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Regulatory airport classification in the US: The role of international markets

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ABSTRACT

In a context of debate over the future of the US Federal Aviation Administration's (FAA) funding model, this paper revisits the current system of airport classification used for the allocation of public funding for capacity developments. Previous papers have already addressed the limitations of the FAA's uni-dimensional method, and proposed new approaches that take into account the two dimensions of "hubbing" activity, i.e., traffic generation and connectivity. However, these studies are biased by the lack of detailed demand data on international connections. Using an MIDT dataset comprising a sample of domestic and international markets served by US airports during the first quarter of 2013, this paper aims at providing a full picture on the pitfalls of the existing FAA method, as well as addressing the impact of international connectivity in characterising the airports' hubbing profiles. Hierarchical clustering is used to provide alternative criteria for hub classification within the context of US National Plan of Integrated Airport Systems (NPIAS). This new typology of primary US airports can help to optimize AIP funding by allowing for further differentiation in the FAA allocation criteria.

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1. Introduction

The US Federal Aviation Administration (FAA) provides grants to airports for capital developments under the Airport Improvement Program (AIP). The AIP is one of five major sources of airport capital development funding. The other sources are tax-exempt bonds, passenger facility charges (PFC), state and local grants, and airport operating revenue. Different airports use different combinations of these sources depending on the individual airport's financial situation and the type of project being considered. Small airports are more dependent on AIP grants than large or medium sized airports. The larger airports, whose projects tend to be much more costly, are more likely to participate in the tax-exempt bond market or finance capital development projects with a PFC (Kirk, 2007). Hence, although the AIP may not be the main source of finance for major airports, it is still an important source of capital for improvements related to airport safety, capacity, security and the environment. In 2014, $586.2 million in AIP funds were allocated to the 30 largest hubs in the US (approximately 18.2% of the nationwide grants).

The latest estimates for the AIP budget indicate a 19% decrease ($52.2 billion to $42.5 billion) for the period 2013–2017, with respect to the estimates provided two years earlier (FAA, 2012). While this drop can be linked to the waning effect of the economic stimulus legislation (DOT, 2013), the FAA has also been pressured to reduce its budget; the Department of Transportation (DOT) pointed at cost inefficiencies as the root of the problem (DOT, 2013, p. 113). From the Agency's perspective, a debate on the future of the FAA's funding model has been proposed (Flightglobal, 2013).

Within a context of financial constraints, public spending should look for a higher efficiency and impact of the resources invested. In this regard, this paper develops a new US airport typology that can help optimize the AIP. The current statutory classification is defined in the National Plan of Integrated Airport Systems (NPIAS) report, which groups airports according to their size and role within the US network and it is mainly based on each airport's share of the total US passenger enplanements (Table 1).

The annual AIP budget is split between "entitlements" and "discretionary" funds. Primary airports (see Table 1) are entitled to receive an annual apportionment of at least $1 million in AIP funds with the total amount determined by the number of enplaned passengers (FAA, 2012). Discretionary funds, on the other hand, are prioritized by the FAA using a National Priority System (NPS) formula that combines four factors (FAA, 2000): i) the airport size

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Table 1
FAA's system of airport classification.
Sources: Title 49 U.S.C., Section 40102; FAA passenger enplanement data.

Commercial airport type	Hub type	Common name
At least 2500 boardings	Percentage of US-wide annual passenger enplanements (739.3 million enplanements in 2013)	
Primary	**Large** 1% or more	Large hub
	Medium At least 0.25%, but less than 1%	Medium hub
	Small At least 0.05%, but less than 0.25%	Small hub
	Non-hub More than 10,000 enplanements, but less than 0.05%	Non-hub primary
Non-primary	**Non-hub** At least 2500 and no more than 10,000	Non-primary commercial service

and role (based on the typology from Table 1), ii) the purpose of the project (e.g., increase capacity), iii) the physical component (e.g., runway), and iv) the type of work (e.g., extension). Numeric weightings associated with these factors reflect the FAA's strategic goals, which are currently oriented to enhancing safety and security, capacity, and environmental performance (FAA, 2012). With regard to the "airport size and role" factor, large and medium hubs receive the same weighting.

