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Efficiency and productivity of French ski resorts

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HIGHLIGHTS

- French ski resorts' efficiency and productivity are analyzed.
- The directional distance function and the Luenberger productivity indicator are used.
- Productivity decreased for the majority of ski resorts during the period considered.
- Productivity scores are driven by the technological change.
- A relationship between size and technical efficiency change is established.

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ABSTRACT

This paper analyses French ski resorts productivity with the Luenberger productivity indicator (LPI) based on the directional distance function. It permits the calculation of a productivity indicator that is decomposed into technical efficiency change and technological change. The conclusions are that productivity decreased for the majority of French ski resorts, which is almost always explained by technological change. Finally, the mixed results do not establish a clear relationship between the ski resorts' size and productivity. Therefore, the Kruskal–Wallis test is used to statistically verify this relationship. Managerial implications are derived from this study.

1. Introduction

It is known that France is the first tourist destination in the world in terms of arrival numbers yet generates less revenue from tourism than many other countries (Randriamboarison, 2003). Known as the "*French tourism paradox*", it points to a need to better identify how France can generate higher returns from its tourism industry (Barros et al., 2010). In this context, an analysis of productivity represents an important first stage in rectifying the problems.

The motivations for the present research are the following. First, ski resort activities contributed approximately 18% to the French tourism economy in 2007[1]. The winter sports sector brings many social and economic benefits: employment through businesses creation, increased income and maintained population in rural areas. However, in the past ten years the number of skiers attending French ski resorts decreased. Second, additional pressures coming from new entrants which are less expensive (e.g. Slovenia, Montenegro) and new consumption practices increase competition and cause instability in tourist demand. Therefore, it is important for France to maintain a high level of competitiveness and performance.

This paper examines the French ski resorts productivity with the Luenberger productivity Indicator (LPI). The LPI was introduced by Chambers (1996) and is based on the directional distance function. It allows the decomposition of productivity into two components: technical efficiency change (EFFCH) and technological change (TECH) to observe changes in productivity between two time periods. The directional distance function developed by Chambers, Chung, and Färe (1996, 1998) is a transposition of the Luenberger (1992) Shortage function in the production theory. The main advantage of this tool is the simultaneous evaluation of the input savings and the output improvements. In this study, a sample of 64 French ski resorts is analysed during the 2008–2010 time periods. Finally, the relationship between ski resort size and productivity is statistically analysed with a Kruskal–Wallis test. Therefore, the innovation of the present research is to analyse for the first time the French ski resorts productivity with the LPI.

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[1] Atout France report (2007).

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The paper is organised as follows: Section 2 presents the contextual settings; Section 3 surveys the literature on the topic; Section 4 presents the methodology framework; Section 5 introduces the data; Section 6 provides the empirical results and managerial implications; and Section 7 formulates the conclusion and discussion.

2. Contextual settings

The unique infrastructure of French ski areas and the diversity of ski resorts make France one of the top three ski nations in the world, along with Austria and the United States (SNTF, 2010). France is a mixture of numerous ski areas with many different types of slopes in terms of size and offer. France ski area is over 1.100 km^2 with 357 ski resorts located in five mountain ranges (Pyrénées, Massif Central, Alpes, Jura and Vosges).

Ski areas bring many social and economic benefits to their regions. However, over the last ten years, ski resorts faced difficulties to attract consumers. Indeed, the number of skiers attending French resorts has decreased. In 2009, the ski industry has declined by 11%. The United States (59.7 million visits) has displaced France (56.1 million visits) as the country with the second-most ski resort visits. Austria remains behind France with 53.4 million visits. Thus, several professionals considered skiing as a mature cash-generating business (SNTF, 2010). This situation creates a need for tourism competitiveness and efficiency (Santos, 2004).

Following Falk (2010), winter tourism demand depends on many factors: domestic and foreign income, prices, transportation costs, Easter holidays timing and climate change. Climate change remains an important factor above all for some low-elevation ski resorts. In these ski resorts, the decrease of demand is much more pronounced as they are very dependent on snow depth (Falk, 2010). Moreover, private companies invest particularly in high-elevation ski resorts to create conglomerate ski resorts (Gerbaux & Marcelpoil, 2006; Falk, 2009) and to continue to attract foreign skiers (Belgian, English, and Russian). Then, the French ski resorts' economic environment is impacted by new competitors from Eastern Europe that provide new infrastructure and attractive prices. French ski resorts' managers must confront their ageing equipment. In fact, a ski area is characterised by the technical infrastructure for the practice of skiing, such as ski lifts, trails, grooming, snowmaking equipment, reception facilities and ticketing services. To improve French ski resort attractiveness and competitiveness, ski area management requires investments to maintain the level of the offer in terms of ski lift comfort and service quality. All of these elements generate cost maintenance conditioning due to new annual regulations. There are crucial determinants influencing the destination business performance, and an important part of ski resort attractiveness depends on ski lift operator management because they constitute the key product of the ski resort.

