



# An empirical investigation of the seaport's economic impact: Evidence from major ports in China



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## ARTICLE INFO

### Article history:

Received 26 March 2013

Received in revised form 2 April 2014

Accepted 14 May 2014

### Keywords:

Port

Throughput

Economic growth

Empirical analysis

China

## ABSTRACT

In this study, we investigate the impact of the seaport on host city's economic development. Based on data from 41 major port cities in China over the period 2003–2010, our econometric analysis shows that port cargo throughput has a positive effect on the economic growth of the host city. In addition, the competing ports in the neighborhood have an even larger positive association with the local port city. Through examining some of the most dynamic ports in the world, this study provides a renewed understanding of the economic importance of seaports.

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## 1. Introduction

With economic globalization and production regionalization, the international trade has been booming in the past decades. Ocean transportation, especially container transportation, plays the most important role in the movement of goods in international trade. Over 80% of the total global trade volume, or over 70% of the global trade value, is facilitated by ocean transportation<sup>1</sup>. The globalization trend reinforces the integration of the global supply chain. In particular, the seaport has transformed from being a single facility into a critical component in the global logistics network and value chain. Together with its host port city, the seaport forms a logistics center facilitating the global market.

A port city functions as both a port and a city. A seaport and its host port city depend very much on each other. On one hand, the development of the seaport may help to improve the economy of the host port city. After all, the cargo flows passing through the seaport bring to the port city trades, information flow, financial flow and many other value-added services. The existence of the seaport may also drive the government to construct supporting infrastructure such as railways and high speed roads, which would stimulate the port city's economy. On the other hand, the port city's economic development, demographic factors, and civil constructions all benefit the seaport.

The history of urban development has shown that seaports and ocean transportation hubs tend to become big cities that are more economically advanced than the rest of the country. Take China for example. The leading cities are almost exclusively port cities that either host or are located near busy seaports. According to the literature, port activities contribute to the economy of the port city in several ways: (1) increasing local employment (Bottasso et al., 2013); (2) improving logistics

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<sup>1</sup> World Economic Situation and Prospects 2012, DESA, DPAD, United Nations.

(Notteboom and Winkelmanns, 2001); (3) lowering production cost (Gripaios and Gripaios, 1995); and (4) attracting other port-related activities (Ferrari et al., 2010; Castro-Villaverde and Coto-Millán, 1998). Although the economic impact of seaports has been discussed from different perspectives in the literature, the conclusions drawn are mainly based on either small samples or individual cases. Most of the insights thus obtained lack statistical sense, and hence are not generalizable.

In this study, we empirically investigate the economic impact of Chinese seaports on their host port cities. Using data from 41 major Chinese port cities and their local ports over the period 2003–2010, we carry out an econometric analysis on the relationship between port activity and the host city's economic growth. Our analysis is designed to provide answers to the following questions: (1) Does a seaport have any (positive or negative) impact on the economic development of its host city? (2) How much does a seaport's cargo activity affect the economic development of its host city?

We believe that China is a suitable and necessary context for researching the linkage between port and economic development. China is now one of the most rapidly developing countries in the world. The export and import trades of China have grown by leaps and bounds since the country's accession to the World Trade Organization in 2001. Driven by the yearly increases in inbound and outbound cargo flows, the seaports in China have developed into world-leading ports. As shown in Table A1, the number of Chinese ports that make it to the list of the world's top ten container ports is growing (two ports in 2000 as opposed to six in 2011) and their rankings go up every year. Nowadays, the world port business is largely dominated by Chinese seaports, such as the Shanghai port, the Hong Kong port and the Shenzhen port. Thus, studies on the economic impact of seaports would be incomplete without discussing the implications from Chinese seaports.

The gradually improving operations and management in nearby port terminals attract cargo flows away from the existing leading ports. To encourage port development, governments of port cities help their ports attract business by providing favorable policies. Consequently, severe competition between Chinese port city dyads, for instance, Hong Kong and Shenzhen, has arisen in recent years. Although the competition is beneficial to a certain extent (e.g. stimulating efficiency improvement of port operations), many port city governments are seriously concerned about competing ports' drawing business away from their local economy. Hence, in this study, we examine by econometric analysis whether the throughputs of competing ports have a positive or negative impact on the economic development of a port city.

In summary, this paper aims to provide some empirical evidence on whether a local seaport has a positive impact on the economic development of its host city and whether neighboring ports have a positive or negative impact on the economic development of a port city. The rest of this paper is organized as follows. Section 2 discusses the related literature. Section 3 describes the data and defines the variables. Regression models and the results are discussed in Section 4. We end the paper with concluding remarks in Section 5.

## 2. Literature review

Our paper is related to three streams of research: the economic impact of port activities on the local area where the port is located<sup>2</sup>; the spillover impact of the port on the neighboring area; the relationship and interaction between adjacent ports. We review the related papers in the following.

### 2.1. Economic impact of ports on local area

In general economic theory, it is argued that the existence of a natural advantage, such as a good harbor, contributes to the emergence and development of big cities. Theoretical models are employed to show that the presence of a port helps to reduce transportation costs, which motivates the rise of urban centers (see Fujita et al., 1999, for a summary of related theories). Hence, theoretical results imply that the port activities accelerate the city's economy.

In the field of port policy and management, the economic impact of ports is a traditional research topic. Input–output (IO) analysis, economic base (EB) study and the income–expenditure approach are the most often used methodologies in the extant literature (Mulligan, 1994).

Most of the related literature uses the IO approach to study the direct and indirect impacts of ports on the economy of the local region (such as impacts on employment and income). Substantial research could be found in the literature (Bossche, 1997; Castro-Villaverde and Coto-Millán, 1998; Davis, 1983; Ferrari et al., 2010; Yochum and Agarwal, 1987; 1988). Yochum and Agarwal (1987) point out that the previous literature has had trouble estimating the primary port impact, which is often either overestimated or underestimated. They suggest using the expenditures per employee of the port-related industry to represent the impact. Acciaro (2008) analyzes the impact of ports on the economic development of the Sardinia region in Italy. The study focuses on the employment generated by port (direct impact) and port-related industries (indirect impact). They show that ports play a vital role in creating employment for and stimulating the economy of the Sardinia region. Guerrero et al. (2008) document the impact of leisure ports, rather than cargo ports, in the Western Mediterranean region (Valencia and Italy, in particular). They conclude that the economic impact is mainly due to facilities purchasing and value-added services. By conducting an IO analysis on the Associated British Port of South Wales, Bryan et al. (2006) provide evidence of the port's impact on the local economy of South Wales. Their analysis shows that the port-related industries are key contributors to the local economy.

<sup>2</sup> The "local area" in this paper indicates the city where the port is located, because we use city-level economic data.

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