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Logistics agglomeration in the US

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ABSTRACT

Governments around the world are investing significant resources in the development of logistics clusters. This paper develops a methodology for identifying them and applies it to answer several lingering questions in the context of the US. It contributes to a more general debate in the general industrial clusters literature: while many authors see industrial clusters growing, others see them dispersing. To answer this and related questions in the context of logistics clusters the paper first analyzes the prevalence of such clusters using a two-index methodology to identify clusters in the US. Evidence of increasing concentration of the logistics industry in clusters in the US over time is tested and documented. In addition, some evidence that logistics activities in counties inside clusters show higher growth than counties outside clusters is found.

1. Introduction

Governments around the world are investing significant resources in the development of new and the expansion of existing logistics clusters, all of whom are central nodes of the global freight transportation network. They are motivated, in large parts by a job creation agenda. For instance the Government of Aragón in Spain invested over €680 Million to develop Plataforma Logística – Zaragoza (PLAZA), the largest logistics park in Europe and the core of the Aragon logistics cluster. Panama is in the process of developing significant logistics clusters at both ends of the canal as part of the strategy to position the country as the center for trade and logistics for the Americas (Council of the Americas, 2011; Government of Panama, 2010). While new logistics hubs are being developed, existing clusters are expanding in scale and scope. These include major ones such as Singapore, Rotterdam, Duisburg (Germany), Dubai, Santos (Brazil), and multiple US locations such as New York, Miami, Chicago, Dallas/Ft Worth, Memphis, Louisville and Los Angeles.

Logistics can be broadly defined as the group of functions associated with production, design, and marketing, which include "...transportation, warehousing and facilities planning, and location" (Kasilingman, 1998). These activities add value to companies' supply chain and increase competitiveness.

The logistical need to move material, parts, and products into manufacturing, distribution and retail locations creates the (derived) demand for freight transportation. To this end, efficient transportation operations are crucial for efficient logistics since transportation costs are a relevant part of the retail price (Xu and Hancock, 2004). Also, the pressure to time-compress logistical operations and provide high level of service gives transportation a central role in logistics (Groothedde, 2005; Stank and Goldsby, 2000). Furthermore, as stated by Rodrigue and Hesse (2006) "...the role of transportation is considered more than a mere support to the mobility of freight within global commodity chains, but an integral part of the value generation process."

Dozens of interviews all around the world suggest that logistics clusters are growing. This finding is in line with the many authors who document and explain the advantage of industry agglomeration, or clustering. They cite tacit knowledge ex-

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change, the development of a local supply base, and the availability of a specialized labor pool (Marshall, 1890; Feser, 2008; Ellison et al., 2010). Other authors point out that the regions where these clusters reside enjoy high economic growth and a higher rate of innovation and capital formation than regions that do not include clusters (Porter 2000, 2003; Delgado et al., 2010; Benneworth and Henry, 2004). Other researchers, however, claim that negative externalities of clusters, the development of information technologies and the efficiency of global supply chains diminish the advantages of geographical proximity, leading to dispersion of like-businesses (Cairncross, 1997; Polenske 2001, 2003; Henderson and Shalizi, 2001). Also, Feitelson and Salomon (2000) point out to the increasing congestion in transportation networks that could lead to dispersion of logistics activities.

Although large investments in logistics clusters seem to suggest that policy makers believe in their positive effects, and though there are some studies that account for their benefits (see for instance Kasarda, 2008; De Langen, 2002, 2004a; Wu et al., 2006), the prevalence of logistics clusters has not been studied yet. This article defines logistics clusters, explains their advantages and tests this prevalence. It then uses a two-factor metric to identify logistics clusters in the US, validating the results through several approaches. Using data from 1998 and 2008 it provides evidence that logistics activities seem to be, in fact, agglomerating rather than dispersing over time.

