Multiproduct facility pricing with outside demand for side services

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1. Research question

Many transport facilities combine the core business, that is the supply of the facility infrastructure and operations to the transport operators, with an extensive side business, that consists mainly in retailing and real estate activities. Examples of two-sided facilities are airports, railway stations and cruise terminals.

Airports’ side business supplies a wide variety of products and services, including car rental, car parking, retailing, food and beverage and real estate. The revenues airports derive from their side activities have been growing faster than core revenues since the privatization of airports. For instance, the side business provides 75-80\% of the total revenues at some medium to large EU and US airports. The side revenues may be used to subsidise the core operations, indeed side operations may be more profitable than aeronautical operations due to the locational rents enjoyed by the airports and the regulation and the charging mechanisms they are subject to.

Railway stations are continuously developing their shopping areas that are considered a major business opportunity. In Italy, Grandi Stazioni has been investing to turn railway stations into \textit{Urban Piazzas} with over 1.5 million sq m of shopping malls, meeting places, venues for art and cultural events. Similarly, in 2012, in the Netherlands, 38 new retail and hospitality outlets were added to the major stations and, in the same year, the shopping center connected to Munich railway station was listed in the category \textit{Continuous Development} of the \textit{European Shopping Awards}.

Cruise terminals are often part of larger retailing complex. For instance, Hong Kong Ocean Terminal is part of the \textit{Harbour City} complex, that is the largest shopping center in Hong Kong with more than 700 shops and over 50 restaurants. The complex also includes three high-end hotels, serviced apartments, parking lots and offices.
Given the extensive development of the side offer of transport facilities, it is relevant to study how the side business affects the pricing of core goods. Indeed, the facilities may reduce the core price in order to attract more passenger and to boost side revenues. This may alleviate the need for *ex ante* regulation of facilities like airports.

To the best of our knowledge, the literature addressed this research question under the assumption that only passengers can demand side goods and services (hierarchical demands) (Starkie, 2002; Czerny, 2006; Czerny and Lindsey, 2014). Indeed most of the literature studied the case of airports and airports used to develop their side business landside, after security screenings. We relax this assumption of hierarchical demands and we investigate the pricing behavior of two-sided facilities when customers can buy the travel ticket alone, the travel ticket and the side services or the side services alone. The motivation is twofold.

First, the side offer of railway stations and cruise terminals is accessible to non-passenger (i.e., they are located outside fair-paid zones). Notably, in the case of railway stations non-passenger demand for side services is particularly relevant because they are usually located downtown and their commercial offer is attractive to local residents.

Second, airports are developing their commercial business landside. For instance, Schipol dedicated 5300 sq m landside to retail and food and beverage. Zurich airport has been investing to renovate and develop the public area of the airport, which now includes book shops, an extensive food court and clothing shops. The investments are part of the project *The Circle*, which is the second shopping center in Switzerland in terms of sales and it is located steps away from the terminal. Hong Kong international airport is developing *SkyCity*, a 10 million sq ft retail, exhibition, business office, and hotel and entertainment complex in direct proximity of the airport. In this framework airport side business targets not only passengers but also employees, meeters and greeters and local residents. In particular, local residents demand increases with the development of airport cities and aerotropolis around the facilities (see Appold and Kasarda, 2011, 2013).

2. **Methodology**

We model the behavior of a monopolistic facility that supplies core and side services. The distinctive feature of our analysis is that the consumption of the side goods and services is not conditional on the consumption of the core service, that is also non-travelers may demand side goods and services. We incorporate in our analysis that passengers and non-passengers may exhibit different tastes for side services. Indeed, they may have different needs and passengers have to go to the facility to travel, while non-passengers should incur a transportation cost to access the transport facility and consume the side services supplied. Furthermore we model that, at the time of transportation ticket purchase,
customers may exhibit different degrees of foresight of the surplus they can get from the side business. We analyse the impact of the side revenues on the pricing of core services and we look at the overall social welfare under different specifications of passengers and non-passengers demands.

3. Main results

We find that, if the degree of foresight is sufficiently low, at the equilibrium the side price increases with the difference between the net willingness to pay for side goods and services of travelers and non-travelers. Equilibrium core (side) price increases (decreases) with the degree of foresight of the individuals. When passengers perfectly foresee the surplus to be gained from side services, the non-passenger demand incentivizes the transport facility to charge higher core prices. Conversely, if passengers are sufficiently myopic towards the side surplus, non-passenger demand induces the facility to reduce the core charge.

4. Key references


