



Measuring synergy effects of a Public Social Private Partnership (PSPP) project

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ABSTRACT

This article applies the Cobb/Douglas production function to measure synergy effects of a Public Social Private Partnership (PSPP) project. Following a short overview of the literature on Public Private Partnership and in particular on Public Social Private Partnership the microeconomic approach of the Cobb/Douglas production function is presented which can be interpreted in this context as a generalised Nash solution of cooperative games and opens up the possibility of allocating the synergy effects to the partners of a PSPP project. The Cobb/Douglas production function is at first briefly analysed with regard to its assumptions, implications and consequences, and then applied to the PSPP project *Anschub.de* that was initiated by the Bertelsmann Stiftung. The empirical analysis uses real data and is based on a survey on the project cooperation partners whereby the resources and budget contributions spent are investigated. With the help of these budget contributions it is possible to determine relative success variables or synergy effects for the partners.

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1. Problem

Public Social Private Partnership (PSPP) projects are understood here in the way that public institutions, private sector companies, foundations and private individuals jointly implement a project that increases welfare and is socially oriented. It is not directed at making a profit. Supports for kindergartens, schools or universities are prominent examples of this type of project. In general, the costs of PSPP projects can be easily measured through the monetary evaluation of the expended resources. In contrast, there is a problem as to how the social welfare effects of these projects are to be measured, because they do not lead to any directly measurable profits. Private participating partners regard their cooperation in the sense that in this way they are contributing to social stability and solidarity (Wettenhall, 2003). In addition, they help to provide goods or services, such as education or security, which the public partners, or the state, can no longer guarantee by themselves (Hearne, 2009). However, the inclusion of the technical competence of the private sector or of non-government organisations promises an additional synergy effect on the increase of welfare, which is to be developed consciously through cooperation in PSPP projects.

The present article initially discusses some fundamental aspects of PSPP projects in Section 2. It then turns in Section 3 to the methodological procedure of how to record the welfare effects of PSPP projects quantitatively by the Cobb/Douglas production function, and how to assign those synergy effects to the partners that finance the project jointly. The production theoretic approach is then applied in Section 4 to the real project *Anschub.de*. Following a commentary on the findings of this empirical analysis the article concludes in Section 5 with a brief summary.

2. Demarcation and evaluation of PPP and PSPP projects

Public Private Partnerships (PPP) are represented in the literature as an innovative organisation concept, whose innovativeness refers to the organisational form of cooperation between public administration and private industry (Linder, 1999). A PPP can be described in this way as a long-term contractually regulated cooperation between a public authority and private industry to fulfil public tasks, in which the necessary resources are placed in a joint organisation context and existing project risks are spread proportionately (Klijn and Teisman, 2003). PPPs are organised optimally if each participating partner can restrict itself to its core competences because of the cooperation with different types of partners so that the service is provided efficiently (Batan et al., 2004). Cooperation in the PPP can thus lead to efficiency benefits in comparison to a purely public provision of

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the service (Flinders, 2005). The preparation of economic efficiency comparisons for PPP represents a broad field in the literature. For example, static and dynamic investment decision models with regard to the quantitative variables (Audretsch et al., 2002; Link and Scott, 2001) and the benefits analysis for assessing qualitative components (Hodge, 2004; Lasker et al., 2001; Spackman, 2002) are recommended for the economic efficiency study. As further approaches for the economic efficiency analysis of PPP the cost-benefit analysis (Grout, 2003), target costing (Budäus, 2006a, 2006b) or the discounted cash flow method (Grimsey and Lewis, 2004) are suggested, as is a consideration of PPP under the aspect of transaction costs economics (Dudkin and Väililä, 2006, Parker and Hartley, 2003). However, the economic evaluations of PPP that can be found in the literature mainly treat the economic efficiency of PPP in general form with regard to questions of risk allocation and of the fundamental possibility of cost savings, without explicitly quantitative findings being derived (Bing et al., 2005; De Bettignies and Ross, 2004; Hodge, 2004; Ng and Loosemore, 2007; Quiggin, 2005).

Some authors show concrete efficiency benefits by means of case studies. In some cases, costs savings of two-figure percentages are presented for PPP projects. For Australian PPPs in the school-building field, Sendt (2006) determines cost savings between 7 and 23 percent. The Allen Consulting Group (2007) also calculates costs savings for various infrastructure PPPs in Australia and finds values between approximately 11 and 31 percent. Nisar (2007) evaluates three British Private Finance Initiatives (PFIs) which are a particular form of PPPs and represent an alternative to raising funds for public projects. PFIs allow private companies to build, own and operate public buildings like schools and hospitals. The projects were mostly completed on time and at the agreed price. Besides, the public managers were satisfied with the results regarding the design and the quality of the buildings.

