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# **Container Port Productivity**

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## **Abstract**

The international container port industry has recently gone through a process of rationalising the number of ports in response to increasing vessel sizes. Continued globalisation in trade means that container volumes are concentrated towards main consolidation points and hub ports. The aim of this research is to investigate the existence of a relationship between the capacity utilisation, volume and productivity of container ports. This will allow the research to provide insight to the resulting productivity impacts from the continued trend in the consolidation of container ports. Academic theory and previous research suggests that increased volume and capacity utilisation will mean downward pressure on productivity.

Inland hub facilities provide an alternative means of quickly providing additional port capacity for the ports remaining after consolidation which is traditionally cheaper than port land or technology increases. This research also investigates whether the use of inland hubs by container ports impacts on the relationships throughput volume, capacity utilisation or productivity of the integrated seaport.

The context for this research is New Zealand, which has a relatively high number of international container ports that are highly competitive across the small domestic container industry. The New Zealand port sector is predicted to go through significant change and rationalisation over the short to medium term as some ports choose not to or cannot afford to invest in the required infrastructure to handle the larger container vessels, although the speed and results of port rationalisation has been heavily debated over the past decade.

Collection of publically available information on the productivity, volume and capacity utilisation produced a quality data set for the six ports that handle ninety percent of New Zealand containerised trade. Regression and statistical analysis is completed on this data set to outline the existence and significance of any relationships. Although this data set is not primarily collected by the author, it is of high quality as has been collected by an objective government agency for the specific purposes of consistently monitoring productivity and growth of New Zealand seaport on a regular basis. The use of secondary data brings with it drawbacks in relation to quality and reliability, therefore more detailed analysis was also completed for an individual port using data collected by the author directed from port operating system. This allows for the confirmation of conclusions developed throughout the analysis of national level data.

This research expands the current academic knowledge with analysis in a smaller trade and port environment than the traditional examples of America or Europe. This research mostly confirms the relationships between volume, capacity and productivity of container ports experienced in international academic literature, however it also shows that the relationship between productivity and volume may be positive (opposite to other literature) dependent on the port, the nature of the volume change and the level of utilisation. It also shows that inland port facilities can be used as a means to improve the productivity and reduce delays in port operations. Finally, this research advances New Zealand academic literature by providing the first detailed analysis of the relationship between capacity, volume and productivity in New Zealand container ports.

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