do the answers to these questions affect the economics of the choices we have to make?
- The traditional approach:
  - Identify options
  - Measure costs and benefits
  - Pick the “best”
- But how do you do this when so much is unknown?
- Reframe the question:
  - Under what conditions would investing in an adaptive action have benefits that exceed costs?
  - What does current knowledge say about the likelihood of those conditions occurring?

Where is the money going to come from?

- The California approach: waiting for a bond issue…
- While you're waiting, answer these questions:
  - How are we insured?
  - Can we get a better deal?
    - Create your own insurance company:
      - Catastrophe Bonds
  - How can we make adaptation an investable opportunity
    - Standard municipal bonds
    - Natural Infrastructure and Green Bonds
  - How can adaptation be combined with other financing
    - Adaptation is a process not a project

Middlebury Institute *of*
International Studies at Monterey
Center for the Blue Economy

- More information:
  - www.centerfortheblueeconomy.org
  - www.oceaneconomics.org
  - ccolgan@middlebury.edu