Examining Tradeoffs Between Drayage Costs, Travel Time Reliability and Warehousing Costs in Determining Warehouse Locations in Relation to the Ports of Los Angeles and Long Beach

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2015 I-NUF Conference
10/22/2015
METRANS worked with Majestic Realty to determine the range of transportation cost penalties paid for port dependent importer/exporters from selecting warehouse locations that are further from the Port.

Surveyed drayage firms who were asked to provide quotes for semi regular service.

Quotes were for “normal” cargo i.e. not overweight and not Haz-Mat.

Quotes were received in late 2014 and early 2015.

After the Christmas peak but while the work slowdown was still being resolved.

While the work slowdown has largely been resolved, the average processing time for dray trucks remains elevated (Journal of Commerce, 2015).
Survey Structure

- Drayage firms were identified through the Drayage.com directory (subsidiary of Loadmatch.com)
  - Will provide numbers but not emails without a subscription
- For most dray carriers, zip code level geography is sufficient to generate rate quotes. Specific addresses are not needed.
- Several firms were unwilling to deliver to/from different terminals that were seen as particularly troublesome from a processing delay standpoint or would only do so for elevated rates
- Quotes were typically provided as base rate plus fuel surcharge.
Factors to Consider

- When comparing different sites, we cannot assume “a warehouse is a warehouse”
- Numerous features differentiate the quality of warehousing stock
  - In general the higher quality warehousing stock is located in the Inland Empire
- What differentiates higher value warehousing according to Majestic Realty?
  - Larger truck swept path (130 feet) to allow for more efficient docking
  - Greater vertical clearance, superior clearance which is particularly important for e-commerce (32 vs 20 ft clearance)
  - “Flat floor” rather than half-percent grade
  - Opportunities for automation that enable more productivity out of each square foot
    - More square footage devoted to actual warehousing rather than dead space
- According to Majestic Realty, most warehouse clients cannot find the warehouse product they need in close proximity to the Port and would face large upfront costs in relocating to a port adjacent facility
<table>
<thead>
<tr>
<th>Zip Code</th>
<th>City</th>
<th>Average Dray Cost</th>
<th>Miles from POLA/POLB</th>
<th>Cost per Mile</th>
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<tbody>
<tr>
<td>90601</td>
<td>Whittier</td>
<td>$304</td>
<td>26</td>
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<td>$8.23</td>
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<tr>
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Initial Results

- There is a strong correlation between distance and drayage cost
  - Most expensive dray to Banning cost $344 more than the least expensive dray to Whittier
- Longer drays have lower costs per mile
  - Drivers incur a fixed cost to get into and out of the port terminal regardless of the dray distance
- In addition to using fuel surcharges to hedge against abrupt fluctuations in fuel cost, drayage firms also impose ancillary fees for driver delays at the port or on the road network.
- Trucker shortage, exacerbated by slow terminal processing times, was seen as an additional risk factor for new entrants to the Inland Empire
- Drayage cost is significant compared to the extremely low current cost of transpacific maritime transportation costs
  - $1,318 per FEU for mid-October according to the Drewry Hong Kong-LA Spot Rate
Correlation of Dray Cost and Distance

\[ y = 0.1955x - 27.269 \]

\[ R^2 = 0.865 \]
Correlation of Distance and Cost per Mile

\[ y = -3.905 \ln(x) + 23.666 \]

\[ R^2 = 0.8521 \]
Role of Reliability: Bottlenecks Ranked by Severity (Source: Caltrans)
Other Factors that may Influence Warehouse Choice

- Role of bottleneck severity in understanding the comparative attractiveness of near port or downtown warehouses versus inland empire locations (next slide)

- Potential impact of PierPASS in bolstering the attractiveness of Inland Empire locations
  - PierPASS ($69.17/TEU) effectively subsidizes nighttime deliveries (6PM-3AM)
  - Drivers who make off peak deliveries do not experience the same degree of congestion delay
  - Thus, the premium paid for locations that do not require drivers to access severe bottleneck corridors may have been higher had PierPASS never been implemented

- Review of data on comparative occupancy and rental rates for three key submarkets (subsequent slides)
  - 5 mile radius of Downtown LA
  - 10 mile radius of the POLA/POLB
  - 10 mile radius of San Bernardino
Comparison of Occupancy Rates for the Downtown, Port Area and San Bernardino Markets
Rental Rates per Square-foot
Comparison of Downtown Occupancy and Rental Rates
Comparison of Port Area Occupancy and Rental Rates
Comparison of San Bernardino Occupancy and Rental Rates
Comparison of San Bernardino Rental Rates per square foot and California Diesel Prices (Nominal Dollars)
Net Premium in Average Port Area Rental Rates over San Bernardino compared with changes in Diesel Prices (CPI adjusted 2015 dollars)
Role of Vehicle Operating Costs

- Diesel price rose substantially between 2001 and 2008, however rental rates of San Bernardino warehouses rose in tandem.
- As near-port warehousing and inland empire might be seen as substitutes, the next step was to see whether increased fuel price might have affected the relative rent premium that could be exacted from closer warehouse locations.
- More sophisticated econometric analysis would be required to see what role, if any, increased vehicle operating costs in the run up to the great recession had on the comparative attractiveness of inland empire distribution compared to more central locations for warehousing services.
Trade-offs

- San Bernardino’s sustained high vacancy rate shows that, like residential real estate, those logistics markets that are at the periphery tend to bear the brunt of short term drops in demand.

- San Bernardino was adding substantial new capacity in the run-up to the crash that was still unfilled when the slowdown in trade occurred.

- In addition to the general desirability of centrally located logistics terminals, comparative vacancy rates may also be affected by different markets and industries served by Inland Empire locations compared to locations in central Los Angeles.
Equilibrium point for Inland Empire Markets

- Since 2010, the cost to warehouse in the San Bernardino region has averaged exactly $3 more per sq foot each year than warehousing in the port area.

- Thus, for a 100,000 sq foot warehouse. A cost savings of 300K per year can be realized by locating in the inland empire.
  - What part of this savings would be offset by increased transportation costs?

- If we assume drayage costs save approximately $400 per trip
  - The warehouse would need 750 annual trips to make up the difference in annual lease costs

- Clearly this does not take into account differences in warehouse quality that can make the “effective” square footage different from the nominal square footage.
Summary Points

- Even if transportation costs are higher than the rent premium, there may be other reasons why warehouses may choose to locate in the inland empire versus the port area.
- Reason 1: There is almost no available space near the port.
- Reason 2: Inland Empire warehouses are on average newer and allow for more efficient operations.
- Reason 3: The clustering of inland empire warehouses may produce greater economies of scope.
- Reason 4: The Inland Empire location is on the way to the cargo’s eventual destination east of Los Angeles.
- Reason 5: Warehouse owners prefer a lower fixed cost and a to hedge against underutilization.
  - If the warehouse is half full, it will likely have fewer daily deliveries and thus it will have lower variable costs. This serves as a natural check.
  - A tendency to favor lower rental costs over lower transportation costs is supported by the literature (Klastorin, Cherrett, Deblanc and Sakai).
Potential Policy Recommendations

- If PierPASS is restructured, make sure it is done in a way that does not subsidize excessively long dray trips.

- If new warehousing is built near the Port, ensure that it can compete on all technical criteria with equivalent Inland Empire facilities so shippers have a full range of options.