3. Literature review

The presentation of this literature review is divided into two subsections: the recent empirical studies on efficiency and productivity in the tourism industry and the relationship between size and productivity.

3.1. Efficiency and performance measurement in tourism industry

Since the 1990s, a number of studies have considered the measurement of efficiency in the tourism industry using the frontier models method to evaluate the relative efficiency in different activities including, for example, the hospitality sector (Assaf & Agbola, 2011; Assaf & Barros, 2011; Assaf, Barros, & Josiassen, 2010; Barros, 2005, 2006; Barros & Alves, 2004; Barros & Mascarenhas, 2005; Barros & Santos, 2006; Hwang & Chang, 2003; Reynolds & Thompson, 2007), travel agencies/tour operators (Anderson, Fish, Xia, & Michello, 1999; Assaf, 2012; Barros, Botti, & Peypoch, 2009; Barros & Dieke, 2007; Barros & Matias, 2006; Bell & Morey, 1995; Köksal & Aksu, 2007), museums (Bishop & Brand, 2003), restaurants (Reynolds, 2003; Reynolds & Thompson, 2007) and destination performance (Barros et al., 2010; Botti, Peypoch, Robinot, & Solonandrasana, 2009).

The analysis of ski resort efficiency is restricted to a very small number of papers, and, to our knowledge, only one contribution can be found in the literature. Falk (2009) compared the conglomerate and independent ski resorts with data on four countries (Canada, France, United States, Switzerland) using the stochastic frontier production approach. Falk explained that the lack of contributions in this field is due to a lack of available data.

The tourism literature is restricted to a small number of studies with LPI. First, we can cite several theoretical papers. Peypoch (2007) illustrated the value of the Luenberger productivity indicator with the French tourism receipts by looking at the number of bed-nights in hotels and campsites based on tourist nationality. Peypoch and Solonandrasana (2006) proposed to measure the efficiency of tourism firms with the proportional distance function to propose new managerial recommendations for the tourism industry. Finally, Peypoch and Solonandrasana (2008) proposed a new methodology for analysing efficiency and productivity of a hotel sample using the directional distance function and an aggregate LPI with optimal reallocation of inputs and outputs. This approach provides for the measurement of efficiency and productivity in the tourism industry and provides operational recommendations to managers. Second, concerning the empirical applications, Barros et al. (2009) proposed to analyse the productivity of a sample of Portuguese travel agencies with the Luenberger productivity indicator based on the directional distance function. Botti, Briec, Peypoch, and Solonandrasana (2010) also proposed to analyse the Portuguese travel agency sector with the LPI and suggested decomposing the process of technological change to study the sources of bias. Barros, Peypoch, and Solonandrasana (2009) analysed a sample of Portuguese hotels using the Luenberger productivity indicator. Finally, we note that these tools have never been applied to the ski resort sector.

3.2. Hypothesis: size and productivity

Williamson (1967) was one of the first to establish a link between firm size and efficiency. In a model of hierarchical control that determines the optimum firm size, he shows that there can be a loss of productivity in larger, more hierarchical firms. Dhawan (2001), Scherer (1991) and Acs and Audretsch (1990) have argued that small firms are more able to innovate than large firms because of the organization is more flexible and managers of small firms are more risk takers. For some authors, the organizational and managerial structure of small firms allows them to take strategic decisions and achieve a competitive advantage (Carlsson, 1989; Tornatzky & Fleischer, 1990; Utterback, 1994; Williamson, 1967). A lot of studies try to establish a link between size and productivity. However, mostly of them showed that large firms are on the average more efficient than small firms; this is due to market power of large firms, strategic grouping by firms and the economies of scale (Dhawan, 2001). Tang, Wang, and Xu (2012) investigated in a financial context the effect of economies of scale and liquidity on the relationship between fund size and performance. Tovar, Ramos-