This airport typology plays a role in allocating both entitlements and discretionary funds, but one may argue that the FAA typology is too broad, especially for primary airports. The major changes in airline network structures after deregulation suggest that the role of primary airports is linked to their ability to support hub-and-spoke operations, which are typically achieved by consolidating originating and transfer passenger flows (Button, 2002; Doganis, 2010). In fact, the existence of these two dimensions of "hubbing" (traffic generation and connectivity) is acknowledged in the NPIAS report, but they are not explicitly incorporated in the method for hub classification. Since one of the main objectives of the AIP is to reduce congestion and delays, from a social perspective it seems reasonable that funding priority should be given to airports playing a central role in the network, not just because they process a significant proportion of US traffic but also because passengers are connecting through them to other destinations, which will also benefit from delay reductions at the hub. Hence, there is a potential to optimize the social benefits from AIP investments by changing the NPIAS airport classification to explicitly acknowledge the importance of hub connectivity along with the airport's potential for traffic generation.[1]

Previous papers have already addressed the limitations of the FAA's uni-dimensional method along the same lines (Rodríguez-Déniz et al., 2013), and proposed alternative approaches that take into account airport size, traffic generation and connectivity (Adikariwattage et al., 2012). However, these studies are biased by the lack of detailed data on international markets, which is not provided by the widely-used DOT traffic databases. This prevents a full characterization of the hubbing activity at the largest airports, for which precise classification is most crucial.

Using the well-known Marketing Information Data Transfer (MIDT) database, comprising a large sample of domestic and international marketsserved by US airports during the first quarter of 2013, this paper aims at providing a full picture on the pitfalls of the existing FAA method by assessing the impact of actual international connectivity in characterising the airports' hubbing profiles. A second objective is to provide an alternative set of unbiased criteria for hub classification within the context of the NPIAS, for which hierarchical clustering techniques will be employed.

The paper is structured as follows: Section 2 reviews the history of the Airport Improvement Program, previous literature on regulatory airport classification and the measurement of connectivity. Section 3 describes the data and methodology, from the indicators of hubbing activity to the hierarchical clustering techniques. Section 4 presents the results, discusses the importance of appropriately measuring hubbing activity in international markets, and provides alternative classification criteria for US airports. Section 5 presents the conclusions.

2. Background: the AIP, airport classifications and demand-based connectivity

2.1. The Airport Improvement Program (AIP): a bit of history

Airport grant programmes have been present in the US since after World War II. The first programme was approved in 1946 by means of the Federal Airport Act and drew its funding directly from the US Treasury. Later, in 1970, the Airport and Airway Development Act created a more comprehensive scheme by the creation of the Planning Grant Program (PGP) and the Airport and Airway Trust Fund, which accumulated revenues from airlines, air freight and aviation fuel taxes. The 1982 Airport and Airway Improvement Act substituted the PGP by the Airport Improvement Program (AIP), which has been modified several times, the last by the FAA Modernization and Reform Act of 2012. The Airport and Airway Trust Fund remains the funding source of the AIP and is still supported by different aviation charges (FAA, 2014).

The current system has been a matter of debate in the industry and media (see, for example, USA Today (2009)). While larger airports have the capacity to attract more private funding and might not be heavily dependent on AIP funds, some critics consider that the AIP scheme is a way of subsidizing airports with no commercial interest. Yet many other argue that the large US network of airports provides a wide range of social benefits such as access to air medical transport. In this regard, the public funding of US airports is a complex matter since the dependence on AIP to pay for capital needs depends not only on airport size, but also on political, commercial and market dynamics. Also, the evolution of the airport business, which is entering a new marketing oriented-era (Halpern and Graham, 2013), along with the view that airports are not just infrastructure providers anymore (Goedeking, 2010) may call for a full overhaul of the US public airport funding system.

2.2. Airport classifications and demand-based connectivity

National and supranational authorities use airport classification for a wide variety of purposes (Table 2): these include slot allocation, delay management, allocation of public funding, assessment of competition, security regulations, or setting use charges within the national airport system. For all of these purposes, the idea of classifying airports according to the "role" they play within each network is always present and the relevance of connectivity

[1] The proposed method places the emphasis on the concept of hubbing, which it is traditionally linked to the activity of full service network carriers (FSNC). However, the belief that low-cost carriers (LCCs) do not offer connecting services is not valid anymore. In fact, the largest US low-cost carrier (i.e., Southwest) offers connections between its flights and the growth limits of the LCC business model are forcing some of these carriers to consider hybrid strategies that include facilitating transfers (de Wit and Zuidberg, 2012). Therefore, the method presented in the paper avoids the traditional differentiation between FSNC and LCC and, instead, discriminates by the type of service, i.e., between traffic generation and connectivity.

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