Section 2 reviews the state of the art in clusters research, with an emphasis on logistics, and provides some context for the analysis. Section 3 presents findings from exploratory research used to develop the thesis of the paper. Section 4 reviews the methodologies used to identify clusters, while Section 5 depicts the model and the data used in analysis of the US. Sections 6 and 7 present the results, including a statistical analysis. Finally Section 8 concludes with final observations.

2. Industrial and logistics clusters

The literature concerning industrial clusters dates back to Marshall (1890), who discusses agglomeration economies and enumerates the externalities-based advantages for firms to co-locate. Economists distinguish among several types of agglomerations. Marshall (1890), and Weber and Friedrich (1929) discussed external economies of scale, resulting from multiple firms agglomerating geographically, as opposed to internal economics of scale, where a single firm expands its production (see, for example Isard and Schooler, 1959). Hoover (1937) defined two types of external economies of scale: urbanization and localization. Urbanization economies arise when many firms from different industries concentrate in the same region; localization economies arise when firms from a particular sector locate in the same region. This paper is focused on external economies of scale and localization economies of logistics firms and operations.

Porter (1998) summarized the main benefits of industrial clustering as follows: "A cluster allows each member to benefit as if it had greater scale or as if it had joined with others formally, without requiring it to sacrifice its flexibility." A related branch of literature argues that clustered firms enjoy not only the benefits of agglomeration economies (Feser, 2008; Ellison et al., 2010), but also higher collective learning and tacit knowledge exchange (Keeble and Wilkinson, 2000; Maskell, 2001; Cohen and Fields, 1999; Leamer and Storper, 2001). Intra-cluster competition drives firms to succeed by increasing their productivity, supercharging innovation, and by stimulating new business formation (Porter, 2000; Delgado et al., 2010). This also results is high economic growth (Baptista, 1998), reinforcing the importance of geographical concentration and supporting a continuing clustering trend.

However, several authors argued that the efficiency of supply chains, and advanced communications technologies represent the "end of geography" (O'Brien, 1992) and the "death of distance" (Cairncross, 1997). Others point to the negative externalities of clusters such as congestion and higher prices of land and labor, creating incentives for firms to leave clusters (Henderson and Shalizi, 2001; Glasmeier and Kibler, 1996; Teubal et al., 1991), as a result of "Dispersion Economies" (Polenske, 2003).

This paper explores the role of clusters in logistics and transportation. A logistics cluster is defined as the geographical concentration of firms providing logistics services, such as third-party-logistics (3PL-s), transportation carriers, warehousing providers and forwarders. Naturally, logistics clusters also include suppliers for such activities, such as packaging manufacturers and transportation maintenance depots.

The academic literature includes only a few articles about logistics clusters with little mention of their prevalence. Van den Heuvel et al. (2011)studied the logistics industry within three Provinces in the Netherlands, concluding that the concentration of relative and absolute employment in logistics firms there has increased in recent years.

The emergence of a logistics cluster depends on the quality of transportation service available in a region (Hong, 2007). Bok (2009) highlighted accessibility and general infrastructure quality as the main factors affecting the location preference of firms. Better accessibility typically drives logistics operations to locate relatively close to each other (Berechman, 1994), as it reduces costs for firms (Rietveld, 1994). Hong (2007) asserted that transportation accessibility is one of the important determinants of location decisions of foreign logistics firms.

Most of the literature related to logistics clusters is specific to ports or airports and not to the logistics sector in general. Haezendonck (2001), Klink and De Langen (2001) and De Langen (2002, 2004a, 2004b) investigated maritime clusters, arguing that, based on their findings, the concentration of maritime activities in clusters is likely to increase. This is not surprising as one considers the, more familiar, increased concentration of airlines in "hub fortresses." The economics of hubs for maritime and air freight are similar.

Martin and Román (2003) document the agglomeration of airfreight carriers in hub airports while Lindsay and Kasadra (2011) developed the concept of "Aerotropolis" – a full urban development around an airport. Interestingly, despite the