Here, the term *efficiency* is understood more broadly than simply the consideration of economic input–output relations. It can also be understood generally as cost and revenue benefits that result as a synergy from the cooperation. Roggencamp (1999) discusses for the first time in a wideranging methodological analysis how far game theory concepts can be used to distribute such synergy effects on the basis of payoffs among the partners of a PPP. While it is true that the concentration of all participating partners of a PPP on their core competences is designated in the literature as a typical characteristic of PPPs (Klijn and Teisman, 2003), such considerations are not included in the substantiation of payoffs or benefit variables, whose recording is assumed in game theoretical economic efficiency studies. They are often limited to a pure cost comparison between the public implementation of a project and its provision in the framework of a PPP.

Up to now, there has not yet been a further economic consideration of the creation of efficiency benefits through the joint service provision by public and private sponsors of a PPP and a theoretical substantiation of these efficiency considerations. For this reason an approach is developed below that makes it possible to describe welfare contributions through PSPP projects methodologically, to analyse the synergy effects that arise and to assign them to the participating partners. Even if the origins of PPP are found in the area of urban development and later on in infrastructure projects (Grimsey and Lewis, 2002), social objectives are moving increasingly into the focus of public–private cooperation (Jütting, 1999). For example, the WHO is increasingly realising international projects in the form of PPPs (Buse and Waxman, 2001). This results in the transition from the Public Private Partnership to the Public Social Private Partnership (PSPP). Here, in contrast to PPP, PSPP projects are characterised by a purely social objective. While PPPs are used to provide and implement

varying projects with greatly differing objectives, PSPPs are restricted to projects of a social nature. In addition, PSPPs represent a guarantee for the realisation of the social objectives in a medium to long term. Analogous to the definition of PPP, in the broader definition for PSPP the two characteristics of social objective and implementation on a partnership basis arise. In the narrow definition the two characteristics are supplemented by the identification of the financing or resource generating instruments of the PSPP (Leonhardt et al., 2007). Budäus sees a similar development of PPP in the area of social objectives and refers to them as third-generation PPPs, or as corporate social responsibility induced PPPs (Budäus, 2006a, 2006b).

3. Recording synergy effects of a PSPP project by the Cobb/Douglas production function

3.1. The assumed production theoretical structure of the performance process of a PSPP project

A multiplicative linking of the resources contributed to a PSPP project by the cooperation or alliance partners is modelled to describe the relationships of cause and effect between the use of resources by the cooperation partners and the resulting synergy effects of a PSPP assignable to them. The selected modelling is based on the concept of the Cobb/Douglas production function, which is to be used here in order to describe the emergence of welfare effects of a PSPP project. The similarity with the so-called generalised Nash approach for cooperative games (Nash, 1953; Fandel, 1979; Bogetoft and Hougaard, 2003) makes it possible at the same time after the emergence of these effects to assign them to the cooperation partners in accordance with the interplay of the balances of power. For this reason, for further analysis the approach will be assumed:

$$w = \prod_{n=1}^N \prod_{z_n=1}^{\bar{z}_n} r_{nz_n}^{a_{nz_n}}. \quad (1)$$

Transferring this production theoretic concept to measuring the synergy of PSPP projects let:

- N be the number of cooperation or alliance partners taking part in the project n , $n=1, \dots, N$;
- r_{nz_n} $z_n = 1, \dots, \bar{z}_n$, be the resources contributed to the project's resource pool by cooperation partner n that expresses its specific contribution to the project;
- a_{nz_n} be constants for which $0 < a_{nz_n} < 1$, $n=1, \dots, N$, $z_n = 1, \dots, \bar{z}_n$, and $\sum_{n=1}^N \sum_{z_n=1}^{\bar{z}_n} a_{nz_n} = 1$ are to apply; the standardisation of the total of exponents to one does not limit the general validity of the approach;
- w be the welfare degree achieved through the PSPP.

The approach (1) shows initially that only those participants n can be considered as cooperation partners that make positive resource contributions to the project, for which therefore $r_{nz_n} > 0$. For $r_{nz_n} = 0$ the cooperation success w would fall to zero in spite of the positive resource contributions of all other cooperation partners. To prevent this, only the party that makes positive resource contributions to the project pool is regarded as indispensable.

The resources r_{nz_n} of cooperation partner n may consist of very different personnel qualifications and materials that are important for the success of the joint PSPP project. Contributed personnel qualifications express here the specific competences of a cooperation partner, and is the reason why particular store is set by its participation in the project. It is exactly for this reason

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